

International Handbooks of Quality-of-Life

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Handbook of Quality of Life and Sustainability

 Springer

International Handbooks of Quality-of-Life

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Handbook of Quality of Life and Sustainability

 Springer

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Introduction: Quality of Life and Sustainability, Socio-spatial, and Multidisciplinary Perspectives

1

Javier Martinez, Claudia Andrea Mikkelsen,
and Rhonda Phillips

This handbook compiles different studies related to quality of life and sustainability considering social, economic, environmental, cultural, and political/governance aspects as well as specific socio-spatial contexts. To achieve this aim and to provide a multidisciplinary perspective, the chapter includes authors from various disciplines, geographical contexts (Global South and North), and from different stages of their academic career.

The varying cultural and socio-spatial contexts of the authors in the selected cases contribute to a first-hand knowledge on quality-of-life realities and sustainability. Methodologically, the authors apply a wide diversity of approaches and tools, which facilitates a unique understanding of the interlinkages between quality of life and sustainability. In this way, the handbook provides a multiplicity of disciplinary, methodological, and scalar perspectives, given works at different

levels such as country, urban–rural areas, and localities or neighborhoods. Some chapters include a policy dimension providing a link to policy and practice.

1.1 Sustainability and Quality of Life: Global Relevance

In 2015, all United Nations member states resolved by 2030 to:

end poverty and hunger everywhere; to combat inequalities within and among countries; to build peaceful, just and inclusive societies; to protect human rights and promote gender equality and the empowerment of women and girls; and to ensure the lasting protection of the planet and its natural resources. We resolve also to create conditions for sustainable, inclusive and sustained economic growth, shared prosperity and decent work for all, taking into account different levels of national development and capacities (United Nations 2015, p. 3)

Members states are also committed:

“to achieving sustainable development in its three dimensions—economic, social and environmental—in a balanced and integrated manner” and they “recognize that sustainable urban development and management are crucial to the quality of life of our people” (United Nations 2015, p. 9).

Transforming our World, the 2030 Agenda for Sustainable Development, adopted by all United Nations Member States in 2015 reflects the

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societal global relevance of the topics which are central in this handbook: sustainability and quality of life and incorporating space as a fundamental element, in particular in its observable category of territory (Schwarz and Streule 2016). In the next section, we elaborate on conceptual definitions.

1.2 Sustainability and Quality of Life: Theoretical Perspectives

The concepts of sustainability and quality of life share similar characteristics as both are multidimensional, multidisciplinary, multiscale, and offer complex and nuanced views on human progress and well-being. In this section, we untangle the conceptual specificities of both terminologies.

The increasing interest in sustainability had several milestones in the last century coinciding with the environmental crisis (e.g., 1970s global oil crisis and concerns over ozone layer depletion), the consequences of industrial and agricultural modes of production, the effects on food and health of the global population as well as key publications and global environmental movements [see, e.g.: *The Limits of Growth* (Meadows and Club of Rome 1972)]. Most significantly in the late 1980s, The World Commission on Environment and Development published *Our Common Future, The Brundtland Report* (World Commission on Environment and Development and Brundtland Report 1987). In 1992, the United Nations Conference on Environment and Development (UNCED) Earth Summit in Rio de Janeiro, Brazil helped foster more interest in sustainable development. Thanks to this global attention, sustainable development became the new global development tenet.

Several documents were approved toward these commitments such as Agenda 21, an action plan of the United Nations related to sustainable development (United Nations 1992); the United Nations Framework Convention on Climate Change (UNFCCC) and related follow-up conferences such as Habitat I, II, and III and the

World Urban Forums. These global sustainability meetings and resulting agendas are relevant as they provide platforms for dialogue and exchange of ideas toward sustainable urban futures (Holden et al. 2008). In Habitat III, the United Nations Conference on Housing and Sustainable Urban Development also incorporates concern of sustainable urban development and quality of life in the Urban Agenda (United Nations Human Settlements Programme 2018).

Sustainability is also associated with intergenerational equity. The Brundtland Commission Report (World Commission on Environment and Development and Brundtland 1987) defines sustainable development as: “[a] development that meets the needs of the present without compromising the ability of future generations to meet their own needs.” (1987, p. 43)

After this report, sustainable development gained not only academic interest but also the attention of a wider and diverse public audience. Currently, there is a common understanding that the guiding principle of sustainability is the recognition of equally important, mutually dependent and interrelated social, environmental, and economic dimensions.

Some authors may give differential relevance to each of the sustainability dimensions or include other ones such as governance and participation.¹ Martínez Castillo and Martínez Chaves (2016) identify seven sustainability dimensions and goals:

- *Environmental*: To preserve and regenerate the complexity and productivity of ecosystems, natural cycles, and biodiversity.
- *Economic*: To achieve an efficient and equitable economic development, for which eco-

¹ It is worth noting that in the preamble of the 2030 Agenda Sustainable Development, there is a reference to “People,” “Planet,” “Prosperity,” “Peace,” and “Partnership.” The first three can clearly be associated to the social, environmental, and economic dimensions of sustainability and the last two concepts can be related to governance, inclusive societies and global solidarity.

conomic activity must be redefined according to material and immaterial needs.

- *Social*: To achieve equitable access to environmental goods, both intragenerational and intergenerational, between genders, and between cultures.
- *Political*: To enhance the direct participation of the population in decision-making, in a decentralized and democratic manner, and in the management of sociocultural and environmental assets.
- *Cultural*: To rethink the evolution of society toward sustainable production and consumption styles, which implies a change in the cultural patterns of society–nature relationship.
- *Educational*: To generate a process of awareness and social action on social and environmental problems and their alternative solutions, in a practical and objective way, without ideological ties.
- *Geographical*: To guarantee that the productive activities of regional economies promote the quality of life of the population and protect their natural and cultural heritage.

Given that sustainability is a multidimensional concept, it does not make sense to refer to “environmental” or “economic sustainability” (the latter also defined as “weak sustainability”), but rather of the sustainability of socio-ecosystems as a whole (also called “strong sustainability”) (Galván-Miyoshi et al. 2008). A strong sustainability stance recognizes the need to reduce resource consumption, carbon concentration, and the implementation of a major transition and change (Holden et al. 2008).

Recently, some authors argue that economic growth is and cannot be environmentally sustainable and that development and growth cannot be sustainable. In exchange, they propose the concept of “degrowth” attached to a movement that involves grassroots innovations (e.g., work sharing, urban gardening, and community currency)

(D’Alisa et al. 2015) and moving away from the idea that growth is continuous. The tensions and conflicts across the three dimensions of sustainability are made visible in what Campbell (2016) calls “the Planners Triangle” where development enters into conflict with social justice (property conflict), which in turn enters into conflict with environmental protection (development conflict), which conflicts with economic development (resource conflict).

To monitor the level of sustainability of countries and cities several initiatives and frameworks using indicators have taken place at the city level. Some of them make use of the notion of the “sustainable city” (Holden 2017).

The sustainable city values the best parts of what have traditionally been considered a natural or rural lifestyle—clean air and water, fresh food, daily connections to local context and territory, plenty of time to relax and enjoy the simple pleasures of life—with none of the social and economic limitations also traditionally associated with rural life. (Holden 2017, p. 22)

One of the most recognized indicators initiatives at the city level was Sustainable Seattle (Holden 2006). Another initiative for comparisons at country level was the Sustainable Society Index, with a framework that includes human well-being, environmental well-being, and economic well-being (van de Kerk 2014).

In this chapter, we provide some of the most common definitions of sustainability. However, since there is not a collective understanding on sustainability and its dimensions, each chapter in this handbook provides its own view and theoretical approximation, in particular regarding how these dimensions relate to the quality of life.

1.3 Quality of Life

Similarly to sustainability, quality of life is understood as the combination of multiple domains (like those dimensions of sustainability) but with usually more precise definitions such as housing,

health, education, income, crime, leisure, culture, or access to green areas. Furthermore, quality-of-life literature distinguishes not only the objective but also the subjective quality of life recognizing satisfaction that people have with those and other domains. It is probably these characteristics of quality of life that facilitate the interplay between “scientific” knowledge and measurement tools (e.g., indicators) and specific policy goals and interventions.

Another similarity to the concept of sustainability is that quality of life is prone to interpretation from different disciplines. Psychologists, economists, geographers, sociologists, and planners have devoted much attention to issues of quality of life and associated concepts of well-being and happiness. Some express the notion of quality of life as a large conceptual umbrella under which terms such as happiness, well-being, subjective well-being, and life satisfaction interact (Mikkelsen et al. 2017; Phillips and Wong 2017). Each of these terms synthesizes specific traditions of discussion and theoretical reflection and may include broad or narrow conceptions within their definitions.

Quality of life reflects the well-being of individuals and societies, whether from the perspective of the satisfaction of individuals with particular life domains (Lee et al. 2002; Rapley 2003; Sirgy et al. 2000, 2010) or comprehensive quality-of-life scales (Cummins et al. 1997; Kelley-Gillespie 2009; Matarrita-Cascante 2010).

Tonón (2010) identifies the studies of Arthur Cecil Pigou, an English economist, as one of the first to probe, during the 1930s, the notion of what can be understood today as quality of life, as he was interested in the quantification of the services or social costs of government decisions from the welfare economy approach. Smith (1973) studied the geography of social well-being in the city of Tampa developing an index to measure social well-being at the intracity level. He identified 47 indicators grouped into six criteria: economic status, environment, health, education, social disorganization, and participation and equality. The work of Campbell, Converse, and Rodgers in the 1970s and from the University of Michigan, left a mark on the genesis of quality-of-life studies by

inquiring about the perceptions, evaluations, and levels of satisfaction that Americans evidenced about personal life (Campbell et al. 1976).

The arrival of the 1990s marked a milestone in this historical journey, when the International Society for Quality-of-Life Studies (ISQOLS) was founded. With it, on the one hand, it was possible to incentivize and gather quality-of-life studies from different parts of the world, promoting interdisciplinary research, while also, on the other hand, it was possible to outline a favorable framework to coincide in a multidimensional and at the same time a synthetic definition of the quality-of-life concept (Tonón 2008).

No agreement exists as to whether quality of life should be limited to objective or subjective measures. Some studies place emphasis on the concept of objective quality of life and the observable characteristics including environment and/or personal characteristics, relying on objective indicators derived from secondary data (Li and Weng 2007; Apparicio et al. 2008). Other studies place emphasis on the concept of subjective quality of life and residents' perception and satisfaction with urban living conditions and their own lives, relying on surveys (Sirgy et al. 2008; Khaef and Zebardast 2016) or comprehensive analysis of components measuring well-being in the human experience (Diener et al. 2010). While much work focuses on individual quality of life, it can also hold relevance for overall community quality-of-life measurement, this is encouraging more inquiry into the collective level quality of life.

Objective approaches for measuring quality of life have high measurement reliability but they have been critiqued because of their low validity in assessing human well-being (Pacione 1982; Foo 2000). Moreover, it is reported that objective indicators have the disadvantage of underreporting, for example, crime, or overreporting issues such as income (Das 2008). Those advocating the use of subjective approaches argue that asking people their perceptions of quality of life is a valid and necessary data collection technique (Bramston et al. 2002; Ibrahim and Chung 2003; McCrea et al. 2005; Lee 2008). Some authors argue that

subjective methods are preferred over objective methods, particularly for planning and policy purposes, because they provide more valuable feedback and allow people to highlight their dissatisfaction with existing conditions (Ibrahim and Chung 2003; Veenhoven 2008). Subjective indicators offer valuable information when tackling community-based issues through a bottom-up approach.

Comprehensive approaches include both objective and subjective indicators, fostering a deeper understanding of quality of life (Cummins et al. 1997; Cummins 2000) as societal well-being and individual well-being are “inextricably linked” (Abbott and Wallace 2012). Some studies combine objective and subjective quality of life to identify four quality of life states namely well-being, deprivation, adaptation, and dissonance (Craglia et al. 2004; Tesfazghi et al. 2010) and use mixed-methods to explain the mismatch between the two (Berhe et al. 2014; Martínez et al. 2016). Furthermore, quality of life as a reflection of values existing in a community and gauging priorities and qualities of a community helps guide future outcomes (Phillips and Pittman 2009).

1.4 The Interdependence of Sustainability and Quality of Life

Quality of life and sustainability are interdependent. This is illustrated by the different paths that people and countries take to recognize the role of sustainability and the environment in their lives. In the Global South environmental dimensions in studies of quality of life seem to have emerged in the 1990s (Celemin et al. 2015) later than in the Global North. This could be related to the issue that countries in the Global South probably first strive for a better quality of life and economic development and only when they are successful the challenge of sustainability emerges (for example, a recognition of reduction of CO₂ emissions). In turn, qualitative changes in quality of life and happiness are required to achieve sustainable development beyond economic parameters

(Guimarães 2003). There could also be a tension between individual behavior toward improving quality of life and sustainability goals at a larger scale.

1.5 The Assessment of Quality of Life and Sustainability: Methods and Tools

The relevance of the assessment of quality of life and sustainability is also reflected in the development of education curricula and the increase in related publications (Tonón 2020). Between 2005 and 2014, UNESCO lead the United Nations Decade of Education for Sustainable Development and authors developed standardized measures to test students’ knowledge, attitudes and behaviors related to sustainable development (Michalos et al. 2012). In the same decade, online courses were developed on the sustainability assessment of cities (Kristin McIlhenney and Holden 2011). More recently, Massive Online Courses (MOOCs) on Sustainable Urban Development became available for free (see, e.g., MOOC offered by the Amsterdam Institute for Advanced Metropolitan Solutions (AMS)).²

Quality of life and sustainability are currently seen as alternative measures of economic progress beyond Gross Domestic Product (GDP). Quality of life and sustainability assessments are being carried out at global, national, and local levels. Some examples include the Organization for Economic Cooperation and Development (OECD) “Better Life Index” (OECD 2020) at the global level. At the national level, examples are found in the “Australian Centre on Quality of Life” (Australian Centre on Quality of Life 2017), the Mexican “Sustainable Cities Index” (Banco Nacional de México 2018) or the Italian BES “Equitable and Sustainable Wellbeing” (ISTAT

² <https://online-learning.tudelft.nl/courses/sustainable-urban-development-discover-advanced-metropolitan-solutions/>

2019). At local levels, cities like Bristol (UK)³ also implemented the systematic monitoring of quality-of-life conditions and made available the surveys as open data. Bottom-up initiatives at community levels are also emerging and in particular in relation to the concept of community well-being (Phillips and Wong 2017).

Geographic Information Systems (GIS) are commonly used to describe, monitor, evaluate, and explain spatial patterns and processes of sustainable development and quality of life (Maarseveen et al. 2019; Pfeffer et al. 2015). Several chapters in this book illustrate the use of GIS as a tool that can be used to inform policy.

In this handbook, some chapters focus on specific aspects of quality of life (housing—health) as well as socio-spatial determinants of quality of life (slums) and the impact that some phenomena have on the quality of life and well-being of communities (e.g., climate change, evictions, and rural shrinkage). The geographic variation of chapters in the book shows that both in the Global North and in the South people's lives are affected by similar problems, both created by unsustainable forms of development (economic-driven urban development patterns) or by their consequences on climate change. However, many of the conceptualizations and empirical approaches may be relevant and applicable to other contexts. We believe that the case studies are a starting point to identify perspectives that can inform the Global South and North in myriad ways.

1.6 Innovations

This handbook also contributes to new concepts such as “actionable social sustainability” or specific interventions that are informed by notions of development beyond GDP and growth. Recent urban paradigms such as smart cities or eco cities claim to be aimed at improving quality of life. However, it is unclear the extent to which they pursue progress to life improvements for all, or they are moved by a technological push and urban

development for an affluent elite as it is already shown in some urban visions in the Global South (Watson 2014). There is also a risk that these new paradigms could trivialize or commodify the concepts of quality of life and sustainability and devoid them of their original meaning.

Transformative actions toward sustainable futures can only be successful if we recognize the context and structural conditions that shape lives. Inequality emerges in several chapters as an element that hinders sustainable development. It is well established that inequality affects several domains of life (Wilkinson and Pickett 2009) and health in particular (Marmot 2015). Bottom-up struggles and resistances for securing a better quality of life are present in this handbook such as the stop evictions movement as well as institutional planning tools for improving quality-of-life conditions such as tenure responsive land-use planning.

The multidisciplinary and multidimensional approach of quality of life and sustainability open the possibility of innovative solutions that would have been impossible in isolated disciplinary silos. Take the case, for example, of social farming projects. Some of the chapters in this book concentrate on specific needs in life: water, land, housing, health, environment, and transport/mobility. However, they do not bring in siloed perspectives as they are aware of the multidimensionality implied in quality of life and sustainability. Quality of life may affect population groups in specific ways, for those interested in this we suggest exploring the handbook series by Springer, articles in the ISQOLS journal, *Applied Research in Quality of Life*, or if interested in the collective level, see the Springer journal, the *International Journal of Community Wellbeing*.

The chapters are grouped into three main sections: foundations and concepts; tools, techniques, and applications; and innovations. The combination of sustainability and quality-of-life concepts and perspectives help to appreciate and unravel the multifaceted and interconnected nature of human, urban, rural, and spatial development. The following sections provide discussion and overview of the chapters within each part.

³ <https://www.bristol.gov.uk/statistics-census-information/the-quality-of-life-in-bristol>

1.7 Part I: Foundations and Concepts (Theory, Conceptions of Sustainability and Quality of Life, Socio-spatial Aspects)

The first part of the handbook includes a selection of seven chapters. Chapter 2, “Tenure Responsive Land-Use Planning as a Tool for Improving Quality of Life: The Perspective Of Sub-Saharan Africa” by Uchendu Eugene Chigbu, identifies Sustainable Development Goals (SDGs) that are land-based and elaborates on the concept of land use planning which is tenure responsive. Contextualized in the narratives about quality of life by African experts it provides a framework on how a “Tenure Responsive Land-Use Planning” can play a role in achieving the SDGs. They present the human-to-land relationship embedded in land tenure within the socio-spatial environment as the path for quality of life to emerge. This is of particular relevance as lack of secure tenure is one of the challenges not only in the quality of life of Sub-Saharan communities but elsewhere across the world as well (see, e.g., Chap. 22 for a case in Europe or Chap. 15 for a case in Asia).

Health, as one of the key domains in quality of life, can be influenced by urban design. Ester Higuera Garcia, Emilia Román, and José Fariña develop criteria to reduce environmental health impacts on the elderly through urban design. In Chap. 3, “Guidelines for Healthier Public Spaces for the Elderly Population: Recommendations in the Spanish Context,” based on the concept of the healthy city and international guidelines, the authors indicate the characteristics that urban streets and other public spaces must have to be safer and walkable. They consolidate urban design strategies in three main categories: *safe and walkable neighborhoods*; *nature-based solutions and more green areas*; and *intergenerational coexistence public areas*. The healthy city relates to several Sustainable Development Goals such as SDG 3, “Health and well-being” and 11, “Sustainable Cities and Communities.”

Chapter 4, “A Multi-Perspective Discourse on the Sustainability of Water and Sanitation Service

Co-Production in Global South Cities,” by Giuseppe Faldi, Federica Natalia Rosati, Luisa Moretto, and Jacques Teller, develops a comprehensive understanding of the concept of sustainability when applied to the analysis of water and sanitation co-production. The study combines different theoretical perspectives and empirical evidence from four city cases (Hanoi, Addis Ababa, Cochabamba, and Dar es Salaam), with the purpose of framing a series of conceptual principles and criteria relevant for assessing the sustainability of water and sanitation service co-production in Global South cities.

The 2030 Agenda for Sustainable Development recognizes that democracy, good governance and the rule of law are key for sustainable development. In Chap. 5, “Rwanda: Planned Reconstruction for Social Quality” Pamela Abbott and Roger Sapsford critically look at Rwanda’s reconstruction as an example of social engineering conducted to enhance quality of life. It demonstrates that improving living conditions for a population is not something individuals can do alone but also shows the tension between top-down state control and the possibility of having pluralistic voices.

In Chap. 6 Damián Molgaray provides “A Theoretical Reflection Based on Children’s Opinions about their Safety to Rethink Different Dimensions of Sustainability in Cities.” This chapter makes use of qualitative methods such as drawings to elicit the safety-related situations and sensations experienced by children in relation to a cemetery in their neighborhood. In a theoretical reflection, the author investigates the (violent) historical memory related to the cemetery and how the figure of the cemetery itself may contribute to the debate on the scope of the concept of sustainability from three dimensions: spatial, symbolic, and political. It also reflects on the obstacles that a climate of fear and uncertainty can imply for sustainable urban development as proposed by the Sustainable Developing Goals aiming at the eradication of violence and the promotion of social cohesion.

In Chap. 7, Andrea Hörtl, Tania Berger, Romana Bates, Meseret Kassie Desta, Ainsley Lewis, Daniel Semunugus, and Hussain

Indorewala elaborate on the nexus between the SDGs and the quality of life drawn from their experience in an education consortium of European, Indian, and Ethiopian Universities. In “The Nexus of the UN Sustainable Development Goals and their Link to Quality of Life: A Case of Urbanization in Ethiopia and India,” they show how relevant domains of quality of life affecting marginalized groups (e.g., housing and informality) can be incorporated in the curricula of higher education. Strategic global objectives such as the SDGs are linked to local realities through education.

In Chap. 8, “Multiple Perspectives on the Meaning and Effects of Resiliency,” Andrew Kim, Soomin Kim and Stephen Buckman assert that quality of life can be ensured by physical safety derived from proper resilience and relative sustainability based on grassroots and communities. They illustrate their chapter with examples derived from catastrophes affecting the quality of life of communities such as Hurricane Katrina and the Fukushima Daiichi Nuclear Disaster.

1.8 Part II: Tools, Techniques, and Applications (Case Studies and Methodologies)

The second part of the handbook consists of a selection of 13 chapters covering case studies in the Global North and South. In Chap. 9, Patrick Guyer, Caroline van Koot – Hodges and Boudewijn Weijermars present the work entitled, “Are Expanded Resilience Capacities Associated with Better Quality-Of-Life Outcomes? Evidence from Poor Households Grappling with Climate Change in Bangladesh, Chad, India and Nepal.” In three comparative case studies, the chapter explores whether poor households with greater resilience capacities also enjoy a higher quality of life. One of the contributions of the chapter is that it demonstrates that expanded resilience capacities and in particular transformational resilience capacities are associated with a better quality of life.

The next chapter investigates a case in Mexico at an intra-urban level. Chapter 10, “Sustainable

Latin American Cities? Evaluation of the Sustainability of the City of Puebla (Mexico) Using Indicators” by Laura Zulaica, Emilia Lara Galindo and Ángel David Flores Domínguez, makes use of an index of sustainability. The purpose of the index is to assess the level of sustainability at sub-city levels.

Robin Goodman, Annette Kroen, and Melanie Davern present a case in Australia where they illustrate the interlinkages between main concepts of this handbook and mobility. In Chap. 11, “Quality of life, Sustainability, and Transport: The Case of Melbourne, Australia,” they show how better accessibility and more diverse forms of transport would not only contribute to resident’s subjective well-being but also improve sustainability. For example, gas emissions could be decreased with the use of more diverse, sustainable modes of transportation. This is of particular relevance as many cities in the world are structured around motorized transport and cars.

Another important aspect of sustainability that affects the quality of life of vulnerable residents is territorial equity. By making use of a geographic information system, Chap. 12, “Territorial Equity Measurement in Buenos Aires Province (Argentina)” by Alejandra Auer; Claudia Mikkelsen and Sofia Ares, map out variations of quality of life within the province of Buenos Aires. The index includes quality-of-life dimensions such as Education, Communication-Connectivity, Water and Health, Dwelling, Economic Activity and Employment, and Environment. These types of methods with geo-spatial perspectives are relevant as they enable the monitoring of one of the SDG goals (Goal 10) aiming at reducing inequality within and among countries.

In Chap. 13, “Protecting Quality of Life: Protected Needs as a Point of Reference for Perceived Ethical Obligation” Rico Defila and Antonietta Di Giulio theoretically situate their case in the salutogenic definition of the “good life” of protected needs. The authors posit that quality of life for all people is the ultimate goal of sustainable development. The main question of the case is to what extent the theoretically ethical obligation of providing the conditions crucial for achieving well-being for the present and future

generations coincides with peoples' perceptions? By surveying a representative sample of Switzerland, the authors empirically show that ethical obligation of warranting need satisfaction for present and future generations corresponds to perceptions of obligation.

Guillermo Ángel Velázquez and Juan Pablo Celemin map the spatial variation of socioeconomic and environmental dimensions of quality of life in Chap. 14, "Geography and Quality of Life in Argentine Regions: Socioeconomic and Environmental Inequalities." By making use of objective and subjective measures and by combining several data sources in a geographic information system, they are able to expose the unequal quality-of-life conditions between Argentine regions.

In Chap. 15, "A City for Whom? Marginalization and The Production of Space in Contemporary Bangalore" Chloe Pottinger-Glass and Karin Pfeffer focus on working on the rapid changes that have taken place in cities, on the urbanization process and urban regulation through a particular case, and on the removal of slums in Bangalore, India. Critically, they explore central studies, and categories such as the right to the city, subordinate urbanism, and social marginalization. Using a qualitative methodology, and applying techniques such as semi-structured interviews, discourse analysis, and spatial mapping, the authors analyze urban change.

"Risk Management of Groundwater Pollution, Sustainability and Quality of Life: The Gap Between Policy and Practice in an Intermediate City of the Global South," by Agustina Barilari, Gabriela Calderón, and Hector Massone provide an interesting reflection on the right to safe water seen from sustainability and quality of life. In Chap. 16, they aim to analyze the relationship between sustainability and quality of life from the perspective of the risk management of groundwater contamination by comparing policies with practices, that is, the gap between what should be and what really is. In this case, the focus is placed on the city of Mar del Plata, Argentina, applying a qualitative nature methodology, where the analysis of documents and the study and evaluation of interviews are central.

Deden Rukmana and Na'Taki Osborne Jelks focuses attention in Chap. 17 "Exploring the Association between Health Disparities and Neighborhood Characteristics: The Case of Diabetes Mortality in DeKalb and Fulton Counties, Georgia" on health dimension linked to the sustainability and quality of life of subjects, specifically attending to the situation of chronic non-contagious diseases. As in other works, it recovers the neighborhood scale and proposes to analyze diabetes mortality by race and to identify socioeconomic factors of neighborhoods associated with the distribution of diabetes mortality in two United States counties, DeKalb and Fulton Counties in the State of Georgia from 2013 to 2017. The author uses information from the censuses analyzed in the GIS environment.

In "Quality of Life in Relation to Urban Areas and Sustainability. Application Case: City of La Plata, Buenos Aires, Argentina", Chap. 18, Carlos Discoli, Irene Martini, and Dante Barbero contribute to the conceptual and methodological debate of the collective dimension of quality of life, sustainability, and urban space, reflecting specifically on La Plata, capital of the province of Buenos Aires, in Argentina. The authors refer to the use of a comprehensive methodology with the use of Geographic Information Systems.

In Chap. 19, "Social Sustainability, Neighbourhood Cohesion and Quality of Life: A Tale of Two Suburbs in Calgary" Sasha Tsenkova and Karim Youssef bring us closer to the city of Calgary in Canada. In this case, the neighborhood appears as a scale of analysis, where they explore social sustainability and quality of life. In a context of population growth in suburban areas, the emphasis is on the smart growth of cities. To do this, they evaluate the neighborhood cohesion focusing on four dimensions: psychological sense of the community, attachment to the place, social interaction of the residents, as well as their correlations with the uniqueness of the neighborhood.

Kimberly E. Zarecor, David J. Peters, and Sara Hamideh in Chap. 20, "Rural Smart Shrinkage and Perceptions of Quality of Life in the American Midwest," propose a reflection on the contraction of the rural population, contributing to

the debate on smart contraction in a context where rural depopulation must, in general, be understood as a fact. To do this, they bring us closer to the state of Iowa, where for 25 years they have studied small rural towns. Methodologically, they address 98 small towns in Iowa and then focus on seven of them to work on the perception of the quality of life of their inhabitants.

In “Ecosystem Services of Ecological Infrastructure and Quality of Life: Contributions to the Analysis of the Sustainability of the Urban and Peri-urban Area of Mar del Plata, Argentina,” Chap. 21, Camila Magalí Mujica and Clara María Karis bring forward a debate on ecosystem services. This relates to the presence of green spaces in cities, incorporating the concept of resilience addressed in the theoretical section, and quality of life, in this case in a mid-sized Argentine city such as Mar del Plata. They concentrate on analyzing the temperature regulation ecosystem service provided by green areas. On account of this, they use a quantitative methodology incorporating a series of objective indicators that contribute to the study of Urban Ecosystem Services (UES).

1.9 Part III: Innovations

In the third and last part of the book, six chapters are included which stand out for their innovation in the methodologies they apply, their conceptual debates, or their proposals for the future. Chapters include discussions contributing to studies of quality of life and sustainability in a spatial sense.

The first of this section is Chap. 22, by Eva Álvarez de Andrés and is entitled “An Innovative Practice of Social Sustainability: The Fight for a New Housing Legal Framework in Spain.” It is a critical text that places us in Spain and again, as in other chapters, refers to the right to housing as a dimension of quality of life. It describes the types of resistance that the subjects applied in Spain in the context of crisis, creating the social movement called “Plataforma de Afectados por la Hipoteca” (PAH)—“Platform of (people) Affected by Mortgage” in 2009. It shows how access to housing is

directly related to other dimensions of quality of life such as physical and emotional well-being or social welfare, and the struggle to improve living conditions. The methodology meant a review of the literature on housing policies in Spain since 1950. The PAH has been examined through participation in assemblies and the analysis of social networks. The author applied interviews and analyses of writings in the press.

In Chap. 23, “Cities Rethinking Smart-Oriented Pathways for Urban Sustainability” Mauro Romanelli provides an interpretative framework to identify the development trajectories that are being promoted in some cities. To do so, he focuses on reflecting on sustainable cities as smart cities. The author reviews the cases of Berlin, Paris, Vienna, and Florence. Although smart cities seek sustainability and common welfare, the author expresses the need to think about the dangers and risks that arise from the use of technology, which would constitute the dark side of urban development, for example, from the excessive intrusion of public surveillance.

In Chap. 24, “Public Useable Space as a Catalyst for Quality-of-Life Improvement: The Case of Cape Town’s Social Farming Projects,” we arrive at Cape Town in South Africa. This chapter is authored by Astrid Ley, Kurt Ackermann, Silvia Beretta, Sigrid Busch, Jan Dieterle, Manal M.F. El-Shahat, Jilan Hosni, Franziska Laue, Yassine Moustanjidi, and Veronika Stützel. The objective is to identify the key characteristics that could influence the planning and formulation of policies to improve quality of life through useable public space. For this, they focus on unraveling the role of urban agriculture as an agent to activate public space and public life in the context of the Global South. The methodology used was to examine the notions of quality of life and public space in the academic discourse as well as through policy documents and gather qualitative data on these dimensions of quality of life: public space and placemaking.

In Chap. 25, “The Potentials and Risks of Wadis in Cities in the Gulf Region” Wolfgang Scholz, Mathias Kaiser, and Matthias Pallasch

refer to the importance of reusing and caring for water in the context of scarcity of such an important good, especially in environments of extreme aridity such as that of the Gulf cities in the Middle East. The authors refer to the importance of the reuse and recycling of wadis, that is, beds of rivers that remain dry for a long time. These can be onerous spaces although with great potential, for example, the ability to green the city. The main objective in Muscat, Oman, was to identify resident's needs, to analyze spatial potentials and to develop technical approaches for a transformation of wadis into green urban spaces for recreational activities, including GIS analysis, expert interviews, surveys among residents, exploration of sites, and workshops.

As stated in Chap. 26, "The Crossroads on the Path to Sustainability while Aspiring for a Better Quality of Life: A Case of Delhi," by Bibhu Kalyan Nayak and Pushkala Rajan, the diverse contexts have made "sustainability" a complex problem. In a globalized world, defining sustainability does not essentially follow a standard process. This job is an effort to understand such complexities through the case of Delhi, of India. In this nation, the percentage of urban population is rapidly increasing, along with pollution, making indoor, and outdoor environmental quality more at risk. The authors present us with the challenge of thinking about environmental quality in buildings where the inhabitants of the cities reside and work daily.

Carlos Zeballos in Chap. 27, "Urban Linkages: A Methodological Framework for Improving Resilience in Peri-urban Areas. The Case of Arequipa, Peru," transports us to Arequipa in Peru, where he proposes a methodological framework related to resilience in peri-urban spaces. The author connects to previous chapters through the proposal to form an integrated model to improve resilience in suburban areas prone to various risks based on the participation of three fundamental actors: planners, population, and political authorities.

Through the presentation of this handbook and its 27 chapters, we are hopeful that more discussion, research, and connection between quality of

life and sustainability will occur in spatial and multidisciplinary contexts. As challenges continue to emerge, there will be much interest in exploring the approaches presented in the handbook, as well as fostering a deeper understanding of what can work in our communities and regions. We encourage readers to continue to explore these important interrelationships as quality of life will be impacted by work in these areas.

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Part I

Foundations and Concepts (Theory, Conceptions of Sustainability and Quality of Life, Socio-Spatial Aspects)



Tenure Responsive Land-Use Planning as a Tool for Improving Quality of Life: The Perspective of Sub-Saharan Africa

2

Uchendu Eugene Chigbu

2.1 Introduction

Land (including other natural resources) is contentious in multifaceted ways. It is a crucial element in economic production and capital investments. It is also a tool for human settlement development because it provides space (and place) for community building. Globally, it is a crucial part of socioeconomic development at global, national, and local levels. In sub-Saharan Africa (SSA), land is the critical factor subsistence living and identity of people (Dube 2008). Nonetheless, forced evictions from the use of land—that violates civil, political rights and socio-economic rights of people—are commonplace in the SSA region. These incidences of forced evictions often violate the rights of people to farm, use of forest resources, housing, and the enjoyment of leisure, and the general use of land with a peace of mind. It impedes access to resources which is a crucial entry point to attaining sustainability of land and natural resources based livelihood. A lack of access to land (and other natural resources lead to inequality by excluding people from enjoying the opportunities “to use their real properties through unfair compensation or forced sale that leads to the concentration of land resources into the hands of rich people” (Uwayezu and de Vries 2018,

p. 1). Further implications are that it leads to a situation whereby the socio-spatial order of human settlements is reconfigured on property bases—that is, those with secure rights to land enjoy better living conditions than those who lack access or are insecure. Forced evictions (especially when done in city slum) produce “differential effects on various social groups” and the cities’ socio-spatial order, thereby boosting the quality of life (QOL) of propertied citizens and negatively affecting those of the evictees (Patel 2016, p. 29). However, these scenarios occur because of a lack of land-use planning that is capable of securing people’s rights on land in many African countries. Attempts to mitigate these situations of insecurity are needed to promote spatial justice, which is a crucial factor for developing balanced socio-spatial orderings and development.

The ownership and use of land—including exercising rights and privileges over land—are essential dimensions of wealth creation (Chigbu et al. 2016). These are what make land—through its ownership, mode of holding, use of resources, the exercise of rights, and access to privileges from its use—directly linked to people’s quality of life. This is because the planning of land uses and improvements in the manner in which people own (and exercise rights over) land are pertinent for achieving the global Sustainable Development Goals. To improve the quality of life of people anywhere, land-uses must be planned to deliver pro-poor outcomes. However, this is only

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possible if the ownership and exercise of rights over land are protected from unlawful acts that could impede peoples' rights to enjoy the use of land. Land-use planning (LUP) and land tenure security (LTS) are crucial elements in improving the QOL of people from a land management context. LTS is a condition commonly associated with land-use and ownership. LUP is a process often applied to (re)set socioeconomic and environmental conditions to enable sustainable use of land. Together, LTS and LUP are powerful development tools because they influence the QOL of land users (and owners) and those of communities in general. They are often implemented in isolation from each other in many developing countries. However, studies show that where the two have been combined and applied in selected countries, they have led to the alleviation of poverty or the improvement of food security (Chigbu et al. 2016).

2.2 The Approach to the Study

The focus of this chapter is on the application of tenure responsive land-use planning (TR-LUP) for QOL in SSA. The following sections of the chapter begin by presenting the narratives about QOL used to draw the generic meanings of QOL used in this chapter. Then it defines QOL and TR-LUP and establishes their relationships with other associated concepts. Then it provides a picture of the quantum of land challenges in SSA that affects the QOL negatively. It then describes what makes TR-LUP capable of generating QOL. Then it objectifies QOL in the context of the global Sustainable Development Goals (SDGs). Furthermore, it identifies TR-LUP activities and how it can catalyse QOL improvements in SSA; and then, concludes. To conceptually deconstruct QOL, and then frame a TR-LUP approach to improving QOL in SSA, it is necessary to understand the land management perspective of QOL. This chapter approaches this by documenting an empirical perception of SSA people concerning what QOL means to them in the land context. It uses the narratives of QOL as told in SSA own voices (collected using direct interviews and

e-Focus Group Discussions or e-FGD) to provide the insights needed to understand the issues of QOL in SSA. Scholars who have used e-FGD include Chigbu (2019a–c), who used it for data collection (particularly for scenario sampling). “An e-FGD, unlike a traditional FGD, involves the use of information and communication technologies to gather people from similar backgrounds or experiences to discuss a particular topic of interest” (Chigbu 2019a, p. 43). The use of narratives to address the question of what QOL means in SSA context was necessary because “studies that directly involve investigations into societal concerns or social challenges” necessitate the use of “methodological approaches dominated by verbal narratives” (Chigbu 2019d, p. 1).

2.3 Understanding QOL by Listening to Voices of SSA People

Evidence from selected narratives on the issue QOL (from across SSA countries as is discernible from the following responses) shows the length and breadth of the meanings and perceptions of QOL in the SSA region (Table 2.1).

Table 2.1 is a list of allusions about QOL from across SSA. From these allusions, it is possible to decipher the meaning of QOL in the context of SSA, as well as the tone of the ongoing discourses about QOL in the region. They show that QOL is a multi-dimensional concept and reality. It has its philosophical, ideological, spiritual, religious, economic, political, environmental, and cultural aspects (among many other dimensions). These QOL reflections also show that it is both a realistic and perceptual conditions of living that cuts across personal, community (group), gender, race, and national levels. The QOL reflections also show that QOL can be based on self-targets (as in the case of individuals, households, and communities) or imposed targets (as is in the case of government policies) for fulfilling the primary or secondary needs of people.

Table 2.1 Allusions of country-contexts of quality of life from selected countries in sub-Saharan Africa

Countries of e-discussants	Allusion of Quality of Life (QOL) in country context
Uganda	“Look at my worn-out shoes. . . Look at my dilapidated house. . . Look at my little child who is at home during school hours. . . Look at our irresponsible government. Look at my sick, elderly mother who is at home because I cannot afford to take her to the hospital. . . That is what quality of life looks like here”
Nigeria	“Look at the economy of Nigeria... A lot of our people are hurriedly emigrating in search of refuge in Europe and the United States. That says loads about the quality of life. Ours is scary while theirs is inviting”
Namibia	“The health status of people in relative and real terms is their quality of life.. It has its psychological, physiological, environmental, and socioeconomic dimensions. It is also an issue of identity, heritage, and culture. When any or some or all of these dimensions are healthy, then it reflects the quality of life in general, specific or partial ways. . . being healthy means that they are as expected by the people, individual or norms set by the society”
Kenya	“. . .It is the presence of access to food and housing, to quality education and health care, to employment that will sustain us. In my experience, it also includes intangibles such as job security, land tenure security, political stability, individual freedom, and environmental quality. . .”
Gabon	“Quality of life. . . kind of the living condition that shows whether we are happy and satisfied with the situation of life around us. It is to me personally, but here in Gabon, we have national situations that represent the quality of life of our nation. It also can be different from communities, regions, and households. . .”
Senegal	“The state of peace, spirituality or political stability, physical security; and moral, economic and social development available for people to enjoy. That is what quality of life means to us here. It is much more than whether we have food to eat today or water to drink today or house to live in today or clothes to wear today or money to buy whatever we need today. . .”
South Africa	“The true nature (or the perception) of your freedom to interact with others of the same or different races, ethnicities, cultures, sexes, and ideological leanings... These are to me, first and foremost, quality of life”
Ethiopia	“The description of your national, group, household, or personal life story based on lived human experience. . . however, the story ends as at the time you told it, irrespective of whether it is good or bad or sad, or crisis-ridden or peace or joyous or reflects confusion. . . that is your quality of life”
Tanzania	“Quality of life reflects the condition of a household in meeting their self-targeted basic needs. For instance, their needs for food, shelter and clothing, and so on. . . In some cases, happiness, joy, self-esteem and many other aspects of life are secondary because life starts with basic needs...”
Djibouti	“. . .Quality of life indicates well-being as well as the entire scale of human experiences, states, perceptions, and domains of thought concerning standards of living or life. It also involves judgments of the value placed on the experiences of communities regarding satisfaction with life and happiness across typical aspects of daily living such as health, income, education, work, family, and leisure. . .”

Source: based on author’s fieldwork

2.4 Towards Defining and Relating QOL and SDGs to TR-LUP (and Its Associated Concepts)

2.4.1 Putting the Concept of QOL into Perspective

The QOL narratives on SSA are indicative that people’s health, attitudes, income, experiences,

and many externalities (such as socio-political situations) affect their QOL. From the land management lens, it is logical to conclude that these reflections are following what is available in the literature on QOL (see Bendzko et al. 2019; el-Aswad 2019; Sait et al. 2019; Gwalebe and Chigbu 2020).

The study of QOL in land management is old. Earliest efforts on the subject have focused on the

agricultural or food security dimension of the issue. The World Health Organization (1997, p. 1) defines QOL as “individuals’ perception of their position in life in the context of the culture and value systems in which they live and about their goals, expectations, standards, and concerns.” This broad definition when synthesized implies that QOL is about the improvement of living conditions of people. The definition considers that the state of people’s psychological, physical and environmental particularities (including their freedom, social relationships, and personal beliefs) must be in a healthy condition for a quality of life to be seen to have improved. In some ways, quality of life (whether good or bad) could be normative because it hinges on particular conditions of people’s way of life (due to personal interests to enhance the state of their wellbeing). What this means is that different people may experience QOL differently under the same conditions. However, it has several dimensions to it, including the “physical, political, moral, social, environmental, and spiritual dimensions” (Pinto et al. 2017, p. 7). Land has always been recognized as a factor of production in economics (and so it is a factor of development). It is a substantial factor in the improvement of quality of life. Many developing countries are nations where land rights remain unprotected. The rich (everywhere) comprises mostly of individuals with secure land (or property) investments. In ancient times, landowners were lords (or ladies), and land renters are serfs. These are evidencing a linear relationship between land and quality of life. That is why Chigbu et al. (2019c) asserted that the appropriate planning of land resources could directly support improvements in the living conditions of people (quality of life). This study posits that such planning of land resources must take a particular form for it to have the desired quality of life effect on people. Hence, it argues for a tenure responsive land-use planning approach to QOL improvement.

2.4.2 Linking QOL to TR-LUP: Relationships with LUP, LTS, LT and SDGs

To understand how TR-LUP relates to the QOL in the land context, six major concepts are worth understanding. These concepts (in addition to TR-LUP and QOL) include land tenure (LT), land tenure security (LTS), land-use planning (LUP), and sustainable development goals (SDGs). Knowing these concepts and their relationships are relevant in the process and outcome of land-based development interventions. Hence, it is vital to unpack their meanings and relationships. They all have a relationship with land. Together or individually, they have causal relationships with QOL (in whatever form QOL is understood).

Figure 2.1 shows a conceptual delineation (and graphic correlations) of these concepts, depicted within a set of graphical spaces to visualize how they intercept and overlap each other. It depicts QOL and TR-LUP as overarching concepts and praxes (respectively) because they apply (conceptually and practically) to all areas of life and knowledge related to land use. They also apply to the other concepts in terms of their objectives. Although their definitions may vary, QOL is widely known to represent an individual’s perception of their living conditions (Pinto et al. 2017) while TR-LUP is known to be a pathway to achieving QOL (Chigbu et al. 2019a–c). In specific terms, QOL and well-being are used interchangeably in the literature (Valiente et al. 2019). It is essential to acknowledge that human needs are what leads to the quest to gain quality of life. Meeting these needs leads to satisfaction in people’s living conditions (or well-being).

This chapter considers QOL interchangeable with well-being because QOL entails the state or conditions in which people live within a specific place and over a particular time. The issue of time and place is essential in understanding QOL because it is a condition which is consistently in a state of flux or highly fluid. QOL is subjective.

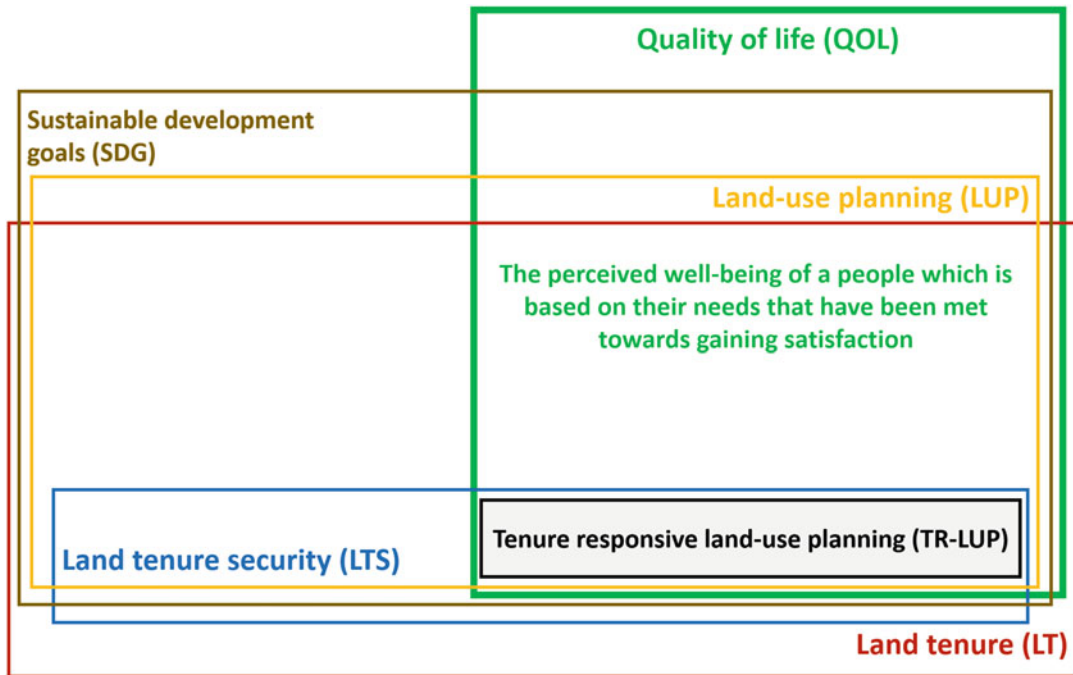


Fig. 2.1 The conceptual relationships shared by the terms used in the study (source: author's diagram)

It manifests in different ways. In addition, the targets (or indicators) needed to achieve QOL can vary. It is capable of changing from place to place and from time to time. In the context of land management, QOL reflects the living conditions that people enjoy or suffer. The enjoyment of adequate space, beautiful vegetation, affordable food quality and quantity, affordable health care, and education can be evidence of positive QOL. Access to safety, freedom of decision-making, and access to infrastructure that enable comfort and respect to privacy (among many others) are indicative of a good QOL. In the contexts of LUP, LT, LTS, SDGs, and TR-LUP, different forms of QOL targets are what most development projects directly or indirectly seek to achieve. Hence, QOL is an embedded concept in all of the other five concepts (LT, LUP, LTS, TR-LUP, and SDGs), which are policy-based concepts for achieving QOL.

The SDGs are embedded in the concept of sustainability. Sustainability is a highly dominant concept and discipline in development studies. It puts focus on protecting the conditions of humans

and their natural environment without compromising the QOL of present and future generations. There is no agreed understanding of the concept of sustainability in literature. However, the SDGs and its targets, provide a view of a combination of sustainability and QOL in a development context. The SDGs are a set of seventeen global development goals. The United Nations (UN) adopted the SDGs in September 2015. The UN tasked all nations to eradicate poverty and achieve the SDGs during 2016 and 2030. The SDGs are, therefore, an embodiment of the sustainability ambitions of governments around the world. It is a concept created to provide opportunities for making a positive change in the QOL of people all over the world. LUP and TR-LUP have a relationship with SDGs because they are processes that can lead to the achievement of the SDGs (which is a development vision). LT and LTS are conditions, which, when well-directed, can lead to the success of specific goals of the SDGs. It is the process of TR-LUP that can make it possible. As a development vision, the SDGs cover a wide range of

targets necessary for improving QOL. These issues include economic growth, hunger, poverty, health, gender issues, education, employment, climate change, urbanization, land, and natural resources, peace and security, and sustainable consumption and production (among others). They relate to SDGs 1–2, 5–11 and 15–16 which have a direct relationship to quality of life. So, one of the conditions for influencing QOL is the achievement of the SDGs.

LUP is a very contentious concept. LUP implies all “activities and decisions concerned with guiding the allocation and use of land in patterns that enable improvements in people’s way of living and their environment” (Chigbu and Kalashyan 2015, p. 8). It involves organizing land uses in ways “that will be beneficial to people who live on or use the land” (Chigbu et al. 2016, p. vi). In principle (and in practice in all countries), LUP activities are “rooted in ensuring improved livelihood options, community cohesion, and food security” (among many other objectives) (Chigbu et al. 2019a). The primary goals of LUP entail achieving QOL outcomes—e.g., improved housing, better agricultural production, increased environmental protection, and reduced climate risks, among many others.

Relevant to LUP is the issue of LT and LTS. The concept of LT means “the relationship among people as individuals and groups on land and other natural resources” (Chigbu et al. 2016, p. vi). This human-to-land relationship is the socio-spatial environment for QOL to emerge. It is also linked to efforts at achieving (in the form of land policy implementations) conditions (such as LTS and SDGs) through development processes (such as LUP and TR-LUP) that influence QOL. Land tenure is critical to changing QOL because how land is used and the mode in which rights are held influence the outcome of development. LTS is the “rights individuals and groups have to effective protection by the state against forced eviction” (UN-Habitat 2008, p. 4). “It implies protection against temporary or permanent removal of individuals or groups from the enjoyment of interests in land—such as access, use, ownership, rights, and legal or social privileges from land—by vested interests or

governments” (Chigbu et al. 2019b, p. 371). In carrying out development activities on land, LTS serves as a catalyst because it promotes and secures the rights and privileges of people (especially land users and landowners) who own and use land. By doing this, it protects them against any actions that could limit their enjoyment developments on land from vested interests.

The concept of TR-LUP evolved due to the need to improve LTS using LUP practices. Usually, LTS issues and LUP have primarily been separately implemented in planning practices. This was the case because LTS is meant to have been in place before LUP implementations. However, LUP and LTS (as two different concepts and praxis) can be combined to achieve better development outcomes or quality of life (Chigbu et al. 2016, 2017). The simultaneous implementation of LUP activities and LTS is what led to the emergence of TR-LUP (a concept that stands in the intersection of LUP, LT, LTS, SDGs, and QOL).

From the preceding, a direct relationship emerges — any improvement or change (Δ) in any of LT, LTS, SDGs, LUP, and TR-LUP; will lead to a corresponding change in QOL. This implies that any action (whether single or combined change) made by LT, LTS, SDG, LUP, or TR-LUP will influence or cause a positive or negative change in QOL. Therefore, QOL is a function of LT, LTS, SDG, LUP, or/and TR-LUP. Aligning with de Vries and Chigbu’s (2017) viewpoint of the same issue (in land management context), the author mathematically expresses it as follows:

$$\Delta QOL = f (\Delta LT, \Delta LTS, \Delta SDGs, \Delta LUP, \Delta TR - LUP) \quad (2.1)$$

As ΔLT , ΔLTS , $\Delta SDGs$, and ΔLUP are concepts embedded in $\Delta TR-LUP$, therefore:

$$\Delta QOL = f (\Delta TR - LUP) \quad (2.2)$$

where:

ΔQOL : change in quality of life,

ΔLT : change in land tenure

Δ LTS: change in land tenure security
 Δ SDGs: change in sustainable development goals
 Δ LUP: change in land-use planning
 Δ TR-LUP: change in tenure responsive land-use planning.

In the context of land management, the above relationship reflects why any (or a combination) of LT, LTS, SDG, LUP, or TR-LUP are crucial for achieving better QOL. The above expression provides a new but straightforward way of theorizing QOL in the land management context. It captures the ideal mind-set that practitioners and academics (especially land management professionals) should bear in mind in their quest to improve QOL at all levels (national, regional, and local). All the six concepts are intertwined because to improve QOL it is necessary to apply LTS, TR-LUP, LUP and LT towards achieving the SDGs. Particularly, an optimal achievement of the SDGs can lead to higher QOL in the aspects of food security, access to natural resources, education and livelihood empowerment (Armah and Baek 2015; World Health Organization 2016; Wong 2019).

2.5 The Quantum of Land Challenges in SSA: Why QOL Matters

TR-LUP is relevant for QOL because it enhances land problems. Land challenges in SSA have multiple dimensions: spatial, land use, natural resource use, and natural resource tenure, policy, governance, rural, urban, agricultural, socio-economic, environmental, demographic, foreign direct investment (FDI), and migratory dimensions. From whatever lens a land challenge is investigated in SSA, the outcome points to a quantum of problems calling for renewed interventions. From a demographic/migratory dimension, SSA is vast with an unequally distributed population that affects resource distribution. “If current dynamics continue, the results will be population densification, with serious implications for the relationship people have

with natural resources, and changes to territorial configurations” (Losch and Magrin 2016, p. 17). The current working population of SSA is young and growing, constituting a vital asset for the development of the region. However, it represents “a major challenge, as the massive influx of young people into unstructured labour markets is causing serious problems” (Losch 2016, p. 19). It has put renewed pressure on infrastructural production, resource use, and distribution. Most importantly, it demands to conduct land development in ways that are desirable to all, including the youths.

From the agriculture (food) and natural resource dimensions, Chauvin et al. (2012) have stressed the insufficient food production in rural areas that need to be addressed for the sake of food security in the whole of Africa. Regarding national income, the exports of agricultural products account for less than 13% of all SSA exports. This is “a long way behind those of oil, gas, and ore” and “heavy dependence on two or three products is the rule in many countries and a source of weakness” (Ribier 2016, p. 35). Dependence on natural resources is emblematic of the resource curse—“the idea that in states with weak institutions, resource exploitation is accompanied by macroeconomic and political failures” (Magrin and Diallo 2016, p. 39). Considering that agriculture is the predominant land use in SSA, an agricultural look in different countries in the region reflect on the challenges these countries face. Chauvin et al. (2012) showed that in Nigeria and Burkina Faso, harsh weather conditions are becoming less suitable for agriculture, and this has food production from environmental and economic angles. In Malawi, agriculture is drought-prone. Hence, rural areas suffer from poor physical, environmental, and economic conditions. In Kenya, drought conditions are also the leading cause of inadequate food production performance. However, unlike most countries in the SSA countries, ‘Kenya has a comparative advantage in the manufacturing of processed agricultural products’ (Chauvin et al. 2012). The rural part of Kenya still suffers like many others in SSA—they lack physical infrastructure and are characterized by poor

living conditions. Van den Akker's (2000) study also showed that low inputs characterize food production in Benin. This means that food security in Benin requires an increase in agricultural land use. Despite that the favourable agro-ecological condition for the production of food in Democratic Republic of Congo (DR Congo), agriculture production has been highly neglected in favour of minerals exports (Chauvin et al. 2012). Many other SSA countries—such as Cameroun, Ethiopia, Gambia, Ghana, Guinea Bissau, Madagascar, Mali, Rwanda, Senegal, Tanzania, and Uganda—have rural problems in need of urgent solutions (see Chauvin et al. 2012).

Many SSA countries are either susceptible to resource curse (e.g., Namibia, Mozambique, Zimbabwe) or are already suffering from resource curse (e.g., Angola, Nigeria, Gabon, and DR Congo). The implications of the resource curse in SSA countries are many. It leads to over-exploitation of natural resources and the neglect of agriculture or agro activities (which are also primarily located in rural areas). Resource curse makes mining sectors penalize existing productive activities (such as agriculture) by keeping other factors of production (labour and capital) away from it and leaving its productive capacity to die off. These have negative implications on food production and distribution, as the neglect of agriculture in SSA is equal to the abandonment of rural areas, which is directly linked to food shortage, and QOL.

From FDI dimension, the significant challenges to SSA development include large-scale land acquisitions (LSLA) and delegitimization or disruption of customary systems of land tenure. The SSA has seen a significant increase in LSLA. Although there is an enormous focus on FDI generated LSLAs, domestic LSLA actors (who receive less media attention) is growing in the region. Existing evidence shows that the most targeted places for LSLAs are land in rural areas. These are land “often characterized by high fertility and water access” and “most intensively used by local people” (Anseeuw et al. 2016, p. 43). Reactions to LSLAs at the local and national levels vary between SSA countries,

“from open conflicts with strong opposition in Senegal, Mozambique and more recently in Ethiopia, to “smooth” implementation processes in Zambia and Malawi” (Anseeuw et al. 2016, p. 43). Despite these differences in reactions to LSLAs, the general scenario challenges the image of LSLAs as a development tool (at least from a rural development perspective). Instead, the LSLAs in SSA create land-use contestations and conflicts.

The problems of growing land and natural resource tenure insecurity, mainly due to uneven distribution and poor governance of natural resources, have its consequences. Surface water, for instance, is not available everywhere all year round in SSA. “Outside the equatorial zone, most watercourses are seasonal, and dams are needed to regulate them” (Farolfi and Jamin 2016, p. 47). Semi-arid SSA countries consume a significant proportion of their renewable water resources mainly for irrigated agriculture. Even in water-rich countries (where there is supposed to be enough water for all), water insecurity exists there too. Many of these countries are struggling to meet the World Health Organization's minimum water requirement (25 l per capita per day) for basic human needs (Khaleq 2007). There is poor access to safe drinking water for many rural SSA people. Generally, “40% of the population has a round-trip of more than 30 min to the nearest source of drinking water (the UNICEF reference standard)” and “the situation is even worse in the countryside, where up to 80% of people have no access to safe water” (Farolfi and Jamin 2016, p. 47). “Paradoxically, the countries with the largest water resources are among those with the lowest levels of drinking water coverage” (Farolfi and Jamin 2016, p. 47). The water also applies to land and forests. These resources are under immense pressure, and they negatively affect the general QOL of people in the regions. The effects of these land-related challenges are felt in rural and urban areas in the form of food and water shortages, forest and environmental services insecurity, and growing slum populations in urban areas due to high rates of rural-urban migration. From a migratory dimension, weak QOL pushes millions of SSA

youths to migrate from rural to urban areas in search of jobs (or better living condition in general). The rural-to-urban migration problem makes the rural areas lose the human capital needed to transform the rural areas towards higher productivity. There is also the problem of inequality in the spatial development of these countries which is increasingly urban and rural resource competition and conflicts, leading to the need for “new ways to manage natural resources and landscapes, and new forms of interaction between rural and urban economies” (IFAD 2015, p. 2).

Furthermore, emerging urbanization in SSA has profound impacts—positive in regards to stronger linkages, but mostly negative due to stronger loss of resources—on its socioeconomic. Deteriorating agricultural (food) production is a significant problem in SSA. Despite some progress made, the region has deteriorating natural resources. Many of the countries constitute physical (and social) geographies (from rural and urban perspectives) where poverty and hunger are concentrated. With these challenges, SSA countries cannot develop due to the lack of (or inadequate) LUP and land governance.

Apart from these dimensions of problems, there is a gender imbalance in SSA which has disempowered women to the point that there are calls for “repositioning culture for development” in its rural communities (Chigbu 2015, p. 334). These and so many other challenges constitute issues that must be resolved (at least to a certain extent) to improve the QOL of people in SSA. Ongoing national development policy debates in various SSA countries present excellent opportunities for policymakers (and sector decision-makers) to explore new pathways to address these issues.

All of these SSA challenges are hinged on the issue of land governance and land tenure (Kirk et al. 2015; Lee et al. 2019). These challenges directly affect QOL in SSA. A failure to tackle these challenges could deprive SSA the opportunities to escape poverty and improve their QOL. Many SSA countries have recognized that land policies and implementing land-based interventions are crucial for tackling these

development problems. Most of them have developed strategies to chart a way forward. However, while the challenge remains in identifying ‘new tools’ for action (Pesche et al. 2016, p. 1), designing and implementing new tools based on ethically, legally and socially inclusive principles is crucial to success.

2.6 Tackling the Challenges: How TR-LUP Generates QOL by Improving LTS

One of the drawbacks on QOL in SSA communities is that there is a lack of secure tenure (or the presence of high insecurity of tenure) on land (Chigbu 2013, 2018b). The effects of insecure tenure in SSA countries “have led to the exclusion of a significant portion of households from legal protection, which in turn leads to a reduction in prospects for economic development” (Chigbu et al. 2016, p. 16). This has been identified as one of the major factors for poor QOL in the region (Ameyaw et al. 2018). Therefore, to improve QOL in SSA, it is necessary to consider an approach that can enhance tenure security situations in communities in the region. TR-LUP was conceptualized by Chigbu et al. (2016) as a way of strengthening land TS situations in developing countries. TR-LUP is therefore founded on the premise that there is a relationship between LUP and TS. The link, according to Chigbu et al. (2017, p. 1623), “is that the former stimulates the latter while the latter can be an outcome of the former.” TR-LUP is, therefore, a process of LUP that allows the delineation of land boundaries, the creation of forums for citizens’ engagement, and the production and recording of land information. All of these are based on activities that have direct impacts on QOL as it resolves LTS situations that contribute to achieving specific SDGs. Hence, a combination of LUP and LTS, to use the former to improve the latter towards ensuring QOL, is what Chigbu et al. (2017) referred to as TR-LUP.

Conventionally, LUP establishes how and where land uses occur and serves as a control mechanism to the performance of land uses.

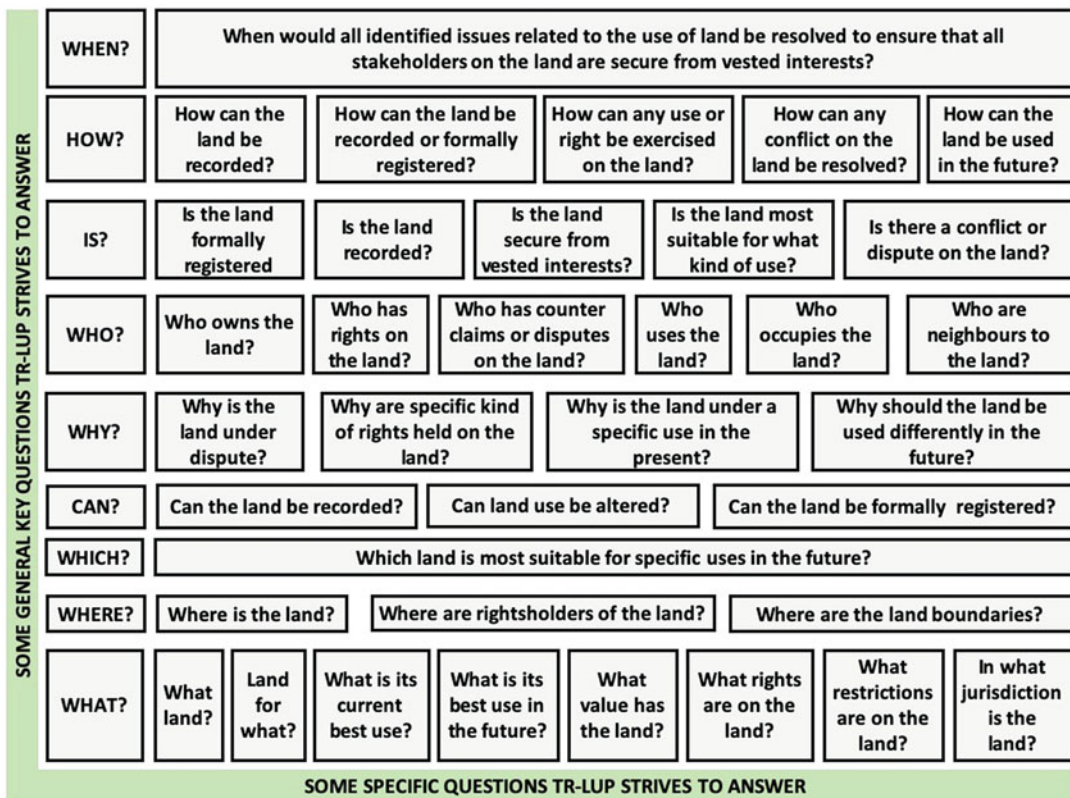


Fig. 2.2 Typical LT, LUP and LTS questions which the process of TR-LUP strives to answer (source: author’s diagram)

LTS helps to sustain livelihoods within human settlements. It is a crucial element for boosting QOL (such as affordable housing, agriculture, and the development of functional land markets). In the context of developing countries, LUP (being key LT elements) are often not sufficiently linked with LTS. This is one of the reasons LUP implementations in many countries of the Global South have often not led to improved QOL. This is the situation that the concept and practice of TR-LUP strive to improve. TR-LUP combines LUP and LTS dimensions of LTS to ensure pro-poor development. TR-LUP method is a highly multidisciplinary and locally flexible intervention that answers critical basic questions that traditional LUP fails to respond. It strives to solve several issues related to the *what, can, where, is, which, why, how, and when* aspects of owning, using, holding, exercising rights, enjoying privileges, fulfilling responsibilities on land (Fig. 2.2).

Answering these questions during TR-LUP implementation leads to building a reliable database of land information, documentation, and evidence-based land conflict resolution that lead to LTS improvements in local communities. The TR-LUP approach is necessary for achieving locally suitable land-use plans and LTS improvements capable of sensitizing QOL.

The significant link between the implementation of TR-LUP and the outcome of QOL is LTS. TR-LUP focuses on

the justness of the rules and processes governing the management of spatial resources which have to be crafted and implemented in a participatory manner to permit all users or owners to access or use those resources to meet their basic needs (Uwayezu and de Vries 2018, p. 6).

It is also based on the principle of a continuum of land rights—a principle that allows for a fair allocation of land (and related resources) to all people. This implies a fair distribution of land

resources to all users. The implication is that a variation in LTS (produced by TR-LUP) influences QOL because when LTS decisions are channelled towards achieving QOL. This can happen, for instance, when LTS decisions are channelled towards achieving SDGs that can boost aspects of QOL. This is possible because TR-LUP activities are primarily designed to ensure the protection of property rights of land users (including owners). This capacity to protect land rights is based on taking critical steps “to invest in long-term solutions that give them access (and makes land and food available) for use in their quest to fight poverty and hunger” (Chigbu et al. 2019a, p. 23). This is right in Tanzania (Gwaleba and Masum 2018), Zambia (Mulenga 2015), Brazil, Chile, Ethiopia, Ghana, Laos, Namibia and Philippines (Alemayehu 2016; Chigbu et al. 2016, 2019b). It is, therefore, logical to assume that this could apply to many SSA countries.

2.7 TR-LUP Activities and How It Can Catalyze QOL Improvements

2.7.1 The TR-LUP Process and How They Relate to QOL Issues

Tenure responsive land-use planning implementation enhances QOL by generating land tenure security. The generation of land tenure security leads to the safety nets that widen the use of land for livelihood improvements. Thereby empowering users of land (and related land resources) to pursue their immediate livelihood activities. These activities are embedded in an iterative planning process that comprises of strategisation and implementation stages (Fig. 2.3).

TR-LUP steps comprise of activities that are adaptable in multiple forms to produce a land-use plan that respects and promotes people’s LTS. The TR-LUP steps designed to ensure gender-balanced and ensure the participation of local citizens in land-use planning processes to reduce land tenure insecurities towards enhancing QOL.

Its most critical QOL responsive aspects can be summarized under nine main measures:

- The setting up of gender-balanced local team as a negotiation platform for decision making during TR-LUP implementation: This allows a gender-sensitive stakeholder to emerge. It enables equality in the management of TR-LUP operations and fosters a stronger sense of belonging to minority groups (like women, youth and vulnerable groups).
- The identification of LT challenges: This allows TR-LUP operations to obtain inventories of specific land related QOL challenges that are due to insecurity of tenure on land. It provides for TR-LUP operations to target the improvement of those challenges.
- Executing all activities based on the principle and practice of a continuum of land rights: The principle of a continuum of land rights implies finding opportunities to improve the rights of those affected by TR-LUP operations to ensure that their rights are protected, somewhat impeded.
- Resolution of land conflicts or disputes: Solving land conflicts ensures an environment of peace in the use of land for development. This creates an enabling environment for improved QOL to emerge.
- Recording and documentation all land agreements: The documentation of TR-LUP procedures ensure that adequate evidence is kept to have proof in case of future conflicts on land. It also boosts the confidence people have in the entire process and raises their level of security.
- Obtaining legal, administrative, and social endorsements for the plan that emerged from the TR-LUP process: Accountability is essential for guaranteeing QOL. Getting the approvals from communities (socially) and government authorities (legally) for necessary activities of TR-LUP operations allows us to share responsibilities and build a collaborative vision for achieving QOL objectives.
- The implementation of land-use planning activities (and their monitoring) in an inclusive and participatory manner: These aspects

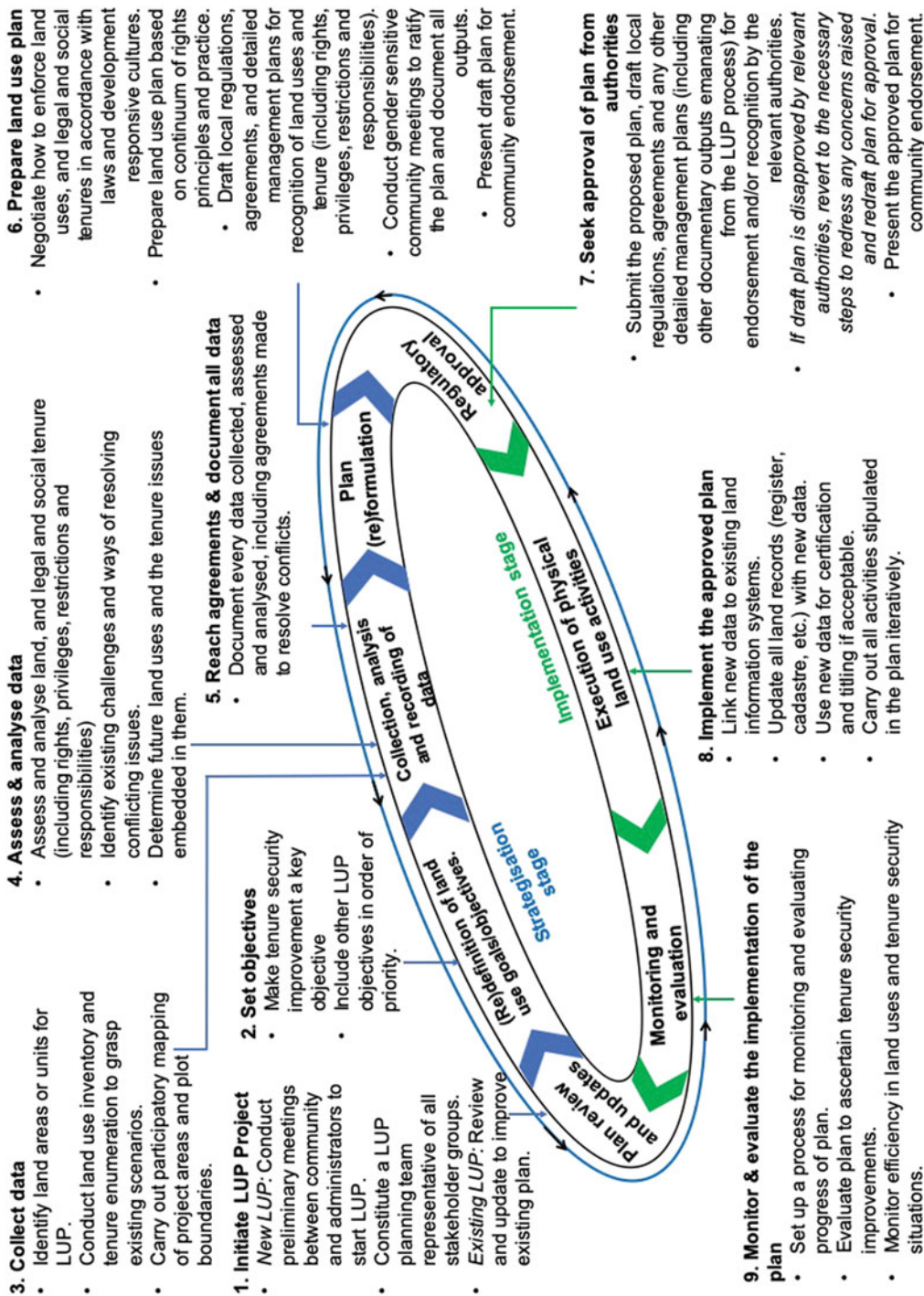


Fig. 2.3 The operational framework for TR-LUP showing its adaptable steps that promote LTS (source: Global Land Tool Network 2019, p. 3)

involve the execution of physical development activities and introduction of new land use controls that will enhance the QOL of people.

A gender-balanced team is necessary to ensure responsible decision-making that is focused on achieving LTS objectives that are capable of improving QOL. The identification of LT challenges is key to ensuring that the focus is put on resolving challenges instead of creating challenges. Tenure analysis and evaluation entail identifying current and future LT problems and a review of the threats and opportunities for expanding the boundaries of LTS of landowners or users. Adopting continuum of land rights principles is necessary to grasp the manifestations of LT in their various forms and ensuring these forms are identified and were essential given the recognition they deserve towards ensuring tenure. Land conflicts cause insecurity of tenure on land. Resolving conflicts is the key to securing the tenure of people. LTS is only possible when there is the availability of proof for the exercise of rights on land. Recording and documenting TR-LUP procedures is a way to ensure the provability of people's tenure. Community endorsements for any plans made are as important as the legal and administrative authenticity of the plans. Efforts should be made to gain approvals from the authorities, as well as the community that will be affected by the plan. Generally, the implementation of TR-LUP activities (and their monitoring) should be conducted in an inclusive and participatory manner. If these efforts are adequately channelled to securing the tenure of people on land, they have the potential to improve specific aspects of QOL.

2.7.2 Objectifying the SDGs for QOL Improvement in SSA: Role of TR-LUP

Achieving the SDGs is critical to improving QOL in SSA. The SDGs objectify the envisaged QOL because it directly represents the essential needs for development (at every level) in the region. It

also made measurable indicators based on commitments from all stakeholders (inclusive of SSA governments) to implement its developmental targets when planning projects and programs at every level. The TR-LUP, therefore, provides a platform for improving QOL because it focuses on challenges that are meant to be developed by achieving the SDGs. Put differently. The SDGs also provide opportunities to grasp further the role TR-LUP can play in QOL improvements (United Nations Statistics Division 2019).

This chapter identifies some applicable targets of the SDGs—globally adopted and agreed upon by the United Nations Statistics Division—that have linkages to land uses. There are at least eleven SDGs with direct linkages to land use. They are SDGs 1–2, 5–11 and 15–16. Based on the allusion of QOL provided by e-discussants from selected SSA countries, it was possible to localise the global SDGs in the context of SSA. With the SDGs localised into various indicators, it was possible to identify the possible data for measuring the localised SDG indicators. Furthermore, it was possible to identify how the TR-LUP process plays crucial roles in achieving the SDGs. Considering that any or a combination of LT, LTS, SDG, LUP, or TR-LUP are crucial for achieving better QOL—refer to the mathematical expression or equation of the relationship between SDGs, QOL and TR-LUP—specific roles of TR-LUP in improving some of the quantum of land challenges in SSA is provided (see Table 2.2).

For TR-LUP to be an effective tool for achieving the land related SDGs to improve QOL, localising the SDGs will be a crucial precondition. Localising SDGs should be done by taking stock of the current local realities to identify potential challenges in local and regional land administration (and management) practices and use TR-LUP implementation as a from-the-ground-up measure to correct them. This requires that all LUP processes to be implemented in SSA should include the SDGs in their design stage so that the emerging land-use (and local development) plans respond to local SDGs.

The role of TR-LUP in attaining QOL by achieving various aspects of the SDGs is what

Table 2.2 The role TR-LUP implementation can play in improving QOL based on specific targets of the SDGs

Global SDGs with direct linkages to land use	Localised indicators of the SDGs that are linked to land uses in SSA	Possible data for measuring the localised SDG indicators in SSA	How the TR-LUP process can play a role in achieving the SDGs in SSA
Goal 1: End poverty in all its forms everywhere	Access to basic services	Proportion of population living in households with access to basic services	Allows continuum of land rights which widens tenure improvements that result in improved livelihoods
Goal 2: End hunger and achieve food security	Agricultural productivity	Proportion of land under productive and sustainable agriculture	It improves tenure security which leads to sustainable land use and better agricultural productivity
Goal 5: Achieve gender equality and empower all women and girls	Women's (or female) land rights	Proportion of total agricultural population with ownership or secure rights over agricultural land; Share of women among owners or rights-bearers of agricultural land	Its gender-responsive and collaborative process contributes to equality, land rights knowledge capacitation and women's empowerment
Goal 6: Ensure availability and sustainable management of water and sanitation for all	Access to safe drinking water	Proportion of population using safe drinking water; Degree of integrated water resources management implementation (0–100)	Can determine access, control and the spatial distribution of water resources usage (in terms of quality and quantity)
Goal 7: Ensure access to affordable and sustainable and modern energy for all	Access energy infrastructure (e.g. electricity)	Renewable energy share in the total final energy consumption	It controls and allocates, through zoning, access to land-based energy resources
Goal 8: Promote sustained, inclusive and sustainable economic growth	Access to employment; or availability jobs in the sector	Proportion of the employed in relation to those in working age; or tourism direct GDP as a proportion of total GDP and in growth rate	Identifies land resources and sets the rules of use which can be beneficial to tourism
Goal 9: Build resilient infrastructure,	Active small-scale industrial sector	Proportion of small-scale industries in total industry value-added	Small-scale industries demand the use of land allocations based on planning.
Goal 10: Reduce inequality within and among countries	Income growth (in)equality	Proportion of people living below 50% of median income, by sex, age, and persons with disabilities	Contributes to equitable land distribution, leading to reduced inequality in project communities
Goal 11: Make cities and human settlements inclusive, safe, resilient and sustainable	Urban slum population	Proportion of urban population living in slums, informal settlements or inadequate housing; Ratio of land consumption rate to population growth rate (also applies to SDG 15)	Enables development (economic, social and environmental) linkages between urban, peri-urban and rural areas by strengthening development Planning
Goal 15: Protect, restore and promote sustainable use of ecosystems	Forest area	Forest area as a proportion of total land area; Progress in sustainable forest management	Serves as platform for combating desertification and restoring degraded land, leading to better wellbeing
Goal 16: Promote peaceful and inclusive societies	Conflict related deaths	Conflict-related deaths per 100,000 population, by sex, age and cause (also applies to SDG 1-2 & 5)	Provides a platform for resolving land conflicts

Source: based on author's analysis

makes TR-LUP a veritable tool for improving QOL in SSA. This is possible in SSA because all SSA countries are into LUP implementations as a way to achieve national and local development goals. Turning their current LUP efforts into TR-LUP will widen their opportunities towards improving QOL in broad terms. While TR-LUP applies differently to the different SDGs, it does have its most substantial QOL influence on SDGs 1, 2, 5, 6, 10, 11 and 15 (Chigbu et al. 2016).

2.8 Conclusion

TR-LUP entails an act of planning (with a focus on land uses) towards the application of policy to improve QOL. Hence, this chapter provides a policy dimension that links TR-LUP practice to development achievements (in the context of QOL objectified in the form of SDGs). In this way, the chapter also provides an understanding of the interlinkages between TR-LUP and QOL; and then that of QOL and sustainability (SDGs).

This chapter raises a vital issue: the relationship between QOL and land use (anywhere) is complicated. This is because both land use and QOL cut across various planning and socio-economic activities, policies, norms and development patterns. TR-LUP (being an intertwined activity of LUP, LTS, and LT) provides a platform for land use control to contribute to QOL. The chapter used the SDGs and their applicable targets to explain the role TR-LUP plays in this regard. Land-use planning (in its conventional sense) is a land management tool for reorganizing spatial units (including urban cities and rural towns and villages). It allows for the (re)ordering of the socio-spatial entity in which people interact, and where development happens. “Socio-spatial order is the projection of social structure and associated socio-economic inequalities onto space” (Patel 2016, p. 36; Owusu Ansah and Chigbu 2020). Land (which is an embodiment of the physical and social earth) provides the space for the manifestation of social structures and their associated socioeconomic (in)equalities. Hence, land is a foundation for socio-spatial ordering. It is the domain (or place). This is

logical because (in)equality occurs when land (and its associated resources) are (un)evenly distributed in a given society—typically through processes of planning of how land is used). (In)Equality can impact the spatial order within a specific place negatively or positively. This makes the planning of land resources (that is, LUP) in a secure way (that is, TR-LUP) critical for ensuring that inequality is avoided or reduced in societies.

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Guidelines for Healthier Public Spaces for the Elderly Population: Recommendations in the Spanish Context

3

Ester Higuera, Emilia Román, and José Fariña

3.1 Introduction

3.1.1 Healthy Urban Cities

Population ageing is accelerating all over the world. The World Health Organization (WHO) predicts that in 2050, those over 65 years will represent 66% of the world's population. The growth of the population over 60 years of age is growing at a rate of 3.26% annually (UN-Habitat 2016). This elderly population lives in cities with public spaces that have been created and transformed over time. Health depends on many elements such as genetic predisposition, lifestyle, environment and social relationships. Economic, energy, social and environmental factors also play a role. The WHO states that the older population is one of the most vulnerable groups in society.

Health, according to the WHO, is the full state of physical, mental and social well-being, and not only the absence of disease or infirmity. For this reason, the physical environment in which people live and carry out their activities is decisive to their health. The WHO defines a **healthy city** as one that is progressively increasing its physical, social and environmental well-being and that uses

its resources to improve them for all the people in the community. Also, the WHO defines the **quality of life** as the perception that an individual has of his or her place in existence, in the context of the culture and value system in which he/she lives and in relation to a person's objectives, expectations, rules and concerns. It is, therefore, a concept related also to the physical health of people, their psychological state, their level of independence, their social relations, as well as their relationship with the environment.

Lastly, health in cities is one of the main concerns of the European Union directives and plans (Europe Strategy 2020), such as Horizon 2020 Strategy, the “Health 2020 health and well-being strategy”, the European Territorial Agenda 2020 (TA2020), the European Disability Strategy 2010–2020 and its Action Plan. The WHO even recognises the importance of the Health Impact Assessment of environmental determinants, highlighting the importance of promoting less unhealthy or healthy urban environments through urban planning, the design of public spaces and non-polluting urban transport, mitigation of climate change, housing improvements and urban regeneration of the consolidated city. These goals are necessary to face the sustainability of the present city, through local proposal actions. The healthy city is also lined up with the Sustainable Development Goals (SDG) of the United Nations (2015), specifically SDG numbers 3, “Health and well-being” and 11, “Sustainable Cities and Communities”, and with the Climate Change scenario (WHO 2008).

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3.1.2 Elderly Urban Health Challenges

One of the WHO’s objectives (WHO 2010) is to make healthy ageing possible for people who are now living longer; this is defined as the “process to promote and maintain the functional capacity that allows well-being in old age”.

The elderly have special conditions with respect to the environment in which they live, and if it is urban there are dysfunctions and risks that must be determined in order to be resolved. Some of the main ones are shown below.

With regard to thermal comfort, the elderly are more sensitive to high temperatures and prefer lower temperatures than young adults. For physiological, psychological and physical reasons, there is a difference of between 0.2 and 4°C between the young (Baquero Larriva and Higuera García 2019) and the old in a particular place. We also found that the recommendations on comfort do not consider the specific considerations for adults, but the comfort diagrams consider a standard adult aged 40 years for the determination of thermal comfort in outdoor and indoor spaces (ASHRAE 1966). Heatwaves cause them a higher rate of collapse, episodes that have increased in many European cities in the last decade (D’Ippoliti et al. 2010).

- The cold also affects the elderly in a decisive way (Hajat and Haines 2002).
- Many of them have a significant cognitive loss from the age of 65 years, and generally in ages

over 75 years with the loss of vision and hearing mainly (WHO 2009).

- Their lack of reflexes, loss of muscle mass and walking difficulties make them suffer falls that can affect their autonomy completely (WHO 2018).
- Respiratory and cardiovascular diseases have a high rate in people over 65 years, producing very serious situations when urban pollution levels are high, or in the presence of heat waves during the summer (Baquero Larriva and Higuera García 2019).
- The elderly have a high rate of urinary incontinence, especially women (Kılıç 2016), which limits their autonomy, their journeys and can increase isolation and loneliness.
- Most of them have a higher level of insecurity and perceive the danger subjectively in a more pronounced way, which influences their movements through the city and confines them to their homes as the safest place.

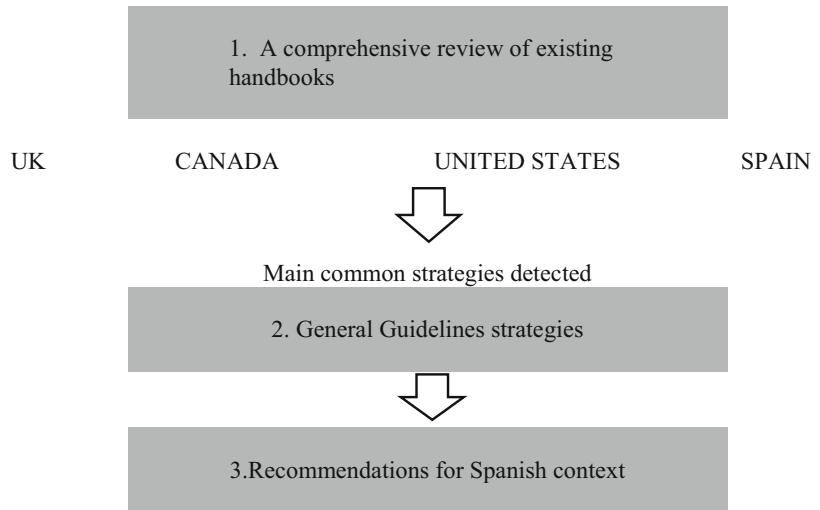
It is considered that the method of ageing is determined 25% by genetic factors and 75% by environmental factors, lifestyle and habits (Comino Sanz and Sánchez 2018). Therefore, air quality, absence of noise, presence of green areas, density, location of urban uses and mobility determine the quality of urban life in old age. In this sense, the main diseases of European cities have been listed by HUDU, 2006 and it helps us to know the risks of the urban environment and the criteria of urban design. Table 3.1 shows how high density parameters, urban structure, the variety of building types, the absence of green areas,

Table 3.1 Risk for elderly population with urban design parameters and main urban diseases

Main Diseases European City	High density	Urban structure	Typological variety	Lack of green areas	Land use spatial distribution	Mobility by car
Obesity	High	High	High	High	High	High
Cardiovascular diseases	High	High	Low	High	High	High
Respiratory Diseases	High	High	High	High	Low	High
Heat or Cold Stress Shocks	High	Low	High	High	High	Low
Accidents	High	High	Low	Low	Low	High
Mental Health	High	High	High	High	High	High

Source: Authors’ own information based on data from “Delivering Healthier Communities in London”, HUDU, July 2006)

Fig. 3.1 Methodological scheme (source: Author's own data 2019)



the location of land uses and road mobility influence the environmental conditions that harm the elderly population.

The increase in temperature in urban areas, especially densely populated areas has given rise to the phenomenon of Urban Heat Islands (UHI) which can threaten the health and comfort of citizens (Leal Filho et al. 2018). These risks shown above, will also be intensified by the future effects of climate change.

The need to adapt the city and public spaces to the phenomenon of an ageing population, in order to achieve more inclusive, comfortable and healthy environments, is a twenty-first century challenge that must be tackled with a multidisciplinary approach, but where planning plays a determining role, due to factors such as density, land use, mobility, location and type of green spaces that condition the environmental aspects of cities. For this reason, it is considered necessary to present a line of action to improve the conditions of the urban environment, thinking first of the oldest population and then of all citizens.

3.1.3 The Methodology of the Guidelines

To achieve a healthier urban environment for the elderly population, urban planners and designers must assess the conditions of existing public

space, to articulate priority proposals and actions to be progressively implemented in all city streets and squares. The term **active ageing** emerged in 2002 (Fernández-Ballesteros 2008) which, according to (WHO 2002), is the process of optimising opportunities for health, participation and safety in order to improve people's quality of life as they age. This is the goal of the guidelines presented.

Though, each street and square is unique in its place, a detailed analysis must be done. Each city has its compositional, morphological, spatial, social, environmental and microclimatic conditions that will demand a personalised answer, as stated by the basic principles of bioclimatic urbanism (Higuera 2006). In this context, how can we propose a guideline to improve the urban design conditions of public areas in cities for the elderly population? In order to address this question, the method is to:

- Conduct a comprehensive review of existing handbooks and international guidelines;
- Summarise those dimensions that can be part of general guidelines for the elderly population in cities: general guidelines strategies; and
- Provide recommendations in the Spanish context.

These are the three parts into which the text presented below is divided and are described in Fig. 3.1.

3.2 A Comprehensive Review of Existing Handbooks and International Guidelines

The first step is an international review of good practices for these keywords: urban health, elderly urban population, spatial planning, public spaces, active ageing and urban planning. A systematic bibliographic review of the scientific literature was carried out, according to the PRISMA method (Liberati et al. 2009; Potchter et al. 2018). The search for studies was made in Scopus, Web of Knowledge, Google Scholar and Science Direct, with the key words: older adults, active ageing, manuals, etc. This has been complemented with a manual search that included the bibliographic references cited in the articles, focusing on those published between 2000 and June 2018. The final selection criteria for the good practice manuals and examples were as follows:

- Studies focusing on older people in urban areas;
- Good practices related to planning, mainly through European plans, programmes, actions, academic research or projects;
- Recent editions; and
- Countries of the developed world, where there is a relevant ageing population and the risks are similar.

The results are presented in Table 3.2, with their descriptive explanation.

3.2.1 The Main Common Strategies Detected

We found many different actions in the international context, with the aim of improving the conditions of the urban environment to ensure the welfare of the elderly. In order to establish lines that synthesize all the strategies listed in Table 3.2, they have been combined in Table 3.3, and from there, three major strategies have been proposed that include most of them (a,

b or c), so that they can be followed as guidelines in the general recommendations.

In view of the above tables, it is proposed to establish main strategies that summarise most of the guidelines found in the documents selected through three main lines of action, which are: *Safe and walkable neighbourhoods*; *Nature based solutions and more green areas*; and finally *intergenerational coexistence public areas*. Although there may be numerous responses it is hoped that planners will follow the above guidelines with these three lines of action. Therefore, it is established that the planning of healthier urban environments for the elderly necessarily involves articulating strategies in public space in the following ways: *Safe and walkable neighbourhoods*, *Nature based solutions and more green areas*; and finally, *intergenerational coexistence public areas*, which are detailed in the following section.

3.3 General Guideline Strategies

In this section we will detail each of the three strategies determined as the main considerations in the new planning and design of urban areas, as argued in the previous section.

3.3.1 Safe and Walkable Neighbourhoods

The city of the Industrial Revolution has probably been one of the most insane in the history of urbanism. In order to solve the problems created, they basically resorted to the separation of functions by segregated land use patterns. The arrival of the private car made it possible to increase the distances between activities. It soon became apparent that this solution entailed high ecological and environmental costs that the planet could not bear. Moreover, this brought very important health problems, different from those produced by the city of the Industrial Revolution, but which must be considered as a priority nowadays. One of the most important and evident is the pollution produced by vehicles. Therefore, an

Table 3.2 Review of existing handbooks and international guidelines

International Review					
UNITED KINGDOM					
	Delivering Healthier Communities in London. HUDU (NHS 2007)	Healthy Urban Development Checklist	National Planning Policy Framework	Active Design. Planning for Health and Wellbeing through sport and physical activity	The influence of land use mix, density and urban design on health: a critical literature review
Goal	Impact on the health of new developments	Prevention of skin cancer from the design of public space	Spaces where opportunities are fostered to meet people	Promote sports in open spaces for everybody	Design a diverse urban landscape, with trees, attractive architectural composition and water elements
Strategies	<ul style="list-style-type: none"> – Visual interest landscape to walk – Urban gardens Inclusive access to public spaces – Extensive tree plantations 	<ul style="list-style-type: none"> – Provide shade – Green areas within 400–500 m from housing, for a walk – “Green gyms” 	<ul style="list-style-type: none"> – Dynamic activity centres – Use of shared spaces to community services 	<ul style="list-style-type: none"> – School sports and facilities for students during school hours and for the community on week-ends – Sport England’s Guide 	<ul style="list-style-type: none"> – Public spaces safety and long maintenance – Good design – Local collaboration for its management
Agent	Public	Public	Public	Public	The University of York. Croucher K, Wallace A., Duffy S.
Reference	Land Use Consultants in association with the Centre for Research into Environment and Health	Department of Health, New South Wales NWS	Department for Communities and Local Government	Sports England	The University of York
Date	2007	2009	2012	2015	2012
International Review					
CANADA		UNITED STATES		SPAIN	
	Public Health and Land Use Planning: Highlights	Creating a healthy environment: the impact of the built environment on public health	Design for Health. Planning Information Sheet: Integrating Health into Comprehensive Planning	Spanish Network of Healthy Cities	Spanish Network of Elderly Friendly Cities (Spain “Secretaria de Estado de Servicios Sociales e Igualdad” 2017)
Goal	Design water structures from territorial to urban corridors	Safe traffic pedestrian actions in urban areas	Traffic calming in urban streets	Integrate health as a fundamental consideration in all local policies	Provide advice and facilitate membership
Strategies	<ul style="list-style-type: none"> – Manage groundwater reserves – Sustainable urban drainage in urban centres 	<ul style="list-style-type: none"> – Traffic calming measures, as crosswalks, protections at crossings 	<ul style="list-style-type: none"> – Speed limitation signs, overpasses, undulations in the route 	<ul style="list-style-type: none"> – Health promotion and protection strategies 	<ul style="list-style-type: none"> – Technical support and training to promote active ageing – Disseminate information and best practices

(continued)

Table 3.2 (continued)

	International Review				
	CANADA	UNITED STATES		SPAIN	
	<ul style="list-style-type: none"> – Update flood plans according to climate change – Energy efficiency criteria 	<ul style="list-style-type: none"> – Safe bike lanes – Traffic signs and traffic lights. – Walkable streets 	<ul style="list-style-type: none"> – Walkable routes – Texture and material of the road pavements and trees – Green roundabouts 	<ul style="list-style-type: none"> – Evaluation criteria and unified indicators for urban health – Disseminate information to the Regional and the European Networks 	
Agent	Public	Jackson R. and Kochtitzky C.	University of Minnesota	Public	Public
Reference	Clean Air Partnership (CAP) in partnership with the Ontario Public Health Association (OPHA)	Sprawl Watch Clearinghouse Monograph Series	University of Minnesota	Spanish Federation of local agents (FEMP), Spanish government	WHO and the IMSERSO (Institute for the Elderly and Social Services)
Date	2011	2010	2007	1998	2011
	International Review				
	SPAIN				
	UNI-Health Project (Higuera et al. 2019)	Health and sustainable urban development	Impact on health of Uretamendi-Betolaza urban renovation project	Medea and IneqCities Project (Borrell et al. 2012)	
Goal	Generate a common knowledge of environmental health through a workshop, with the elderly community, local agents and academics	Incorporate the health variable in the planning, development and urban management processes of local government	Identify the positive and negative impacts on the health of the project	Identify urban health inequalities and effective measures to reduce them	
Strategies	<ul style="list-style-type: none"> – Joint virtual library – Academic methodology to visualize urban health at the neighbourhood scale – Strategic action plan – Multidisciplinary network 	<ul style="list-style-type: none"> – Prioritize policies that reduce health inequalities and mitigate climate change – Improve the quality of “green” and open spaces – Promote active displacement 	<ul style="list-style-type: none"> – Estimate the magnitude and distribution (by age, sex, socioeconomic condition, etc.) of the health impacts – Propose indicators for monitoring the health impact – Make recommendations 	<ul style="list-style-type: none"> – Planning for health equity at an urban level – Prioritization of health problems and interventions – Monitoring and evaluation of the actions proposed 	
Agent	Academic Higuera et al. 2019	Udalsarea21 Basque Country	Public, Local government	Borrell et al. (2012)	
Reference	European Institute of Innovation and Technology. EIT Health. European Union	Practical guide for the analysis of the effect on health of local urban planning initiatives. Workbooks N° 17	Department of Health and Consumer Affairs Basque Government	European Union	
Date	2019	2014	2009	2012	

Source: Authors' own data 2019 with the selection criteria described, based on the on-line documents selected

Table 3.3 Summarised international strategies in three main strategic lines

Selected plan or document, Country	Strategies by document	Determinant factors ^a
Delivering Healthier Communities in London. HUDU, UK	– Visual interest landscape to walk	a
	– Urban gardens	b
	– Inclusive access to public spaces	c
	– Extensive tree plantations	b
Healthy Urban Development Checklist, UK	– Provide shade	b
	– Green areas within 400–500 m from housing, for a walk	b
	– “Green gyms”	b-c
National Planning Policy Framework, UK	– Dynamic activity centres	c
	– Use of shared spaces to community services	c
Active Design. Planning for Health and Wellbeing through sport and physical activity, UK	– School sports and facilities for students during school hours and to the community on weekends	c
	– Sport England’s Guide	b-c
The influence of land use mix, density and urban design on health: a critical literature review, UK	– Public spaces safety and long maintenance	b
	– Good design	c
	– Local collaboration for its management	c
Public Health and Land Use Planning: Highlights, Canada	– Manage groundwater reserves	b
	– Sustainable urban drainage in urban centres	b
	– Update flood plans according to climate change	b
	– Energy efficiency criteria	a-b-c
Creating a healthy environment: the impact of the built environment on public health, the United States	– Traffic calming measures, as crosswalks, protections at crossings	a
	– Safe bike lanes	a
	– Traffic signs and traffic lights.	a
	– Walkable streets	a
Design for Health. Planning Information Sheet: Integrating Health into Comprehensive Planning, United States	– Speed limitation signs, overpasses, undulations in the route	a
	– Walkable routes	a-b
	– Texture and material of the road pavements and trees;	a-b
	– Green roundabouts	a-b
Spanish Network of Healthy Cities	– Health promotion and protection strategies	a-b-c
	– Evaluation criteria and unified indicators for urban health	a-b-c
	– Disseminate information to the Regional and the European Networks	a-b-c
Spanish Network of Elderly Friendly Cities	– Technical support and training to promote active ageing	a-b-c
	– Disseminate information and best practices	a-b-c
UNI-Health Project, EIT Health, European Union	– Joint virtual library	a-b-c
	– Academic methodology to visualise urban health at neighbourhood scale	a-b-c
	– Strategic action plan	a-b-c
	– Multidisciplinary network	a-b-c
Health and sustainable urban development, Spain	– Prioritise policies that reduce health inequalities and mitigate climate change	b
	– Improve the quality of “green” and open spaces	b-c
	– Promote active displacement	a-b-c

(continued)

Table 3.3 (continued)

Selected plan or document, Country	Strategies by document	Determinant factors ^a
Impact on health of Uretamendi-Betolaza urban renovation project, Spain	– Estimate the magnitude and distribution (by age, sex, socioeconomic condition, etc.) of the health impacts	a-b-c
	– Propose indicators for monitoring the health impact	a-b-c
	– Make recommendations	a-b-c
Medea and IneqCities Project, European Union	– Planning for health equity at the urban level	a-b-c
	– Prioritisation of health problems and interventions	b-c
	– Monitoring and evaluation of the actions proposed	a-b-c

Source: Authors' own data and summarised proposal on the three strategic guidelines

^aDeterminant factors. (a) Safer and walkable neighbourhoods, (b) Nature based solutions and more green spaces, (c) Intergenerational coexistence public areas

industrial pollution problem more or less solved by planning has been replaced by various other forms of pollution, some more diffuse and others more specific (amongst others, particles, gases, acoustics, visual) due to the transport of people and goods from one urban area to another. In spite of everything, it seems that it is one of those issues that can be solved more easily if the necessary conditions are put in place. Thus, the intended use of clean energy and much more efficient systems are being considered.

But probably, as many authors have denounced, the most important health problems are those derived from a sedentary lifestyle. Among others: obesity, cerebrovascular accidents, diabetes, some types of cancer, fibromyalgia, heart diseases such as heart attack, metabolic syndrome, cholesterol problems and high blood pressure, and many others of a psychological nature (such as depression) caused by the massive use of the car. This use progressively locks up the inhabitants of today's cities either in their homes or in their cars, in such a way that no type of physical exercise is carried out. And, above all, the cheapest and most elementary physical exercise such as walking is not frequently carried out. Also, active ageing is a way of understanding the old age that begins at birth. So, that reaching an advanced age in perfect physical and mental conditions has to start from childhood.

It is necessary to change the focus of current master urban plans and projects so that the goal is to build walkable cities, to be able to move pleasantly from one place to another on foot. There should be a series of six conditions that can be summarised. The first three are critical: sufficient density, complexity and contiguity. The other three are also important, but they act in a complementary way to the previous ones: comfort, security and a system of priorities that favour the pedestrian, (a low dose of moderate to vigorous physical activity reduces mortality by 22% in adults aged ≥ 60 years (Hupin et al. 2015).

Without density, there is no urban life possible. Sufficient density should be determined by the activities themselves. Thus, in order for children to be able to walk to school, it is necessary for enough schoolchildren to go to the school. It is the same with products that are acquired every day, or with a park, or with any facility of urban life. In other words, the density would be determined by the type of resident population and by the urban activities that this population has to carry out and that are considered critical. In this case, the critical activities would have to be directly associated with those that are frequently carried out after a certain age (Schaie and Pietrucha 2000).

The second necessary element has to do with complexity. Urban areas should be complex.

Complexity means the existence of diverse and interrelated elements. Thus, the more different elements and the more relationships between them, the greater the complexity. Diverse elements such as ages, jobs, economic conditions, hobbies, level of studies, etc. are necessary. A neighbourhood, district or urban area, only of elderly residents, of high economic capacity; or exclusively with residential buildings for protected housing is not sustainable. It is essential that, in addition to residences, there are offices, workshops, facilities, schools, day care centres, and even compatible industries. And, of course, that people of different social and economic status can find accommodation. Without this condition, it is impossible for an urban area to function in a more or less autonomous way. And as far as the elderly are concerned, it is precisely the opposite of confining them in separated zones and segregated from the rest of the population.

Finally, there is a need for continuity in the urban land use model. The present system occupying territory with urban fragments separated (sometimes tens of kilometres long) from each other, makes it impossible to move by foot. Furthermore, this is not only by walking but also by public transport, which also needs enough density to be profitable and which does not multiply the need for stops with the consequent lengthening of travel times between one place and another.

With regard to the other three conditions (elderly comfort (Guergova and Dufour 2011), safety and priority to the pedestrian) it should be said that they depend very much on the urban area considered and on the fulfilment of the previous ones. As far as comfort is concerned, mention should be made of the need to achieve a certain degree of climatic comfort, for which the urban designer has tools such as the bioclimatic chart, which, by manipulating certain parameters such as sunshine, wind or humidity, allows the conditions of the site to be thermally adapted so that it can be considered as comfortable. But also, especially in ageing societies, with topography without excessive slopes and accessibility conditions (cities for all) that meets the standards required by legislation. Similarly, that the rest

areas have adequate and well maintained facilities, benches in shaded or sunny situations when necessary, fountains, services and even in certain free Wi-Fi places or the possibility of access to them. In addition to comfort, security is essential. This is probably one of the issues that can most dissuade the use of public space in the case of elderly people. Firstly, there is the safety against accidents. It is necessary to take care of the design of sidewalks and traffic lanes so that as little interference as possible is produced and always produced in favour of the aged pedestrian (Takano et al. 2002). It is particularly important to think of the conflicts produced by shared traffic routes (bicycles, cars, pedestrians, scooters). In addition, maintenance is vital because a neglected sidewalk can lead to falls and problems. But also, security against crime has to be considered. There are methods such as CPTED (Crime Prevention Through Environmental Design) (Cozens et al. 2005) that allow the urban designer to achieve significant increases in the perception of security (subjective security) and also the reduction of certain types of crime such as the so-called “crimes of opportunity”.

Something very important in the design of cities is the priority for the pedestrian. In today’s city, the priority is clearly on the private car, whether one considers the widths of roads and sidewalks, waiting long times at traffic lights or even at many intersections. But priority must also be given to other transport systems such as bicycles or, more modern scooters. A different sector corresponds to public transport, in charge of transporting pedestrians over distances that exceed walking distances in normal times. So, it could be understood as a complement to pedestrian movements.

3.3.2 Nature Based Solutions and More Green Areas

Nearby green areas should be for public use and in the public domain, of an adequate size appropriate to the needs of the population they serve, although small enough to be managed by the residents themselves and distributed throughout

the urban fabric of the city. In addition, it is essential that they should be interconnected with each other by corridors that also provide additional uses that cannot be produced in small areas (paths for running or walking, routes carrying out sequences of physical exercises, bicycle lanes, etc.). This is known in specialised literature as urban green infrastructure (Aram et al. 2019).

Some authors, such as Shanahan et al. (2015), maintain the need to establish “minimum doses” of nature so that these nearby green spaces should be the vital public network of our cities. Even others like Louv (2008) speaks of the life that takes place in a cement-based urban environment as basically producing what is called in the specialist literature a disorder by “deficit of nature”. There are numerous studies that state this in such a way that, following Kaplan’s (2001) terminology, they act as “support environments” for the development of crucial activities in daily life, such as the static activities walking and physical exercise. That is to say, activities of relation and social interchange.

With regard to physical exercise, there are also quite a few works that relate the existence of proximity green spaces with an increase in the performance of physical exercise, which is essential if we want to act against a sedentary lifestyle, as shown in Choi’s works (Choi et al. 2017). Even the benefits in this aspect increase in relation to elderly people. Of course, these green areas must have the same conditions that have already been specified for public space in general. In other words: comfort, safety and priority for the pedestrian. Each one of them should take into account the considerations specified above: climatic comfort (temperature, relative humidity and wind in appropriate conditions), topographic comfort, accessibility, safety against accidents and delinquency, priority for pedestrians and public services. This is particularly important for the elderly, although often neglected.

There is much evidence of the physical and mental benefits of nearby green spaces (Shanahan et al. 2015). Thus, from Wilson’s works on biophilia (Wilson 1984) to Ulrich’s on stress reduction (Ulrich 1983) or Kaplan’s nature restorer effector, many authors highlight their importance.

Even according to Ulrich’s so-called “psych evolutionary theory” (PET), these benefits can be derived from the simple contemplation of trees that can be seen from a window.

However, the introduction of nature into the city should not only be done through a network of nearby green areas, but it is important to have green spaces of different sizes and with different activities and services. According to (Sukopp and Werner 1989), there is an inverse relationship between the size of nature areas and their frequentation, which does not mean that there should only be very small frequented areas. It is important that there should be diversity both in the sizes and in the objectives to be achieved in each of them. Thus, in a large city, small, almost domestic areas (green pockets) of daily frequentation to large, sporadically visited metropolitan parks, are necessary. This is due to the fact that certain functions of public space require conditions that cannot be provided in all of them. Particularly, those that refer to social relations between people who do not know each other, are typical of the urban way of life.

The green zones, besides having direct benefits on the physical and mental health of citizens, have other qualities that are necessary to mention. For example, green areas can help reduce the so-called “heat island effect” which, with climate change, will become an increasing problem in some cities (Demuzere et al. 2014). Cities have large energy consumption concentrations much of which is dissipated as heat in the surroundings. Green areas reduce temperature, increase humidity and also help if they are properly designed, to reduce air, noise and visual pollution.

As mentioned at the beginning of this section, the need to link all urban, peri-urban and metropolitan green areas should also be addressed. Not only because of ecological needs, maintenance of biodiversity and greater resilience, but also from the point of view of the possibility of carrying out some types of physical activity that are difficult to do in isolated spaces. The union of all the green areas with each other, accompanied by ecosystem services, is what has been known in specialist literature as “green infrastructure”. And precisely some of the ecosystem services provided by this

type of infrastructure are related to health, particularly of the elderly.

Finally, and in relation to the point that will be seen below, also to the benefits mentioned (amongst others) of controlling the urban micro-climate, reducing pollution, fighting sedentary lifestyles or improving the mental conditions of neighbours, there are many other studies that show the importance of the introduction of nature in cities related to welfare and social cohesion. For example, a study carried out by (Kuo and Sullivan 2001, pg 45) with 145 people in a relocation neighbourhood, after classifying buildings according to their proximity to natural or naturalised environments, anticipates that “proximity to nature is positively related to a greater capacity for attention, more positive social behaviour and the reduction in the appearance of aggressive behaviour and even the reduction of criminal activities”. In other words, the proximity of green areas helps to improve psychological balance and the probability of a higher level of social cohesion.

3.3.3 Intergenerational Coexistence Urban Places

Although all that has been said so far is no more than the search for spaces for coexistence, it is necessary to attend to certain issues of almost priority interest related to what could be called “intergenerational coexistence”. It has already been mentioned for the need for a sufficient density that supports urban relationships. If there are few or no people, it is difficult to establish interpersonal relationships. It has also been said that complexity is essential, and in the case that we are dealing with, with demographic complexity. All ages should be present in public space (in streets, squares, parks) because older people feel comfortable and more animated in the company of young people and children (White 1980), and children need their elders because they learn from them. If there are only older people (or only young people and children) in an urban area, urban life suffers.

And at least one paragraph should be devoted to urban facilities. It is not well known why children’s games are usually separated (and at a long distance) from the facilities that are now normally placed in parks or boulevards for the elderly to exercise or rest. If they come together, there can be communication and mutual help between them. It is also necessary to study very carefully the case of dogs and how to achieve a peaceful coexistence between them. And if we are talking about urban furniture, it is almost essential to place fountains, benches and public urinals in the places and at a sufficient distance to make the walk or stay comfortable (and sometimes simply possible) (Takano et al. 2002).

For common use by all, a public space must meet a set of appropriate conditions. It is necessary to “activate” this space. Explicitly, to give it social and relational content. This can be done from an institutional perspective or by the people who live in the area. Initially, it is usually necessary that the local institutions are the ones that start the process. This is usually carried out and is quite understandable in some cases. There are many examples of how a space with the correct conditions can become a welcoming space (Maas et al. 2009). In the Lumpini Park, in Bangkok, at certain times of the afternoon, you can see groups of people who, commanded by the corresponding instructor, carry out aerobic exercises. In Madrid, certain spaces have become community gardens run by collectives that are in charge of their cultivation and harvesting. In the *Puerta del Sol* in Fuengirola, groups of teenagers, adults, parents and children congregate to play and exchange materials through the Internet, as there is free Wi-Fi in the park. In a square in Vitoria-Gasteiz, a giant chess game brings together chess players. In Cali, a park and a street have become an improvised museum of modern art. All these are examples of different ways of activating public space and turning it into a pleasant and nice place.

With regard to public facilities, same methodologically guidelines mentioned in previous sections should be followed. In such a way that multifunctional spaces should be prioritized over more specialized ones. The so-called “old people’s clubs” and the like should be changed

Table 3.4 General guidelines in the three strategic areas determined by the literature review

General guidelines strategies		
1. Safe and walkable neighbourhoods	2. Nature Based solutions and more green areas	3. Intergenerational coexistence urban places
Thermal comfort	Nearby green areas	Facilities location
Acoustic comfort	Drainage and soil permeability	Proximity
Safer streets	CO ₂ sink elements	Accessibility
Identity	Acoustic control	Social networks
Commercial streets	Brown field control	Mixed uses
Pedestrian mobility priority	Microclimatic urban conditions	Diversity
Public transport	Thermal comfort	Identity
Bike lanes		
Accessibility		

Source: Author's own data 2019

into places where events are held for everyone (also for the elderly). Increasing complexity improves coexistence by giving more opportunities for interaction and also improves the economic performance of the equipment.

In general, one could say that one of the most important problems faced by the elderly is loneliness. In the words of Pirostka Östlin at the International Forum on Solitude, Health and Care, held in Madrid in November 2018, “unwanted solitude can be defined as a perception of social isolation” (Östlin 1989, pg 77.), that is, something subjective, as opposed to social isolation, which is something objective: “Isolated people feel much more alone than those who are not, but loneliness as a sensation can be present in people who are constantly in company”. There is an important relationship between loneliness and health in a double sense. On the one hand, mental health issues increase the risk of isolation and unwanted loneliness and also the difficulty of maintaining social relationships: “Out of 10 people who were classified as ‘alone’, 6 of them blamed their mental and physical health issues,” notes Östlin. In addition, loneliness has an impact on health. An American study, which followed 3.4 million people for 7 years, found that 26% of people with a close relationship to loneliness had an increased risk of premature death. So, according to the conclusions of this Forum, “people who feel lonely have a greater tendency to suffer cognitive impairment and there is a greater relationship between loneliness and heart attacks,

depression, alcoholism and anxiety” (Maas et al. 2009, pg 167.).

It is therefore essential to the proper functioning of this type of space to help to avoid one of the biggest problems faced by older people such as loneliness. But, probably, this functioning cannot be maintained indefinitely by the institutions, but it will be necessary to leave it partly in the hands of the users themselves. Thus, the need arises for real and effective participation on the part of the population involved. However, in order to be effective, three conditions should be satisfied: an initial commitment on the part of the administration; constant and permanent structures over time, and finally, the convenient existence of a physical place of reference located in a suitable place co-managed by the administration and by the neighbours themselves. In addition, support for new technologies seems to be an influential factor in the process.

Table 3.4 summarizes the general guidelines in the three strategic areas determined by the literature review.

3.4 Recommendations in the Spanish Context

Most of the Spanish population live in urban contexts by 2019, where more people aged over 60 live, according to INE data for 2018 (Abellán et al. 2019), the percentage in this age range reaches almost 25% of the total (as opposed to 15% less than 14 years old).

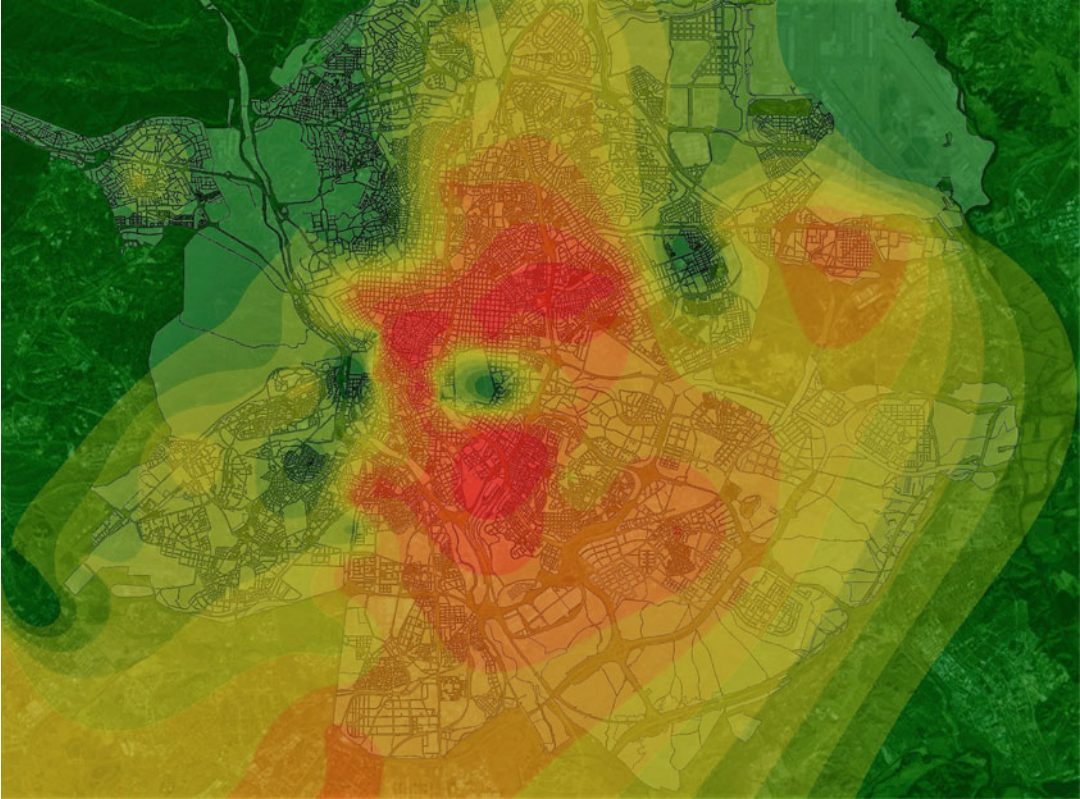


Fig. 3.2 Urban heat island in Madrid 2015. There are several hot spots (more dense areas) and cold spots related to the presence of large parks (in green) (source: MODIFICA Project, ABIO Research Group-UPM, Núñez Peiró et al. 2017)

The quality of life of the elderly has been the object of study from the local and state administration in Spain. Elderly people living in Spanish cities are at high risk for respiratory and cardiovascular diseases. Pollution of urban areas and the presence of urban heat island or heat islands, are a real threat in large cities such as Madrid.

In the city of Madrid, (Fig. 3.2), recent studies have determined the existence of several heat sources due to the growth in extension of the constructed zone, the increase in pollution, the smaller presence of the wooded zones with respect to the constructed zones and the greater number of impermeable and low albedo surfaces (Román et al. 2017).

Madrid, Barcelona, Valencia, Seville and Bilbao are the five cities with the highest mortality rates attributable to the increase in temperatures for the coming decades, so it will be necessary to incorporate new elements of

urban design (Nikolopoulou and Steemers 2003) to achieve a suitable outdoor microclimate for older people living in the city.

Spain is a territory with a lot of diversity due to its geomorphological and climatic conditions, which have determined the population settlements since remote times (Pozo Menéndez 2019), so in order to establish a general recommendation it is necessary to consider factors related to climate, population density, urban size, the presence of heat islands, social and economic conditions, etc. Accordingly, Table 3.5 presents in a simplified, schematic and approximate way the decisive factors that influence citizens' health, adapted from Borrell et al. (2012), according to the guidelines proposed.

The need to establish a different response to each situation will require the development of plans, actions, policies and programmes of very diverse nature in the Spanish context. The three

Table 3.5 Determining factors for a healthy city in the Spanish context

Three strategic lines proposed	Considering the difference on Spanish areas		
	Environmental	Built and urban conditions	Social and economic factors
1. Safe and walkable neighbourhoods	Climatic zones in Spain ^a Urban microclimate (wind, sun and vegetation conditions) Climate Change effects	National Code Legislation: (CTE) (MFOM 2019) Urban heat island (UHI) Projections of UHI, facing climate change Air pollution and air quality Master Plan and urban determinations Building types and characteristics Accessibility	Population size Economic factors (Borrell et al. 2012) Predominant activity Employment and working conditions Public policies: health, social services, education Security
2. Nature Based solutions and more green areas	Geographical conditions Green Infrastructure Blue Infrastructure Climate Change effects Pollution and air quality	Geographical conditions Urban green areas Urban heat island (UHI) Projections of UHI, facing climate change Accessibility	Management and conservation Proximity agriculture
3. Intergenerational coexistence urban places	Climatic zones in Spain Climate Change effects Urban microclimate (wind, sun and vegetation conditions)	Master Plan and urban determinations Social transfers Accessibility	Family, social structure Social networks Community participation Security, Identity Energy poverty

Source: Author’s own data based on Borrell et al. (2012) and general actions lines proposed

^aClimatic regions of Spain according to the National Geographic Institute are: Oceanic: Coastal, Transition, Mediterranean, Continental sub humid, Continental with cold winters, Continental with warm summers, Warm interior, Shoreline, Arid and sub arid, Subtropical and Warm Coast

priority actions: *Safe and walkable neighbourhood, Nature Based solutions and more green areas and intergenerational coexistence urban places*, should form part of most of the planning instruments that will be drafted in the coming years in order to establish priorities on active ageing.

3.5 Conclusions

Cities have to consider the needs of the older population living in them, as they are hampered by numerous factors, such as less mobility, lower cognitive capacities, different response times to eventualities and setbacks, greater fatigue, differentiated perception of risk and insecurity in the streets, amongst others. However, there are

many studies that establish the need for the socialisation of the elderly and the enormous damage caused by being kept in their homes, where loneliness and lack of self-confidence and mobility condemn them to worse living conditions. In many situations, the street is not friendly to them. It is for this reason that a multi-disciplinary new approach must be delivered, having planners as an important role.

The first conclusion is that there are a large number of proposals and regulations already underway, which establish the consolidation of these research issues and the need to adapt the general lines to the specific conditions of each city and each neighbourhood.

A summarised approach has been carried out, in order to condense all the urban design strategies into three large ones: nominated as

Safe and walkable neighbourhoods; Nature Based solutions and more green areas and finally new intergenerational coexistence urban places.

A contextualisation of these general guidelines in the Spanish context has been achieved, considering its environmental, built-up and socio-economic characteristics.

Finally, it is necessary to be cautious about what urbanism can really do. It has a certain capacity to make possible environments favourable to a healthy city or, on the contrary, to make them impossible. But there are many other fields that have capacity for influence. By means of urban design, it is possible to achieve friendly streets that invite people to walk or green places in proximity that make it possible, for example, for the neighbours to get to know each other. However, education or public awareness campaigns can have as much influence as planning. In other words, by means of a series of urban planning techniques, it is possible to achieve streets and more friendly neighbourhoods that make healthier cities possible for the elderly. It will therefore, be necessary to establish appropriate policies, campaigns, roundtables and child education in accordance with the model of active ageing that the local administration wishes to promote towards the rest of the actors of civil society, and planners should be able to proffer real active ageing solutions in urban public spaces.

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A Multi-perspective Discourse on the Sustainability of Water and Sanitation Service Co-production in Global South Cities

Giuseppe Faldi, Federica Natalia Rosati, Luisa Moretto, and Jacques Teller

4.1 Introduction

Poor access to water supply and sanitation (WSS) services is still a pressing challenge in many urban contexts in the Global South. It undermines the quality of life of the most vulnerable inhabitants and poses difficult questions on sustainable urban futures. In cities in the Global South, the provision of WSS services through conventional planning models, based on centralized networked infrastructures managed by public or private sectors, has often been unable to keep up with rapid urbanization processes and growing water and sanitation demands (Bakker et al. 2008; Coutard 2008; Coutard and Rutherford 2015; Furlong 2014; Moretto et al. 2018). In many urban and peri-urban contexts, the inability of WSS centralized systems to ensure

an effective and universal service has de facto led to the emergence of alternative practices for accessing water and sanitation, hybrid or decentralized, individual or community based (Allen et al. 2017; Bakker 2003). These practices seldom rely on multiple sources, socio-technical arrangements and determinate selling/redistribution dynamics that are complementary to the municipal networked system (Faldi et al. 2019; Kjellen 2000). Accordingly, attention to the sustainability of users' active roles in service provision and to alternative user-provider arrangements is growing at the international level.

The concept of co-production, developed primarily in the public governance and management literature, was recently introduced into WSS studies. Co-production was once defined as “the process through which inputs used to produce a good or service are contributed by individuals who are not ‘in’ the same organizations” (Ostrom 1996, p. 1073). With respect to WSS services, service co-production has been mobilized mostly in reference to decentralized community-based systems, and unofficial hybrid systems produced and operated through a regular long-term collaboration between state actors and communities during some or all the phases of the service delivery cycle (planning, design, delivery and assessment) (Faldi et al. 2019; Joshi and Moore 2004; Moretto et al. 2018; Nabatchi et al. 2017). As highlighted by international bodies (United Nations 2016) and scientific communities (Allen

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et al. 2017; McMillan et al. 2014; Mitlin 2008; Moretto et al. 2018; Moretto and Ranzato 2017), the interest in service co-production has recently increased. It is now recognized as a way to secure sustainable access to WSS services, especially for the poorest inhabitants.

Some studies have suggested that co-production may improve the equity and efficiency of provision, while also contributing to citizens' empowerment and local governments' effectiveness (Allen 2013; Mitlin 2008; Moretto 2010). However, others have highlighted how it may also be subject to resource capture by elites and to conflicts among groups over service management (Ahlers et al. 2014; McMillan et al. 2014) and lead to environmental decay and urban fragmentation (Cabrera 2015; Faldi et al. 2019; Moretto et al. 2018). Social, environmental and economic questions over co-production may therefore emerge, ones that deserve to be examined against sustainable urban service provision goals.

Despite this increasing interest, an integrated and transparent discourse on the sustainability of co-produced services has not yet been produced at the scientific level. When addressing the sustainability of WSS service co-production, there is a clear gap in the consideration of the complexity of the practice in sustainability assessments. On the one hand, research has often made reference to the general literature on WSS infrastructures, which has largely been arguing over the sustainability of alternative user-provider arrangements and decentralized solutions, mostly employing conventional triangular socio-economical-environmental approaches. As an example, while some authors have pointed out the management, environmental and equity challenges associated with decentralization (De and Nag 2016; Domenech 2011; Dos Santos et al. 2017; Furlong 2014), others have highlighted its potential capacity to reduce production and distribution costs and to increase users' flexibility when dealing with water stress (Ali 2010; Domenech 2011; McGranahan 2013; Opryszko et al. 2009). On the other hand, specific studies on WSS co-production have mostly analysed the practice from specific conceptual perspectives—such as its management and

governance systems (Mitlin 2008; Moretto 2010) and the relations between formality and informality (Ahlers et al. 2014; Allen 2013)—and most studies have addressed specific aspects of co-production by often mobilizing single principles of sustainability (e.g., equity, efficacy, ecological integrity, citizenship) without providing a systemic reading of their relations.

Recently, some studies (Faldi et al. 2019; Moretto et al. 2018; Moretto and Ranzato 2017) have suggested the need to analyse the co-production of basic services, such as water and sanitation, through an interdisciplinary approach taking into account their natural, social and spatial dimensions. Indeed, WSS co-production involves different dimensions: managerial, which concerns the relationships between users, intermediaries and providers; techno-environmental, which includes the technical infrastructures for resource distribution and treatment; and spatial, which includes the socio-spatial configuration of the service, with its accessibility and its geographical scale (Faldi et al. 2019). The understating of trajectories of WSS co-production in a specific urban context therefore requires consideration of the multidimensional interrelations between user/provider/intermediary relationships, the resource flow, and the technological and settlement/land characteristics of the service.

This study moves from the recognition that analysis of the sustainability of WSS co-production needs to rest on an integrated perspective, as basic service co-production cannot be understood outside its integrated conceptualization (considering natural, social and spatial dimensions). Such conceptualization therefore requires a re-discussion of key principles for questioning the sustainability of these unorthodox forms of service delivery. This chapter is aimed at contributing to the debate on sustainable provision of urban services by specifically developing a comprehensive understanding of the concept of sustainability when applied to the analysis of WSS co-production in the urban South. To this end, the study explores key dimensions of service sustainability through a complementary reading of the processes and outcomes of WSS

co-production on the basis of three main theoretical perspectives that cover multiple elements of the practice from different vantage points: governance-institutional, socio/political-ecological and incremental-urban. The final scope is to frame a series of conceptual principles/criteria and their interrelations relevant for assessing the sustainability of WSS service co-production in the urban South. The analysis is based on a systematic review of cross-cutting literatures on service co-production in the Global South, sustainable urban water management and urban studies. The review is integrated with empirical insights from four city-case studies of WSS co-production in the Global South, developed within the framework of an ongoing research project.

The chapter is organized in three parts. First, the limits and challenges of conventional sustainability assessment of WSS services are individuated. We stress the need for a holistic view of sustainability, especially with reference to a conceptualization of co-production that understands the practice in the relation between actor relationships, resource flows, technological dimension and area dimension. Second, the integrated reading of sustainability following the three theoretical perspectives is deployed while exploring the outcome and process elements, and their connections, relevant for studying WSS co-production. Finally, a complementary reading of these perspectives allows us to design a systemic framework highlighting principles and criteria to consider when assessing the sustainability of WSS service co-production in the urban South.

4.2 Sustainable WSS Services: The Need to Employ an Integrated Evaluation Approach for Co-production

Sustainability and sustainable management of urban WSS services are complex issues involving different stakeholders, scales and temporalities and requiring multidisciplinary knowledge and understandings. The meaning of sustainability

(and thus the scope of a sustainability assessment) can vary widely, depending on how it is considered by different actors and decision-makers.

In the last 20 years, the literature on sustainable urban water and sanitation has extensively engaged in setting principles and criteria and defining approaches and methods, capable of navigating this complexity. Some key features of the concept, which are now agreed among different researchers and practitioners, are fully embraced in the present study. These include the holistic and multidimensional nature of sustainability, which stresses the interrelations and interdependencies between and across socio-economic and biophysical systems, multi-scale levels, space and time (short and long terms); the existence of certain inviolable limits of these systems; the contextual characters (location-specific) of many considerations about sustainability; and the focus on supporting the present and future quality of life, a key component of sustainability that refers to people's objective and subjective needs for improving personal well-being (Gibson 2006; van Leeuwen et al. 2012; van Kamp et al. 2003; Weaver and Rotmans 2006; Wiek and Larson 2012).

Notwithstanding such common ground, the debate on sustainability has not yet produced universally applicable definitions of sustainability. Numerous approaches and frameworks to WSS management have emerged in the last few decades. They have often employed different perspectives when addressing the challenges and looking at the features of sustainability (Carden and Armitage 2013; Foxon et al. 2002; Lockwood et al. 2003; Ostrom 2009; Pahl-Wostl et al. 2010; Wiek and Larson 2012). Rijsberman and van de Ven (2000) classified the existing approaches into four main groups—ratiocentric, carrying capacity, ecocentric and sociocentric—on the basis of their primary focus on people's needs vs. environmental problems and on quantitative norms vs. qualitative values. More recently, a stronger claim for integration of these multiple conceptual perspectives as the key to address WSS service complexity has emerged as the mantra of WSS sustainability science (Bertrand-

Krajewski et al. 2000; Kallis et al. 2006; Wiek and Larson 2012).

From a conceptual point of view, integration has been largely expressed through the *triple bottom line* (TBL) approach, which offers a comprehensive framework to look simultaneously at the economic, environmental and social dimensions of sustainability (Leigh and Lee 2019; Levett 1998; WWAP 2015). This triangular model was mostly used as a background condition to define principles and criteria for assessing the performance of a specific WSS service or initiative, including questions of economic viability and incremental costs of alternative infrastructures, ecological outcomes, human safety and institutional governance (Guest et al. 2010).

From an operative point of view, part of the literature on sustainable WSS services has strongly advocated for an integrated approach to service management, grounded on multi-dimensional sustainability principles and considering WSS services as components of larger physical and organizational systems (Carden and Armitage 2013; van de Meene et al. 2011). Studies on integrated urban water management (IUWM) have highlighted the need to consider WSS services coordinately as the basis for addressing issues of environmental protection, economic growth, equity in water access and community well-being (Butterworth et al. 2010; Carden and Armitage 2013; Leigh and Lee 2019; Maheepala and Blackmore 2008; Pearson et al. 2010). Within this strand, the question regarding the potential of service decentralization has been crucial in nourishing the debate on the sustainability of alternative WSS services in recent years, including co-production arrangements in the Global South. On the one hand, the focus on decentralization of delivery functions, responsibilities and technology draws attention to system innovations and stakeholder participation as essential keys for ensuring a better quality and sustainability of WSS services (Leigh and Lee 2019; Serageldin 1995; Wilderer 2004). On the other hand, concerns regarding difficult management of the services, health issues and inequality due to service fragmentation have left open questions over the sustainability of

decentralized WSS solutions (De and Nag 2016; Domenech 2011; Faldi et al. 2019).

Notwithstanding this effort to include public and societal questions in water sustainability discourses, understanding the interrelations and feedback between the multiple subsystems of sustainability involved in producing an urban WSS service still remains a mayor challenge, especially in the case of alternative infrastructures in the Global South. This is due for several reasons. First, the majority of studies, initiatives and policies still adopt sectorial (i.e., looking just at some component of water sustainability or at isolated water systems) and technically rigid (i.e., over focused on technical elements) paradigms when assessing the sustainability of WSS services (Olalla-Tárraga 2006; Wiek and Larson 2012). In most cases, practical applications of the TBL approach have failed to consider all aspects and related principles of sustainability equally and to grasp the interrelations between dimensions of the service. As Wiek and Larson (2012, p. 3153) suggested, “a comprehensive perspective on water sustainability that equally recognizes depletion, justice, and livelihood issues in the long-term” is currently lacking in most of the mainstream approaches.

Still, studies on sustainability of IUWM and service decentralization have predominately addressed the management issues of the water service (water supply, wastewater treatment) or the engineering, economic and environmental aspects of technical innovations (following principles of cost effectiveness, social acceptability and wise use of natural resources). Conversely, studies have left little space for cultural and political considerations and for aspects related to the quality of life of service recipients (Butterworth et al. 2010; Pearson et al. 2010; Wiek and Larson 2012; Wilderer 2004). In fact, as Tàbara et al. (2008, p. 48) highlighted, most of the current paradigms for the sustainable management of WSS services adopt tools and methods that address a “single area of reality”, without considering the multiple ways of understating factors of change related to the overall sustainability problems. This is the case in most of studies focusing on alternative WSS services in

the Global South, where the question of sustainability has been predominately addressed with environmental, social and economic metrics, but without really highlighting the systemic relations between and the impacts of the multidimensional aspects characterizing decentralized or hybrid services (Carden and Armitage 2013).

Second, a non-transparent display of values and principles guiding a specific WSS initiative and an over focus on its outcomes were also evidenced as strong limits of mainstream sustainability evaluation approaches, especially when referring to decentralized solutions in the Global South (Bertrand-Krajewski et al. 2000; Leigh and Lee 2019; Wiek and Larson 2012). As Pearson et al. (2010) showed, sustainability should be increasingly recognized not just as an outcome, but also as a process; it is “not a state to be arrived at but a broad evaluative framework for understanding and justifying social practice” (Lundie et al. 2005, p. 1). A stronger focus on the cognitive and behavioural processes connected with sustainable water management is therefore needed, going beyond the mere measuring of the achievement of a certain output. In fact, IUWM has prevalently employed measurement approaches based on metrics of sustainability defined in relation to qualitative and quantitative outcomes of the services, such as TBL reporting, life cycle analysis, ecological footprint, analysis of water quantity and quality, and cost-benefit and multi-criteria analysis (Balkema et al. 2002; Erbe et al. 2002; Hellstrom et al. 2000, 2004; Lai et al. 2008; Lundin and Morrison 2002; Pearson et al. 2010; Rees 1992). As Guest et al. (2010) and Montgomery et al. (2009) suggested, metrics looking at the functionality of the practices that can capture the evolutionary characters of the service in relation to managerial, economic and community demand components are required.

Overcoming these emerging challenges in the evaluation of alternative WSS services in Global South cities makes it necessary to embrace an holistic view of sustainability, namely to “look beyond single factors (e.g., water supply or water quality) to the interactions of multiple factors, all of which may be important but impacted differently by various actions and actors” (Davis et al. 2016, p. 120). The peculiarity of WSS

co-production—a complex practice made up of managerial, techno-environmental and spatial dimensions—emphasizes the need to look at the connections and the integrated elements that can influence the sustainability of the practice. When addressing the sustainability of WSS service co-production, there is still a clear ambivalence reflecting a lack of systematic understanding of the key sustainability values and principles that may be involved in the evolutionary trajectory of the practice. When, where, for whom and with respect to which principle is co-production desirable? Which factors of co-production can relate to sustainability? Are we looking to both the process and the outcomes? By treating sustainability as an outcome, a triangular guiding question can emerge: does co-production deliver environmental, social, economic and political sustainability? Otherwise, the following could be a process question: is co-production a form of delivery that is politically, socially, environmentally and economically sustainable? Such questions express a general gap in the understanding of which process and outcome elements are worth observing when analysing the sustainability of WSS co-production.

By addressing this emerging gap, the chapter contributes to overcoming the limitations of using conventional triangular approaches to assess the sustainability of unorthodox WSS services, such as co-production initiatives in the Global South. This requires the disentangling of the concept of sustainability when applied to service co-production, namely exploring its meaning within the different literature strands that have differently addressed the multidimensionality of co-production. The goal is to combine different theoretical perspectives with empirical evidence to provide a systemic view of the concept of sustainability when applied to the study of WSS co-production.

4.3 Perspectives for Interpreting Sustainability of Water and Sanitation Co-production

Alternative socio-technical arrangements for producing basic services, such as co-production of

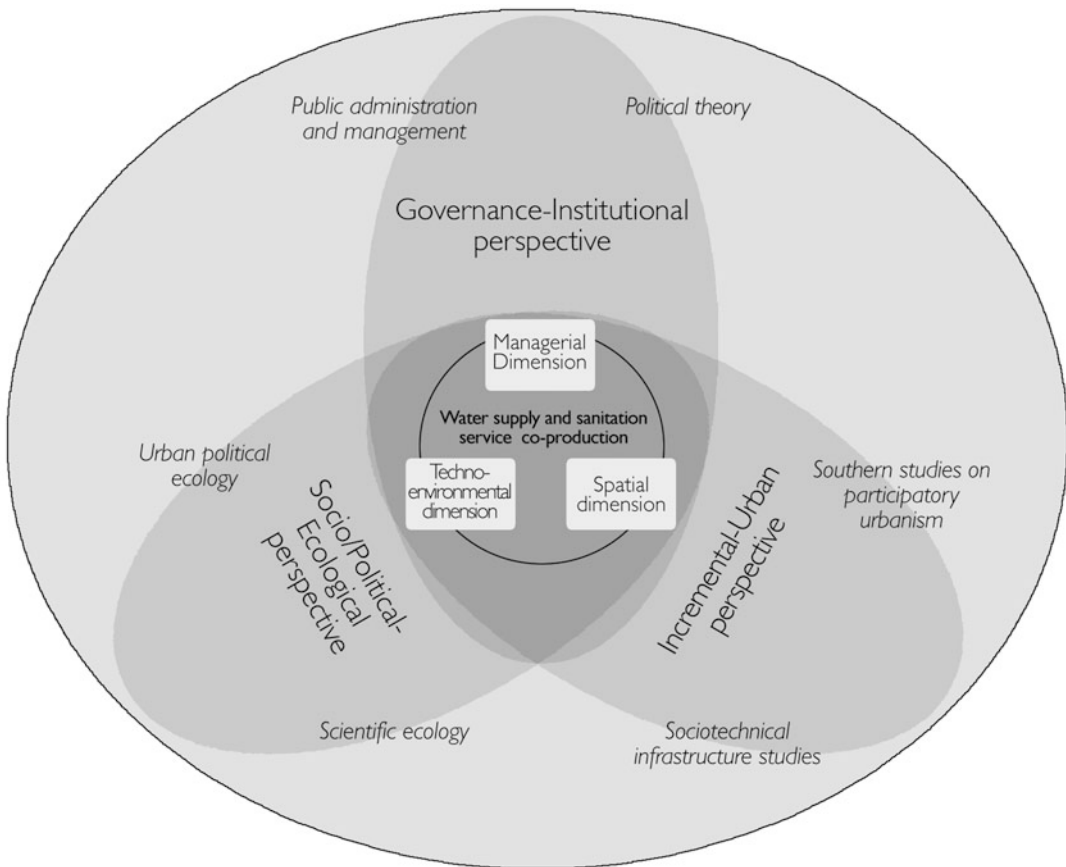


Fig. 4.1 Conceptual perspectives addressing the multidimensionality of WSS co-production

water and sanitation, have been studied in different literatures, from social sciences to applied sciences. Three theoretical perspectives in the study of WSS co-production, which have explored the interrelations between the managerial, techno-environmental and spatial dimensions of the practice in different ways, are identified in the present research: governance-institutional, socio/political-ecological and incremental-urban (Fig. 4.1).

The governance-institutional perspective has the strongest legacy in the study of service co-production since the first conceptualization of the co-production model by Elinor Ostrom in early 1970s (Bovaird 2007; Nabatchi et al. 2017; Ostrom 1996). This perspective, belonging to political theory, public administration and management scholarships, has primarily looked

at the managerial dimension of WSS co-production with less interest in grasping its techno-environmental and spatial characters. It has studied the potential benefit that co-production could offer to urban public governance through the development of decentralized management systems and the redistribution of certain levels of power and control from the state to citizens (Moretto et al. 2018; Osborne and Strokosch 2013; Ostrom 1996; Pestoff et al. 2012). Studies have mostly looked at the roles and responsibilities of actors (users/providers/intermediaries) involved in different levels (i.e., co-planning, co-design, co-managing, co-delivery, co-assessment) and scales (i.e., individual, group, collective) of service co-production (Bovaird and Loeffler 2012; Nabatchi et al. 2017; Verschuere et al. 2012)

and at the institutional regulatory frameworks facilitating co-production (Bovaird 2007; Pestoff et al. 2012; Verschuere et al. 2012), including questions related to identification of leading initiators (citizens or governments) (Jakobsen 2013) and motivations to co-produce (Van Eijk and Steen 2014).

The socio/political-ecological perspective, belonging to scientific ecology and urban political ecology scholarships, has primarily explored the relations between the managerial and techno-environmental dimensions of co-production. Unlike the widespread technocratic and apolitical approaches dealing with infrastructure development in the Global South, studies have addressed questions of poverty, marginalization, inequality and informality (Allen 2013; Kooy 2014) related to different socio-ecological configurations that are produced and transformed by socio-economic and political processes (e.g., urbanization, social power, capitalism and economic transactions) (Heynen et al. 2006; Monstadt 2009; Swyngedouw et al. 2002). This perspective has mostly looked at material characters of WSS co-production (quality/quantity/technology) within broader political and ecological contexts, being particularly focused on understanding which socio/political and ecological dynamics activate WSS co-production and how the materiality of co-produced WSS services influences social and ecological structures at different scales (Ahlers et al. 2014; Budds et al. 2014).

The incremental-urban perspective, belonging to contemporary studies on participatory urbanism and on the spatial nature of socio-technical infrastructures in the Global South, has mainly stressed the relationships between the spatial and managerial dimensions of co-production. Studies have mainly addressed the technologies of everyday life, namely technologies and techniques through which urban flows, infrastructures and spaces constituting the social life of cities are produced, maintained and reconfigured on a daily basis by ordinary citizens (Coutard and Rutherford 2015; Graham and Marvin 2001;

Graham and McFarlane 2014; Rosati et al. forthcoming; Silver 2014; Simone 2004). In particular, this perspective has mostly explored the roles of community in producing the urban space through evolutionary socio-technical WSS infrastructures and observed how co-production contributes to changing socio-spatial relationships, which ultimately can bring significant advances in the quality of, and access to, urban services and settlements (Faldi et al. 2019; Moretto et al. 2018).

The three perspectives cover the social/political and physical-technical evolutionary characters of WSS co-production in different ways, by alternatively mobilizing specific principles of sustainability to grasp the outcome and process elements of the practice. Through a review of the theoretical arguments on sustainability of WSS co-production within these different perspectives and an analysis of empirical cases, this study enhances the knowledge of how the concept of sustainability may be used when applied to WSS co-production. The research explores the key principles of sustainability, their interrelations and selective interpretations, and the relative outcome and process elements that have been used in each perspective for analysing the characteristics of the practice.

The literature review is combined with empirical insights from four case studies in the Global South, namely Hanoi (Vietnam), Addis Ababa (Ethiopia), Cochabamba (Bolivia) and Dar es Salaam (Tanzania). Empirical evidence is selectively used to sustain or counterbalance the conceptual discourses regarding the outcome and process elements of sustainability emerging from the review of each theoretical perspective. The four city-cases represent rapidly urbanizing environments where WSS co-production is a non-marginal phenomenon, which has developed with different managerial, techno-environmental and spatial characters (Table 4.1). They have been selected to exemplify a wide range of WSS co-production practices in Global South cities—from decentralized (such as community wells or

Table 4.1 Managerial, techno-environmental and spatial characters of WSS co-produced practices in the four city cases

	Managerial	Techno-Environmental	Spatial
Hanoi	<ul style="list-style-type: none"> – Co-funding and co-management of water infrastructures (i.e., pumps and water tanks) by individuals – Co-planning and co-management of secondary drainage system by users' groups 	<ul style="list-style-type: none"> – Hybrid system: co-produced water infrastructures (pumps, water tanks) connected to the municipal centralized network, and shared secondary drainage connected to municipal channel system – Emerging questions of lowering quality of surface water due to growing contamination pose environmental and management issues for co-produced practice 	<ul style="list-style-type: none"> – Group co-production of secondary drainage mostly occurs in peri-urban areas and former villages – Individual water co-production mostly emerges in both collective housing blocks and peri-urban new urban areas incorporating older settlements – State-driven urban development is transferring management of water and sanitation to households and groups respectively
Addis Ababa	<ul style="list-style-type: none"> – Co-management of shared water tap by water users' groups – Co-funding and co-management of water infrastructures (mainly water tanks) by individuals 	<ul style="list-style-type: none"> – Hybrid systems: co-produced water infrastructures (shared taps, water tanks) connected to the municipal centralized network – Emerging questions of water scarcity in the centralized systems due to poor water sources pose management issues for co-produced practice 	<ul style="list-style-type: none"> – Group co-production has historically occurred in slums, while individual co-production is currently emerging in both slums and publicly subsidized condominiums – The increasing water demand in the city is deeply connected with such forms of urban development
Cochabamba	<ul style="list-style-type: none"> – Co-planning, co-design and co-management of collective water networks, funded and operated by basic territorial organizations (OTB) – OTBs are officially recognized by the state after claims of a "human right to water" 	<ul style="list-style-type: none"> – Decentralized system: use of groundwater from shared well fields – Emerging questions of lowering groundwater table pose environmental and management issues for co-produced practice 	<ul style="list-style-type: none"> – Co-production emerges in growing peri-urban areas not served by the municipal centralized water systems – The water networks do not follow a specific urban pattern
Dar es Salaam	<ul style="list-style-type: none"> – Co-planning, co-design and co-management of shared water networks, funded by local authorities and operated by water user associations (WUAs) – Co-management of shared water taps by water users' groups, formally recognized and supervised by local governments – Co-management of decentralized wastewater systems, owned by local governments and operated by private intermediaries 	<ul style="list-style-type: none"> – Decentralized system: use of groundwater from community well, and of shared wastewater systems (DEWATS) – Hybrid system: co-produced water infrastructures (shared taps, water tanks) connected to the municipal centralized network – Emerging questions of lowering quality of groundwater due to growing contamination of shallow aquifer and seawater intrusion pose environmental and management issues for co-produced practice 	<ul style="list-style-type: none"> – Decentralized group co-production occurs in southern peri-urban areas not served by the municipal centralized water systems, while hybrid group co-production has historically occurred in consolidated slums – Co-produced practices always emerge at the territorial level of the local administrative unit

shared wastewater treatment plants) to hybrid systems (such as communal tap or neighbourhood secondary drainage)—coexisting with other networked or non-networked infrastructures. Case study analysis is grounded on desk-based

reviews of WSS policy and urban planning documents and a collection of face-to-face surveys, interviews and focus groups with inhabitants and local stakeholders, carried out by the authors between 2016 and 2020.

4.3.1 The Governance-Institutional Perspective

4.3.1.1 Outcome Elements of Sustainability

Within the governance-institutional perspective, the discourse on the sustainability of co-production mainly involves key principles of service efficacy/efficiency and the socio-economic equity of practice outcomes. Efficacy/efficiency corresponds to the capacity to allocate a service (i.e., efficacy or effectiveness) with the lowest economic and social cost involved (i.e., efficiency) and in such a way that no further reallocation is needed (Ingram et al. 2008). Co-production has been primarily considered as a service delivery strategy with the potential to increase the cost-effectiveness of local governments' actions (Parks et al. 1981). Economic aspects are seldom the primary reason for the engagement of governments in co-production, even if "improving effectiveness and service outcome are much more important for most governments than increasing productivity or cutting cost" (Pestoff 2014, p. 385). As Pestoff (2014) and Hudson (2012) suggested, strengthening end-user involvement in collective co-production at any level may result in improved service quality and economic viability with respect to individual co-production.

In the governance-institutional perspective, the efficacy/efficiency of the co-produced practice is mostly related to actor and management elements, such as the nature of the end-users' group, the type of service involved and how it is organized (Pestoff 2014). Such elements determine the feasibility and durability of the action. When referring to services relying on natural resources, such as WSS, the organizational dimension of a collective action has been extensively explored through Ostrom's principles for the governance of common pool resources (Ostrom 1990; Ostrom et al. 1999). Overexploiting water sources can lead to subtractive benefits for users at different urban scales (Pestoff 2014). System management mechanisms are therefore the elements where the outcome

sustainability of the practice resides. Such elements include: (1) the flexibility of institutional user/providers' relationships in defining collective arrangements and rules for limiting uncontrolled use of resources and for adapting to social and ecological changes; (2) the introduction of elements to regulate WSS practices such as monitoring, graduated sanctioning, and conflict-resolution mechanisms; and (3) the access and sharing of information about the state of the system and the action of other actors involved in the practice, to allow flexibility, learning, goal renegotiation, and strategy modification as needed (Anderies et al. 2004).

In line with Ostrom's principles, in the case of the OTBs in Cochabamba, we observed how the introduction of norms for regulation for water supply was fundamental for giving durability to the practice, in a context of increasing scarcity of resources due to limited groundwater. In Cochabamba, the shared definition of mechanisms of control and extraction of the common resource became the means to increase the efficiency of the service, limit water loss and minimize the costs of the purchase of water from private vendors. This case shows how the existence of pro-social motivations and the recognition of the collective value of a good/service can be the drivers to create ownership, increase managerial skills and finally define an effective management strategy.

Other studies (Jakobsen and Andersen 2013; Pestoff 2014) dealing with the governance dimension of co-production, have shown how the discourse on service efficacy/efficiency and management mechanisms to improve service quality, is strictly correlated with the key principles of socio-economic equity. Equity refers to the capacity of the services to provide an output performance able to allocate benefits and costs of the services to all the users efficiently, fairly and affordably (Wiek and Larson 2012). It is not defined in an absolute sense but with respect to the needs of people (Pena 2011; Talen 1997) and it is therefore based on a comparison of groups (Kooy et al. 2016), identifiable with respect to income, gender, ethnicity, geography or use of a service (conventional vs. alternative).

When referring to WSS co-production, studies have highlighted how discourses about service equity consider a series of objective and subjective outcome elements, including physical, economic and social accessibility to the WSS service (to resources and technology); the distribution of costs and benefits among users of the co-produced service and among citizens in general; the level satisfaction of users' needs and expectations with respect to the quality and quantity of the service; and the perceived value and acceptance of the service (willingness to pay or complaining) (Demsey et al. 2011; Kooy et al. 2016; Marques et al. 2015; Wiek and Larson 2012). The benchmark is usually represented by people's access conditions before the introduction of the co-produced service and by the performance of the existing conventional networked systems.

However, the relationship between equity and efficacy/efficiency may be bivalent. Increasing the quality and efficacy/efficiency of the co-produced service may or may not correspond with an equal service outcome for the involved citizens. As Jakobsen and Andersen (2013, p. 705) suggested, "distributional consequences" of co-production are directly related to knowledge and tangible resources of co-producers: "unbalance in knowledge and available resources may exacerbate gaps between advantages and disadvantages [for] service users".

The case of Dar es Salaam clearly shows such ambivalence and the variability of the equity principle when referring to different benchmarks. In southern peri-urban Dar es Salaam, we observed that the cost of water from co-produced systems, based on community wells managed by WUAs, is often higher than the water cost from the centralized municipal network reaching the most affluent areas in the north of the city (relative inequity), but still less than the cost of water purchased from private vendors (relative equity). If, on the one hand, the co-produced wells have given the inhabitants the chance to enjoy their basic needs in an area otherwise deprived of water sources, on the other hand, the access to the local systems often

depends on the economic resources of inhabitants and the distance to the main water infrastructures. In many areas, the equity of the system is directly proportional to the efficacy/efficiency and quality of the service. When WUAs have the management and financial capacities to develop and upgrade their own systems, through increases in revenues from the registration of new users and technological improvements (expansion of main pipe-lines, endowment of new pumps/reservoirs and drilling new wells), the quality and quantity of the service have improved and the benefits have been redistributed in a more equitable way. Furthermore, in some peri-urban areas of the city, this renewed access to water has given users the chance to develop new income activities, such as urban agriculture, food processing and livestock. This example testifies to how equity discourse requires considering the types of users' use and consumption of water/wastewater and their collective or individual economic activities. These elements convey users' needs and determine people's interest and responsibility in co-production. This also shows the importance of including evaluations of the potential role of co-produced practices within sustainability analysis to increase people's opportunities of pursuing economic activities beyond securing their livelihoods.

4.3.1.2 Process Elements of Sustainability

The governance-institutional perspective identifies the process elements of sustainability within the typology and mechanisms of participation in co-produced practice, considered as a potential catalyst for democratization and renewed political citizenship. Some studies (McMillan et al. 2014; Mitlin 2008; Nabatchi et al. 2017) have reflected on the role of co-production in pursuing "participation as citizenship" (Hickey and Mohan 2005, p. 238), as a result of its potential to increase democratic governance and to empower users. Nabatchi et al. (2017, p. 767) have suggested that co-production has a "normative value for society in terms of citizenship and democratic

governance, and social capital”. Mitlin (2008, p. 339) has shown how the promotion of self-help groups and transparent collaborations may “enable individual members and their associations to secure effective relations with state institutions that [both address] immediate basic needs and enable them to negotiate for greater benefits”.

This literature considers co-production more than a simple users’ consultation because it involves citizens in the planning and delivery of a service (Nabatchi et al. 2017; Pestoff 2014). In fact, synergic relations among users and between users and providers, as well as direct involvement in the production of the service, may favour users’ ownership over the practice, learning and building skills and capacities resulting from knowledge exchanges between actors (Moretto et al. 2018; Pestoff 2014). Nabatchi et al. (2017) and Pestoff (2014) indicated that the potential to foster democratic governance and citizenship, especially for the poorest and most marginalized inhabitants, resides in the collective interaction and greater responsibilities assumed by users within the co-production process. However, Moretto et al. (2018, p. 438) highlighted the risk that this potential can be neutralized and instead bring “depoliticization of the service production and delivery process”. Community participation can bring also along some significant limitations, such as the gap between rhetoric and reality, when speaking about participation in urban services (Moretto 2015), which means a differentiation between the “formal level of participation” and “the way that participation operates in practice” (Tunstall 2001, p. 2512), or the risk of an instrumental role in citizens’ involvement (Jessop 2002; Mirafteb 2004; Swyngedouw 2005).

The cases of Cochabamba and Dar es Salaam testify to the bivalency of the process sustainability of different forms of participation in co-production. In Cochabamba, WSS co-produced practice emerged from a social movement for “the right to water”. This created those synergistic group connections that gave process sustainability to the practice. The political imaginary produced by the idea of direct users’

involvement in urban production, and the legal recognition of OTBs that came in a second phase, assumed the key role in increasing social capital and in giving shape to a principle of citizenship. In Dar es Salaam, WSS co-production in the southern peri-urban areas was mainly connected with the need to satisfy a primary individual demand in a situation of the total absence of a reliable and fair source of water. The development of WUAs was the result of an infrastructure development strategy from the state that had local leaders and local water committees as the leading initiators of the initiative. Even if the users are involved in the election of the managerial board of the association, in many cases of community wells in Dar es Salaam, the absence of any real involvement of the community since the beginning of the process, and the consequent lack of ownership over the system, have led to the failure of some projects (as an example, the impossibility of maintaining the infrastructure when financial management boards have not secured the surplus funding to invest in improving the system). In the most successful cases, the cornerstone was precisely the ability of leaders and board managers to involve the majority of the inhabitants of the area in a process that was not just a consultation to ensure the necessary financial and human resources were available to support the development of the system. In some cases, WUAs have reached 5000 users having started with a few dozen.

These examples show how a co-production model could help to establish new democratic and sustainable institutions only when citizenship rights to produce the service are secured and when it is promoted by participatory processes that are inclusive, transparent and symmetrical from a communicative level. As Moretto et al. (2018) suggested, the early involvement of the users in the co-planning process of WSS systems may favour the creation of conditions that provide a renewed political citizenship for the co-producers. However, in most cases in the literature, WSS co-production could not provide adequate space for new democratization, being mostly limited to the co-management phase.

4.3.2 The Socio/Political-Ecological Perspective

4.3.2.1 Outcome Elements of Sustainability

Within the socio/political-ecological perspective, co-production is intended as an alternative service provision modality “produced as a result of the articulation of socio-political, economic, biophysical and infrastructural drivers whose interaction constitutes new practices, thereby producing new meaning” (Ahlers et al. 2014, p. 2). WSS co-produced service provision is therefore the result of the interactions between users and providers through a “dynamic set of social and material relations to access, provide, and control water supply” and disposal (Ahlers et al. 2014, p. 2) that influence the characteristics of water and its circulation (Budds et al. 2014). In such a perspective, the outcome elements of sustainability are defined in the relationship between the ecological integrity of the resource flow (considering both centralized and decentralized services, with their technological arrangements), with equity/justice in access to service.

In the literature, the principle of system ecological integrity refers to the capacity of maintaining the fundamental function of the water resource system by reproducing the fund elements in the metabolic process characterized by a material flow across the socio-ecological system (Falkenmark 1997; Madrid et al. 2013; Wiek and Larson 2012). Such a principle involves a balance between the needs of the co-producers (and of the other inhabitants) and the current and future capacities of the water system (Wiek and Larson 2012). It recognizes the physical connection between hydrogeological and socio-economic systems and the interconnectivity between the spatial and temporal scales of the co-produced practice. In this view, the question of ecological integrity requires considering the existence of certain boundaries of the co-production practice (qualitatively and quantitatively), from the upstream (take) to the downstream (disposal), and between different groups

of users or inhabitants in general. The physical trajectories of the water cycle of co-produced service involve certain inputs and outputs of the system, including the sources of water (quantity of resources), the technology employed, the quality of water (potable, non-potable, wastewater, pollution sources) and people’s consumption of water/wastewater to sustain needed activities and related practices of reuse/recycle and the disposal of water (Button 2017).

However, some studies (Faldi et al. 2019; Moretto et al. 2018) have shown that ecological integrity (and the closure of the local water cycle) is a relevant challenge for the sustainability of co-production and the quality of life of inhabitants. For example, in the cases of Dar es Salaam, Addis Ababa and Hanoi, we observed that none of the existing co-produced socio-technical arrangements considered the circularity of the water cycle. These is mostly due to poor capacity or a lack of centralized wastewater treatment systems, poor inhabitants’ awareness, and management and financial problems related to the operation of decentralized wastewater treatments. More specifically, in Dar es Salaam, we observed that some co-produced decentralized sanitation systems (e.g., DEWATS), built by NGOs and donated to local authorities and communities, have not been made operational for two main reasons: poor users’ willingness to pay desludging fees and a lack of agreement between private operators and local leaders regarding the percentage of service revenues to be redistributed to the community. As a result, diffuse untreated disposal into surface or ground water is deeply affecting the quality of urban agriculture and creating health risks for inhabitants.

In the socio/political-ecological perspective, as also highlighted in the previous examples, the trajectories of the water cycle and its ecological integrity are not just related to its physical and spatial elements, but also to how societal norms, organizational arrangements, and in general specific relations between certain actors, have determined (or not) a more equal service. As in the governance-institutional perspective, discourses of equity refer to economic, physical and social

accessibility to service, but the socio/political-ecological perspective is more interested in analysing the allocation of benefits, who gains and who loses (and how) from a certain WSS practice that entails a socio-environmental change (Heynen et al. 2006). In other words, the principle of equity does not refer to economical and physical distributional questions only, but it also includes an understanding of the evolution of political and ecological contexts that have determined certain conditions of inequality (Perrault 2014). In such a political perspective, equity is intimately correlated with a discourse of social and environmental justice, where justice corresponds to “the need for the socially [*and environmentally*] excluded to be acknowledged as legitimate claimants, to be recognized as having valid political, social and cultural standing” (Perrault 2014, p. 239), expressing their right to obtain a certain quality of life. In fact, especially in the cities of the Global South, inequality in accessing the service can be grounded in conditions of deep ecology vulnerability and elite capture of the best option within a diversified landscape of available WSS infrastructures. Service fragmentation in “archipelagos” is often the result of service privatization policies and/or decentralization policies, growing environmental pollution, limited availability of water resources, or poor infrastructure capacity of the centralized systems. These dynamics can work at different urban scales, given the multi-scalar nature of the water resource system, from global to local (Moretto et al. 2018).

In this perspective, looking at the equity of WSS co-production therefore involves understanding of the existing barriers to WSS access, including possible mechanisms of marginalization and exclusion in accessing the collective action, and socio-economic and ecological changes determining eventual disparities between groups of inhabitants with respect to their access to existing services, either co-produced or not (Kooy et al. 2016; Perrault 2014). First, such understanding induces consideration of if and how the quality and quantity of the accessed water fulfil all users’ consumption needs and desires or, by contrast, the limited consumption

of a certain group renders the access of a wealthier one more secure. Second, it requires an analysis of how biophysical processes and WSS infrastructures may influence the everyday politics of water and reproduce mechanisms of inequality (Ahlers et al. 2014).

The cases of Addis Ababa and Dar es Salaam clearly show how marginalization in access to WSS services may occur. In both cities, water co-production is a mechanism to fill the gaps in the centralized municipal network: in Addis Ababa in the form of hybrid systems, connected to the centralized network but independently managed; in Dar es Salaam mainly in the form of decentralized systems, existing within a landscape of different modalities of accessing water. In both cases, the boundary conditions of quality and quantity of the resource are affecting management options and equity/justice in accessing water service.

In Addis Ababa, in the slums and in the condominiums, the co-production of water service takes place at an individual level. It is used to fill the deficiencies of the centralized municipal system, which cannot provide a satisfactory water supply, due to the limited volumes available (i.e., there is 100% connection rate, but the service is limited to some days/week). As a consequence, inhabitants are obliged to store water individually and/or to buy water from private vendors at costs much higher than the network tariff. The current urban development strategy, which entails the relocation of slum dwellers in collective block housing, presupposes a transition to more energy-intensive technologies (e.g., from pour flush to normal flush toilet). This will require a further use of co-production at the level of resource storage, the cost of which is not affordable for the poorest citizens.

In Dar es Salaam, access to the municipal centralized system is a privileged condition for the planned city. The centralized network serves the richest areas (i.e., the connection rate is about 40%), while unplanned settlements are often not connected or partially connected through public fountains. Consequently, multiple water supply practices emerge, an archipelago of sociotechnical systems with different resource

qualities and costs per unit. The quality of the groundwater plays an important role in such a waterscape, as most of these alternative practices involves the use of groundwater as a primary source. These include the endowment of private boreholes, which redistribute water to group of inhabitants, and the installation of community boreholes managed by public water committees or by WUAs. In a city almost lacking a centralized sewerage system (i.e., the connection rate is about 7%), groundwater pollution—mostly due to percolation into the shallow aquifer of effluents from pit latrines and other agricultural and industrial pollutants (Mato 2002), and to growing seawater intrusion caused by over-pumping (mostly by industrial activities) (Faldi and Rossi 2014; Mjemah 2007)—makes the use of decentralized co-produced practices very risky for the inhabitants of the poorest areas, and it often requires them to purchase water from private street vendors at very high cost.

4.3.2.2 Process Elements of Sustainability

In the socio/political-ecological perspective, the process dimension of sustainability is situated in the existing power dynamics across the wider socio-ecological systems in which co-production operates. As previously stated, the political ecological literature has clearly highlighted that “socio-natural arrangements and water politics either enhance or challenge the unequal distribution of resources and decision-making power in water governance” (Boelens et al. 2016, p. 2). Metabolic flows of water and wastewater through the socio-ecological system may induce “enabling” or “disabling” conditions for different individuals and groups, producing conditions of empowerment and disempowerment (Heynen et al. 2006, p. 10). Consequently, WSS co-production cannot be always considered a neutral collaborative practice. It may instead reproduce asymmetrical relations of power and thus determine contested WSS services (Ahlers et al. 2014; Perrault 2014).

Uneven relations may emerge among different users, especially when WSS co-production is coupled with other WSS service arrangements.

Meehan (2014) has underlined the role of complementary technology (such as water tanks and booster pumps) as a means of power that allows inhabitants who can afford such artefacts to secure their individual access to the best WSS options, in the framework of the general conditions of limited water quality and quantity at the urban level. In the cases of Addis Ababa and Dar es Salaam, we observed that individual water tanks become instruments of power in the poorest areas. Equipping with such devices allows individuals to take a prominent position in the community, due to a more secure access to water and, when coupled with a private source (e.g., a private/group well), the possibility of reselling water to neighbours lacking other service options. These examples highlight how complementary technologies for adapting to disruptions in centralized systems can create new power relationships between inhabitants within the co-production process.

Faldi et al. (2019), Jaglin (2012) and McMillan et al. (2014) have shown that uneven power relations may also emerge between users, providers and intermediaries as a consequence of the contradictory role that WSS service co-production may have in the Global South. In fact, the state can consider co-production as a regulated transition phase towards an ideal universalization of the service through a fully centralized network. Still, co-production has sometimes been mobilized to justify the reduction of state responsibility and investments, especially when coupled with a service commodification policy (Faldi et al. 2019; Jaglin 2012). In such cases, “coproduction arrangements work to legitimate unequal power relations, not to change them” (McMillan et al. 2014, p. 203). Here, water supply and sanitation might play a different role where water supply is conventionally driven by private and market interests that can negatively affect co-production consolidation, while common interest in reducing pollution through sanitation in decentralized systems might support and motivate the involvement of users and private intermediaries, even if management and financial challenges persist, as highlighted above in the case of DEWATS in Dar es Salaam.

Infrastructure policies, key actors and their power relations (i.e., competition between power arrangements and competition in the long run) are therefore fundamental elements for assessing the process sustainability of WSS co-production in a socio/political-ecological perspective. As an example, what may happen when the conventional network arrives in settlements previously served by co-produced services? Cases of African cities show that social relationships and community power dynamics may disappear once the public network arrives, leaving space for new stakeholders and power relations. In fast growing cities, the competition between different types of WSS arrangements is increasing in peri-urban areas, with huge consequences in terms of sustainability of co-production (Jaglin 2002, 2012). As an example, in the cases of Addis Ababa and Hanoi, the transition from a collective form of co-production to an individual one is a recurrent dynamic connected with the development of new urban areas. In Dar es Salaam, the water authority is currently implementing a policy of recentralization of community-based fragmented infrastructures and replacement of local management boards with public ones. Such changes imply a reformulation of users' capacity to act within the socio-ecological system and of power dynamics across the socio-ecological system.

Still, political ecology research has highlighted how the presence of multiple practices of accessing water with various technologies (i.e., the complexification of the hydrosocial cycle) can translate into higher users' capacity to cope with urban and environmental transformations (increasing pollution, climatic variability and change, environmental hazard, urban expansion etc.), but it can also increase inequality—especially in the case of pollution of the main water source, where the costs of alternative solutions are higher and not affordable for the poorest inhabitants (Button 2017; Kooy et al. 2016)—and finally determine different organizational and power arrangements. By contrast, a recentralization of power may reduce users' adaptability to changing urban and environmental conditions, especially in contexts where the ideal of WSS

universalization has been largely disputed (Coutard 2008; Furlong 2014).

In a social/political-ecological perspective, ensuring sustainability of WSS co-production therefore resides in the enhancement of the “democratic content of socio-environmental construction by means of identifying the strategies through which a more equitable distribution of social power and a more inclusive mode of environmental production can be achieved” (Swyngedouw et al. 2002, p. 125). In their study about co-production of WSS services in Caracas, McMillan et al. (2014) defined co-production as sustainable when it is embedded in a wider political process that challenges asymmetric power dynamics and forms of patronage leading to elite captures, and when it is promoted through the full recognition of users' political, social and environmental rights to produce the service, a real prerequisite to ensuring (any form of) social and environmental justice (Perrault 2014). In line with such a statement, the case of Cochabamba has clearly shown how the question of rights was the lever to ensure the process sustainability of the OTBs' co-produced water systems.

4.3.3 The Incremental-Urban Perspective

4.3.3.1 Outcome Elements of Sustainability

The incremental-urban perspective considers WSS co-produced infrastructures as locally produced materialities that adapt and evolve, on an ordinary basis, within the socio-material assembly of the city. The literature has mostly analysed the role of community participation in the production of urban space and infrastructures with a specific focus on the socio-spatial outcomes produced by incremental sociotechnical arrangements (Coutard and Rutherford 2015; Graham and McFarlane 2014; Moretto et al. 2018; Rosati et al. *forthcoming*; Silver 2014; Simone 2004). This perspective identifies the outcome elements of sustainability within a discourse on efficacy/efficiency, spatial equity and socio-spatial cohesion emerging in the relation

between the sociotechnical configurations of the co-produced practice and the spatial-economic accessibility to the service, within multi-scalar patterns of urbanization.

In the literature, the question of efficacy/efficiency is primarily connected with the recognition of the potential capacities of users to improve service management (Moretto et al. 2018; Rosati et al. *forthcoming*; Watson 2014). As Watson (2014) suggested, state and citizens (service users) may have different but complementary forms of knowledge that together can contribute to improve the final outcome and, consequently, to move the services toward a more efficient and sustainable condition. Still, studies (Cabrera 2015; Moretto et al. 2018; Rosati et al. *forthcoming*) have underlined how the deployment of these co-production capacities demonstrates a pure socio-spatial value, as WSS services are strictly related to the mechanisms that drive the production of human settlements. In fact, co-production may trigger some degree of social and spatial change that emerges at different but interconnected spatial scales (Moretto et al. 2018; Rosati et al. *forthcoming*). In this view, the efficacy/efficiency of co-production is linked to the capacity of involved actors to integrate their technological and management knowledge with the production of local shared spaces and economy.

The cases of Cochabamba and Hanoi clearly show such relationships. In Cochabamba's southern areas, for example, the states can produce trunk services while citizens can produce related feeder services. Given the inaccessibility of groundwater, in a number of neighbourhoods, the municipal water company regularly provides water to collective water tanks, co-funded by citizens and governments. The construction and management of the piped network for water distribution in the neighbourhood is handed over to water associations or water committees which not only have the ownership and control over the infrastructure, but also invest water-related funds to improve the neighbourhood public spaces and facilities for residents. Likewise for sanitation, in Hanoi, we have observed that the government manages the main drainage pipes at the inter-

commune level, while communes are engaged in construction and maintenance of secondary drainage and irrigation canals within the territories under their jurisdiction. This allows communities, traditionally engaged in water-fed production (like rice production or fishing) to reuse waste (wastewater) and to turn it into a valuable resource (water for irrigation), while contributing to a primary, and often the only, form of wastewater treatment.

Within the incremental-urban perspective, other relevant debates around the outcome sustainability of co-production of WSS services mobilize the concepts of spatial equity and socio-spatial cohesion. With respect to principle of spatial equity, some studies (Faldi et al. 2019; Moretto et al. 2018) have shown how limitations in accessing a co-produced service might be affected by past or present conditions of spatial marginalization correlated with access to land and house tenure. State-citizen co-production is unlikely to take place in squatter areas or informal settlements, especially when governments and urban planning departments have interests over land for redevelopment (Bakker 2003). Addressing the question of equity through an incremental-urban perspective therefore requires a look at the settlement evolution with respect to the distribution of land accessibility to WSS services (with their technology) in the urban area and the existing governance forms and regulatory frameworks with respect to land. The analysis of spatial equity is therefore concerned with comparing the locational distribution of facilities or services (people's proximity to the resource/service) to the locational distribution of different socioeconomic groups (service costs and income distribution) in multiple urban typologies and land tenure positions (Talen and Anselin 1998). In this perspective, the idea of spatial equity can be applied both within the area where co-production occurs, and in different settlements in the city.

With respect to principle of socio-spatial cohesion, some authors (Cabrera 2015; Moretto et al. 2018) have suggested that co-production can reinforce the dynamics of socio-spatial fragmentation, based on the perimeter of the shared

resources, while triggering urban sprawl. However, co-production may also foster a shift toward a more inclusive way of governing the city and managing urban settlements, grounded on self-ruling mechanisms and participation in the sharing of resources and public space (Moretto et al. 2018; Silver 2014; Simone 2004). In this sense, co-production may allow forms of spatial reconnection in the city.

The case of Cochabamba is particularly illustrative of this bivalency. Here, we observed that community-based service providers play a relevant role not only in the planning and maintenance of the water infrastructures (generally mini-networks connected to wells or water tanks), but also in the production and consolidation of urban settlements. The water tariffs are often reinvested to improve the quality of shared spaces (i.e., street paving, tree planting, construction of public facilities) to strengthen social ties and solidarity among neighbours (i.e., economic support to funerals, festivities), and to prepare to cope with environmental transformations that could affect the robustness of their co-produced services (i.e. emergency funds in case of drought). However, neighbouring quarters are often competing for access to a supposedly common pool resource at risk of overexploitation. Given the lowering of the aquifer water table, in a number of neighbourhoods, we observed that new dwellers have been excluded from the connection to the existing network, and therefore they have to rely on more expensive water sources, such as purchasing from water vendors. Moreover, in a number of cases of community-based water networks, clientelistic logics, corruption and poor management of collective economic resources have been reported.

This example shows that the evaluation of the outcome sustainability in an incremental-urban perspective implies verifying whether WSS co-production fosters social cohesion between communities or, vice versa, it determines forms of exclusion of specific social groups from the decision-making process. Spatializing the distribution of benefits or the boundaries of co-production therefore helps us to understand whether co-production leads to a fragmentation

of the urban environment or contributes in creating premises for a better cohesion.

4.3.3.2 Process Elements of Sustainability

Within the incremental-urban perspective, the process elements of sustainability have been associated with users' and technical infrastructure capacities to learn and adapt to the incremental logic of urban production (Graham and McFarlane 2014; Graham and Thrift 2007; Hamdi 2004; King 2016; Silver 2014).

The literature on Southern participatory urbanism has moved from the recognition that "incremental", "tactical", "handmade" world cities are rapidly growing outside and beyond planning processes. While cities are rapidly urbanizing and infrastructure networks are evolving, the participation of communities in the production of contemporary cities, namely the processes of formation and consolidation of urban settlements and related serviced infrastructure, is considered as a fact. As co-designers and co-producers of the urban space, communities are described as the change processes or catalysts of change that can substantially contribute to more equitable and sustainable urban development (Hamdi 2004; McFarlane 2011; Silver 2014; Simone 2004).

In this perspective, incrementalism can describe how the sociotechnical processes of maintenance and repair of urban infrastructure by ordinary citizens produce knowledge and innovation. Accordingly, the co-production of WSS services, which is made by constant adaptation and reconfiguration of infrastructure systems, embeds a learning process, by which, through sharing different forms of knowledge, urban dwellers learn about their cities, their limits and the conditions of possibility (Graham and Thrift 2007; McFarlane 2011; Silver 2014; Simone 2004). The cases of peri-urban areas in Hanoi and condominiums in Addis Ababa clearly show how such a learning process often implies a direct action of the users within the service cycle through complementary technologies. In both cases, we observed how users' adaptive knowledge was mainly oriented toward the optimization and upgrade of the networked water

infrastructures through individual technologies to improve drinking water quality while guaranteeing a regular supply through the use of booster pumps and private storage tanks.

Co-production initiatives, like all sociotechnical systems, may induce profound transformations of broader urban processes (Graham and Marvin 2001; Monstadt and Schramm 2015; Moretto et al. 2018). The literature on sociotechnical infrastructure in the Global South has largely explored the constant evolution of “unfinished networks”, addressing the “incremental nature” of co-production by looking at how trajectories and transformations of co-produced initiatives constantly adapt to changing spatial conditions to feed their life-cycle (Jaglin 2014; King 2016; Rosati et al. [forthcoming](#); Silver 2014; Zerah 2000). As the physical elements of the water cycle are spatially located, there is an intimate relationship between socio-technical arrangements and settlement typologies that makes co-production profoundly differ from one case to another (Rosati et al. [forthcoming](#)).

The shaping of the physical, but often invisible, boundaries of urban metabolic flows of WSS services is embedded in the governance structure of the city and related services at large scales. Moreover, as water and sewerage pipes are embedded in the physical boundaries of housing systems, dwellers operate differently in the technical lifecycle with respect to their housing systems at a local scale (Habracken and Teicher 1998). The cases of Hanoi and Cochabamba exemplify the potential influence over the process sustainability of such adaptive dynamics between socio-spatial urban patterns and co-production arrangements. In both cases, urban households are continuously extending, upgrading and reshaping their living space, producing incremental urban development. A study on Hanoi planned settlements (Rosati et al. [forthcoming](#)), from Soviet collective housing blocks to current new urban areas, has revealed that the original settlement structure, building units and WSS infrastructures have served as supports on which infills, re-arrangements and extensions have provided inhabitants a meaningful participative role in the design process. Following these

transformations, WSS co-production initiatives have evolved from the collective to the individual scale. By contrast, in recent neighbourhoods in peri-urban Cochabamba, where residents are not yet connected to piped schemes, co-production has evolved from individual (households supplied by water vendors) to collective (small scale piped schemes) scale.

4.4 A Systemic Framework to Evaluate Sustainability of WSS Co-production

The literature review and the insights from empirical cases have shown how the trajectories of WSS co-produced practices are related to multi-dimensional elements that define its process and outcome sustainability in specific contexts. The research has revealed multiple elements related to the sustainability of WSS co-production, displaying the key principles that should be mobilized for the study of co-production in the Global South, their interrelations and their possible bivalency. In particular, the analysis has framed a set of outcome and process principles and criteria that systematically come into play when evaluating the trajectories of sustainability of WSS co-production in urban contexts in the Global South. The resulting framework is articulated in four outcome and three process principles and their relative criteria: efficacy/efficiency, ecological integrity, socio-spatial cohesion and equity as outcome principles; learning/empowerment, democratization/citizenship and adaptability as process principles (Table 4.2). These principles integrate the managerial, techno-environmental and spatial dimensions of WSS co-production differently, and they deeply intersect each other on two levels (Fig. 4.2).

The primary level of intersection follows the logic of the TBL model and defines the outcome elements of sustainability in the relationship between the principles of efficacy/efficiency, ecological integrity and socio-spatial cohesion. Interrelations between these principles are deeply connected to the process mechanism of users' learning with regard to the economic,

Table 4.2 Principles and criteria for assessing outcome and process sustainability in WSS co-production

Sustainability principles	Criteria—Governance-Institutional Perspective	Criteria—Socio/Political-Ecological Perspective	Criteria—Incremental-Urban Perspective	WSS Co-Production Dimensions
Outcome elements				
Equity	<ul style="list-style-type: none"> – Physical, economic and social accessibility to the WSS service (to resources and technology) – Distribution of costs and benefits among users – Distribution of WSS services compared to previous conditions and to the performance of the conventional networked service – Level of users satisfaction and users' willingness to pay for the service – Economic opportunity beyond securing livelihoods 	<ul style="list-style-type: none"> – Physical, economic and social accessibility to the WSS service (to resources and technology) – Allocation of benefits among users (who gains, who loses) – Fulfilment of users' needs and desires – Inclusion or existing barriers to access WSS services and marginalization in accessing collective action – Consideration of political and environmental conditions that have determined ecology vulnerability for users and service elite capture (social and environmental justice) 	<ul style="list-style-type: none"> – Distribution of WSS services to different settlement typologies and socioeconomic groups (proximity to the resource/service) – Presence of condition of service marginalization correlated with land entitlements and environmental degradation 	Managerial, Techno-environmental, Spatial
Efficacy and Efficiency	<ul style="list-style-type: none"> – Organization and management mechanisms (nature of the group, type of service, monitoring and control, flexible tariffs and subsidies) – Collective norms for limiting uncontrolled use of resource (enhance water-use efficiency) – Access and sharing of information 		<ul style="list-style-type: none"> – Improved service management capacities of users – Self-ruling mechanisms and participation in the sharing of resources and public space 	Managerial, Techno-environmental
Ecological Integrity		<ul style="list-style-type: none"> – Maintenance of the fundamental function of the water resource system – Balance between users' needs and the capacity of the water system – Upstream to downstream integrity (consideration of water cycle circularity) 		Techno-environmental, Spatial

(continued)

Table 4.2 (continued)

Sustainability principles	Criteria—Governance-Institutional Perspective	Criteria—Socio/Political-Ecological Perspective	Criteria—Incremental-Urban Perspective	WSS Co-Production Dimensions
Socio-Spatial Cohesion			<ul style="list-style-type: none"> – Maintenance of social-spatial relationships when changing infrastructural and urban boundary conditions – Equal distribution of benefits avoiding spatial fragmentation 	Managerial, Spatial
Process elements				
Learning and Empowerment	<ul style="list-style-type: none"> – Knowledge exchanges between actors – Building users’ skills and capacities 	<ul style="list-style-type: none"> – Equitable distribution of social power and a more inclusive mode of environmental production (addressing asymmetrical power relations and uneven services) – Enabling conditions for marginalized groups – Knowledge of the resource/tech service – Complementary technology as a means of power 	<ul style="list-style-type: none"> – Complementary forms of knowledge – Learning process (new skills and awareness of service-users) 	Managerial, Techno-environmental, Spatial
Democratization and Citizenship	<ul style="list-style-type: none"> – Level of inclusiveness of participation (symmetrical communication level) – Legal or institutional legitimation to co-produce – Securing citizenship rights and including marginal groups from co-planning – Ownership over the practice 	<ul style="list-style-type: none"> – Policies bringing common interests between users, intermediaries and providers – Wider radical political project for changing state-society relationships – Full recognition of users’ political, social and environmental rights 		Managerial, Techno-environmental
Adaptability		<ul style="list-style-type: none"> – Users’ capacity to cope with urban and environmental transformations 	<ul style="list-style-type: none"> – Constant adaptation and re-configuration of (urban and) infrastructure systems 	Managerial, Techno-environmental, Spatial

environmental and social management of the co-produced system, such as sharing of information and knowledge, investments in technology development, or monitoring and control mechanisms to avoid uncontrolled used of the resource, spatial fragmentation and economic collapse of the practice. Within the three theoretical perspectives, the managerial aspect of WSS

co-production is therefore considered as the key dimension to build those actors’ capacities to facilitate outcomes that are economic efficient/effective and socio-spatial cohesive, and to minimize problems related to poor ecological integrity of the practice. The emergence of such capacities is deeply connected with the conditions of the learning process embedded in co-production,

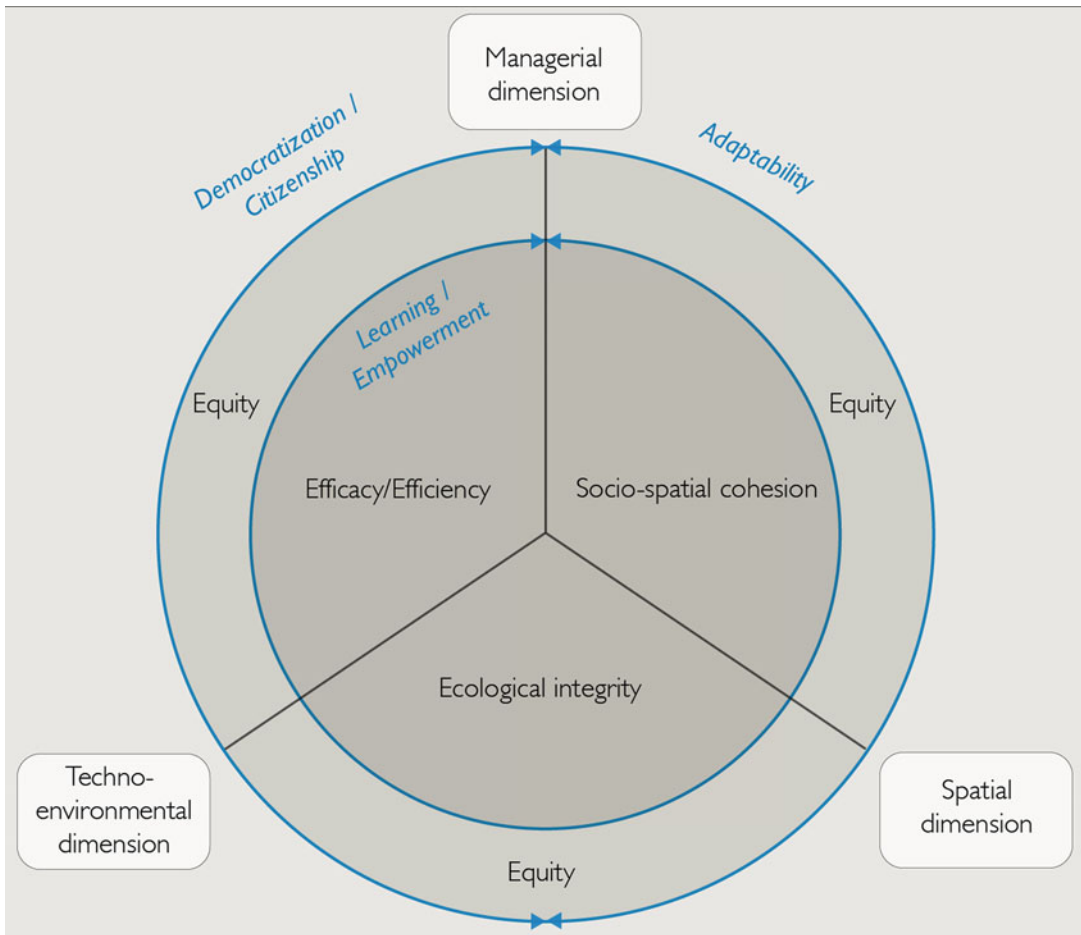


Fig. 4.2 Sustainability framework for WSS co-production

namely the level at which users can intervene in the physical space and in the decision-making process, as well as the level of inclusiveness, communicative symmetry and transparency of the participatory process.

The secondary level encompasses the primary outcome principles, and it is related to the principle of equity, which appears to be the cornerstone for most of the literature on WSS co-production. The principle of equity defines the interrelations between the elements of WSS co-production in its outcome and process values, which emerge at multiple interacting scales. At the local scale, the three primary outcome principles interface with respect to how equity is guaranteed by the co-produced service. In fact, specific performance of a WSS co-produced practice, measured in

terms of efficacy/efficiency, ecological integrity and socio-spatial cohesion, is often subordinated to the redistribution capacity of the practice, measured with respect to socioeconomic and spatial accessibility to WSS services and to the limitation of selective benefits from conditions of environmental, spatial and technological advantage or marginality of individuals or groups. An equal WSS co-produced system therefore connects objective aspects related to the fair and affordable performance of the service with subjective aspects related to the satisfaction of users' needs, namely the possibility of improving quality of life from the obtained benefits.

On the municipal scale, the question of equity involves the consideration of the relationship between WSS co-production with the existing

policies for infrastructural development and the ensuing environmental and urban transformations. In fact, case studies have showed that WSS co-production in the Global South may occur spontaneously as a form of adaptation to the deficiencies of the centralized system or, otherwise, it may be supported as a deliberate strategy following the process of decentralization and commodification of the WSS services. In both trajectories, co-production facilitates a dynamics of redistribution of material and immaterial advantages or disadvantages to users. Considering the relationships between resources, technologies, space and leadership/governance dynamics at multiple levels appears as the only procedure for observing the equity of WSS co-production.

Still, equity is often the outcome of a process of users' learning/empowerment and recognition of the right to co-produce, which in turn may facilitate citizenship and users' capacity to adapt to changing institutional, urban and environmental boundary conditions. Such a process may redefine the relationships between users, providers and intermediaries and related power relations. The consideration of equity as a principle involving multiple interactive levels implies the need to recentre the mainstream discourse on socio-economic equity typical in the literature on sustainable water management towards considerations of social and environmental justice and quality of life.

The principles of democratization/citizenship and adaptability therefore provide criteria that allow us to assess the potential connection between the outcome elements of sustainability and the progressive recognition of users' needs and political, social and environmental rights within the co-production process. As the literature review showed, the elements that can influence the process sustainability of the WSS co-production include the evolution of the governance arrangements in place at multiple scales, participation levels, regulatory frameworks and legitimation of user/provider relationships, and users' adaptive capacities. Still, case studies have shown how the principles of democratization/citizenship and adaptability can sometimes contrast in many urban contexts in the Global

South. Both principles imply users' learning/empowerment and the progressive awareness of users' own capabilities. Such process elements should be based on a form of active participation capable of creating the conditions to transform the co-produced system towards more desirable outcomes. However, this theoretical assumption has some practical limitations when observed in the case studies. In fact, in urban contexts of the Global South, the adaptability of WSS co-production has often lain in users' autonomous arrangements to cope with service shortcomings, without a real recognition of rights and of division of responsibilities between users and providers.

Through the literature review and insights from empirical cases, this study has therefore shown how assessing the sustainability of WSS co-production means understanding the trade-offs between objectives/principles and the feedback between the dimensions/elements of the practice. Co-production practices may have a positive process/outcome performance compared with some principles/criteria but a negative one compared with others. For example, questioning the sustainability of WSS co-production in a specific context may imply evaluating whether more adaptive processes lead to outcomes that are fairer, that are more efficient or that maintain system ecological integrity; or whether active participation and synergistic distribution of responsibility/power between actors is actually associated with fairer and more cohesive outcomes. The systemic framework developed in this study has provided an organized set of principles and criteria to assess the sustainability of WSS co-production practices in multiple case studies in the Global South and to explore the interrelations and trade-offs between process and outcome elements affecting the sustainability trajectories of WSS co-production.

4.5 Conclusions

This study has reviewed how the question of the sustainability of the WSS co-production functions within three different conceptual perspectives that have largely covered the outcomes and processes

of the practice in the Global South. By considering the sustainability of WSS co-production in relation to its managerial, technical-environmental and spatial dimensions, the review has complemented the general literature on sustainable water management. At a theoretical level, it has provided a deeper understating of how to integrate the TBL approach, avoiding sectorial paradigms but considering the interrelations between the social, economic and environmental dimensions of sustainability with political and societal questions. At a practical level, it has framed a series of principles and criteria for assessing the outcome and process sustainability of WSS co-production within a discourse of IUWM and WSS service decentralization in the Global South.

Such results may contribute to a better comprehension of what “sustainability of WSS co-production” may mean and for whom, and with respect to whose quality of life. This represents a fundamental step towards clarifying the impact and trajectories of WSS co-production in different contexts in the Global South, with respect to other forms of service. Is WSS co-production the best way of reaching the poor or not? What is the relationship between decentralized WSS services and the development of the centralized network? Which are the sustainability issues to address when dealing with WSS services in the Global South? How is it possible to increase the sustainability of WSS co-produced services?

To answer these questions, this study has demonstrated the importance of considering the connections between the elements of WSS co-production and the related principles/criteria of sustainability. When questioning the sustainability of the practice, it is worth analysing whether the relations between co-production elements determine conditions that, according to some principles, affect the quality of life of one person/group with respect to others. The analysis of the process/outcome performance of co-produced systems with respect to the conventional networked systems and to previous

contextual conditions is also fundamental to revealing the changing trade-offs and tensions between groups and inhabitants.

Fostering a sustainable WSS co-production implies supporting actions/practices that favor win-win solutions between the process and outcome principles. This requires a search for a balance between process and outcome principles, based on a clear understanding of trade-offs and feedbacks between dimensions, and a clear explanation of political and strategic priorities over the practice. In general, the review has highlighted that there is no general measure of sustainability of WSS co-production. Sustainability represents a contextual dynamic condition that may change constantly within a systemic relationship between outcome and process principles, which instead should be prioritized through a transparent enunciation of the objectives that WSS co-production may have in a specific context.

However, further research is needed to operationalize the measurement of the provided principles and criteria. Evaluating sustainability criteria requires a further definition of indicators and analytical methods to employ. The difficulty in identifying indicators and selecting appropriate measurement methods that drive the interface between social and applied science is a well-known issue in sustainability studies (Levett 1998; McCool and Stankey 2004). We agree with Levett (1998, p. 291) in the claim for a “fit for purpose” approach employing “different indicator sets for different purposes”. Universal indicator sets for measuring the sustainability of WSS co-production are not available. Thresholds and indicators are in fact context-specific, and they should be defined within the different case studies in accordance with the outcome and process principles that are relevant in the specific context. We hope that the present study may provide researchers and decision-makers with a conceptual framework capable of facilitating sustainability metric selection for the analysis of process/outcome performance of WSS co-production trajectories in the cities of the Global South.

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Rwanda: Planned Reconstruction for Social Quality

5

Pamela Abbott and Roger Sapsford

5.1 Introduction: Reconstructing Rwanda

In a hundred days of 1994 the majority Hutu fraction in Rwanda killed at least 800,000 of the Tutsi, along with Hutu who opposed the slaughter and some of the Twa (indigenous hunter-gathers), in the Genocide against the Tutsi. The result was the near destruction of the nation. Many people fled the country, GDP plummeted, agriculture was disrupted, food ran short, the schools and hospitals were looted or demolished. The Genocide constituted a total systemic breakdown of governance and of the norms and values that provide the basis for a shared life. Rwanda's history since then has been a story of recovery led by its Government and grounded in a dominant discourse of service to the nation on the part of both Government and citizens.

This chapter looks at Rwanda's reconstruction as an example of social engineering conducted to enhance quality of life (QoL). It illustrates the proposition—which underlies sociological approaches to QoL such as the Social Quality Model (Beck et al. 1997, 2001; van der Maesen

and Walker 2012) and the Decent Society Model (Abbott et al. 2016)—that improving life conditions for a population is not something individuals can do alone but requires an effective economy, a strong and consistent regulatory infrastructure and a collectivist discursive framework of norms and expectations which favours cohesion and social inclusion as well as individual empowerment.

We show that even impoverished states—and Rwanda is still one of the poorest—can provide many of these conditions. However, when social engineering works at the level of normative discourse as well as on material and regulatory conditions, seeking to change the way its citizens understand their world, it becomes totalitarian in the sense of seeking to control how people think as well as what they do. Such control can work against QoL and is very difficult to put aside once undertaken.

Our sources of evidence for what has been achieved include some of the many national surveys which the National Institute of Statistics of Rwanda (NISR) carries out periodically, following a sampling pattern which incorporates random selection of households and respondents within quotas to ensure accurate geographical and demographic representation. They all have substantial sample sizes and are carried out by trained interviewers under NISR direction and quality control. We mostly use the Integrated Household and Living Conditions Survey (EICV—the acronym dates from the original French name), the

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Rwandan Labour Force Survey (RLFS) and the Rwandan Demographic and Health Survey (RDHS). From outside Rwanda we have used international time-series data: the World Bank's World Development Indicators (WDI) and Worldwide Governance Indicators (WWGI) and OECD sites for informant on government revenues and development aid. Mostly we have analysed the microdata ourselves or extracted data from published time series, and the 'source reference' will be simply to the source's acronym (e.g. EICV, OECD); the *Sources of Data* section of the Reference List gives a URL from which they can be accessed.

The case of Rwanda shows how a destroyed society can be rebuilt and QoL enhanced but also that social engineering for this purpose may come at a price.

5.2 Social Quality and the Decent Society

The conceptual framework of the chapter is the Decent Society Model (Abbott et al. 2016). QoL is what people experience. Social Quality is the extent to which a society provides the material, economic and discursive infrastructure to facilitate QoL. The Decent Society Model focusses more precisely on the level of the nation state and government planning for change. The model's four inter-related quadrants are illustrated in Fig. 5.1 in the Rwandan context.

The four quadrants do not assume a fixed causal order but display multiple and even recursive connections, and the allocation of an aspect of life to one quadrant or another is to some extent arbitrary. For example, Economic Security is fundamental for individuals, households and communities—none of the rest is possible when life is from hand to mouth—but cohesion, inclusion and particularly empowerment enhance the ability of individuals to contribute to the national income. Money (or land and animals) provides for the security of the individual and the community, but it is also an element in social inclusion—the poor are excluded from activities available to

the more affluent—and gross disparities tend to make social cohesion much looser.

- *Economic Security*, in the Decent Society Model, applies to both individuals and the nation state. Individuals need sufficient resource to feed, house and clothe themselves and their household, and they need to know that they will survive the expensive life-stages—in Rwanda particularly child-rearing and old age. Beyond this they need sufficient surplus to cover them during the less productive parts of the year—agriculture is seasonal—to insure against loss of employment and to deal with sudden emergencies such as ill health. At the national level sufficient resources are needed for welfare services to be affordable and sustainable.
- *Social Inclusion* is a self-explanatory concept: the decent life depends on good relations between fractions of the population, which must not feel that they are losing a competition for resource or being treated as less than full citizens, and there must be trust in dispute-resolution procedures and in the willingness of all parties to follow them. There is an economic dimension to this quadrant: those who are in poverty are socially excluded—not free to follow the pattern of life which others take for granted, including participation in politics.
- *Social Cohesion* is the 'one Rwanda' concept—that the primary self-definition is in terms of equal citizenship, not membership of a group which is favoured or disfavoured in terms of inclusion and/or empowerment. Its discursive extension is into regarding other groups as 'like me' rather than 'the Other' and taking some responsibility for the well-being of outgroups as well as one's own. A fundamental element is the Rule of Law—the belief that the same rules fall upon everyone equally—and the eradication of corruption is important for the same reason.
- Individuals are *empowered*—education is an important means—to develop capabilities, but they exercise them through state-provided infrastructure—healthcare provision, physical infrastructure, internal safety and external

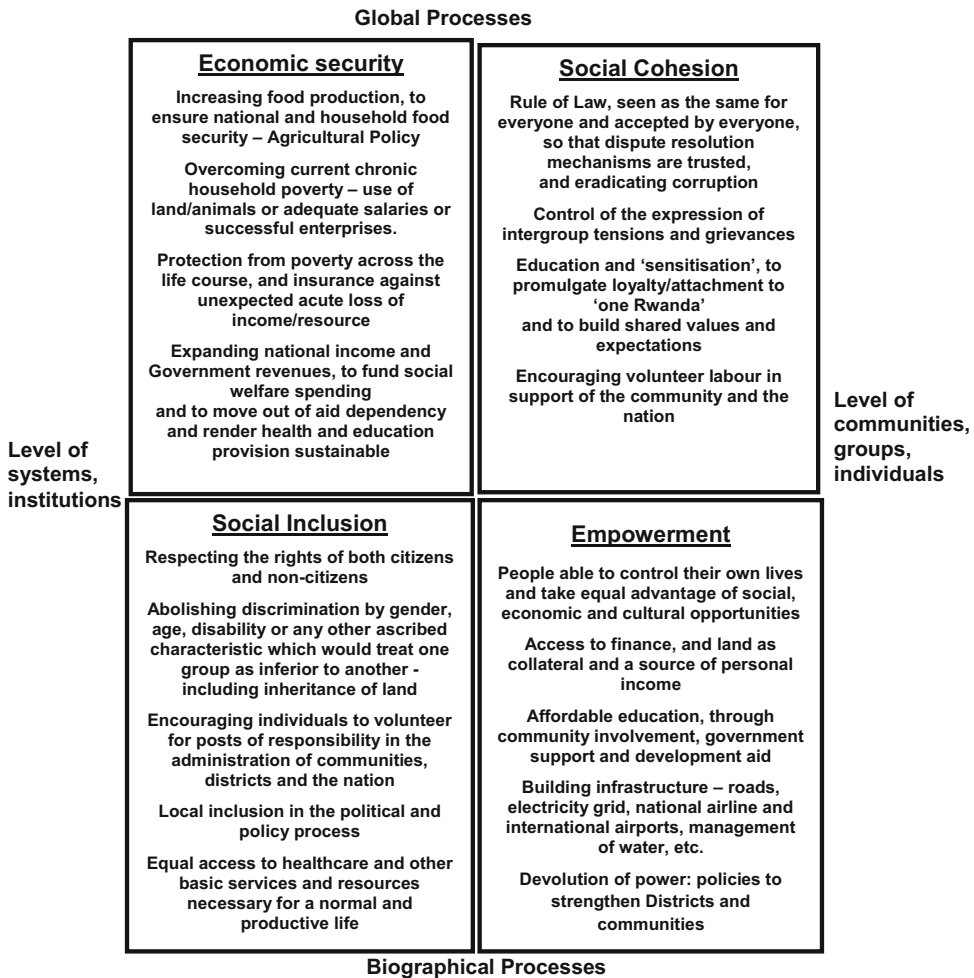


Fig. 5.1 Social quality in the context of Rwanda (source: adapted from Abbott et al. 2016)

security—in general, a well-regulated set of systems which makes what is needed available and regulates disputes. An important element is political empowerment—the extent to which individuals or groups can contribute to the making of policy and influence the division of resources and opportunities, which in turn entails the capability on the part of Government to tolerate dissent, free expression, freedom of association and even freedom to protest (peacefully), in areas central to the Government’s vision for the country. This is the core of liberal ideology, such civil/political rights were among the first to be declared in United Nations Conventions and they are seen

as self-evidently desirable in the developed North and West. Their value may not be as obvious, however, in countries where internal dissent has led to catastrophic events such as the Genocide against the Tutsi.

5.3 Building Social Quality in Post-genocide Rwanda

After the Genocide and the ‘liberation’ by the Rwandan Patriotic Front (RPF), Rwanda quickly passed out of explicit military rule and rebuilt itself as a presidential republic with a strong

central government and a parliament. The economic stance and ‘political settlement’ of the RPF, the party which has been in power since the first post-Genocide elections in 2003, involves long-term investment in the future lives of the population—‘developmental neopatrimonialism’ (Booth and Golooba-Mutebi 2012). The problem the RPF were trying to solve by assurances of improvement in QoL was a matter of collective identity; the policies for reconstruction, including economic policies, were driven by the need to prevent another genocide and were about creating a national identity rather than an ethnic one, through a reduction in socioeconomic inequalities—pro-poor policies and more recently inclusive growth, along with gender equality.

In what follows we outline what the Rwandan Government has done to implement this programme. Its commitment to a developmental neopatrimonialist political settlement reproduces many of the elements of the Social Quality Model, as is evident even in the first Constitution after the Genocide, which announces major elements of Social Inclusion, Empowerment and Social Cohesion as fundamental principles:

Article: 9

The State of Rwanda commits itself to conform to the following fundamental principles and to promote and enforce the respect thereof:

- fighting the ideology of genocide and all its manifestations—eradication of ethnic, regional and other divisions and promotion of national unity;
- equitable sharing of power;
- building a state governed by the rule of law, a pluralistic democratic government, equality of all Rwandans and between women and men;
- building a State committed to promoting social welfare and establishing appropriate mechanisms for ensuring social justice;
- the constant quest for solutions through dialogue and consensus. (Government of Rwanda 2003)

By Article 87 the Senate (the upper house of Parliament) is tasked with supervising the application of all these principles.

Despite the use of the Social Quality/Decent Society framework, our exposition is not neatly

divided into its quadrants, because any given policy or law has multiple aims and multiple effects across the quadrants. The descriptive material is divided into three broad subsections:

- The Rwandan economy (the attempted shift to more labour-efficient agricultural production, building an expanding market economy and creating decent non-farm jobs—in the first instance a matter of Economic Security but also essential for funding the institutional provisions intended to foster improvement in the other three quadrants);
- Welfare and the social wage (poverty alleviation, social protection against seasonally non-productive periods, vulnerable life-stages and unexpected crises, and the education and healthcare systems as part of the ‘social wage’—core elements of provision for Social Inclusion and Social Cohesion, but with implications for empowerment as well);
- Cohesion, Empowerment and Governance (which looks more broadly at the underlying ideological/discursive framework of Rwandan political thought and how cohesion is produced and maintained through communitarian involvement).

5.3.1 The Rwandan Economy

Inevitably, the economy has been an early and continuing target of intervention—for the country to survive at all as an entity, and to resource the provision of decent lives for all citizens. Rwanda’s developmental plans were encapsulated in *Vision 2020* (Rwandan Ministry of Finance and Economic Planning 2000), which envisages the transformation of the country from an economy dependent mainly on subsistence agriculture and modest exports of agricultural products and minerals to a modern market and service economy. The plan has been that those who remain in agriculture should become more efficient and produce sufficient to feed Rwanda and generate a surplus for export. At least 50% of workers would be employed outside

agriculture—perhaps adding value to exports of food or minerals, perhaps manufacturing goods for export or to deflect imports), perhaps developing tourism (one of Rwanda’s intangible but strong ‘natural resources’), but to a substantial extent imitating the success of Singapore and leapfrogging manufacturing to move directly to a ‘knowledge economy’ and employment in the service sector. Immediate targets for planning and investment have been (a) the modernisation of agriculture, (b) building a private industrial/commercial sector, (c) expanding the cultural/conference tourism sector and (d) giving Rwanda a role as a knowledge hub for Africa. This was to be underpinned by building human capital through education. At the same time, economic security was to be procured inclusively by insuring against risk through health and social security provision, and more generally (e) offering good governance dominated by the Rule of Law.

5.3.1.1 Agricultural Policy

Although the pre-Genocide vision of the peasant economy was rejected (see Verwimp 2013), agriculture and the land remain the essential core of economic security for the majority of Rwandans. The most recent Integrated Household and Living Conditions Survey (EICV5), shows over 70% of households as still dependent solely or mainly on it and just over 90% of households as deriving some of their ‘income’ from it.

Traditional farming has left the land over-exploited, under-fertilised and liable to erosion. Farming is also unproductive in the sense of farmers being under-employed—they say they usually work an average of only 13.2 h/week (RLFS 2018). To increase the proportion who do *not* work on the land and still generate agricultural surpluses for internal sale and export, farming had to become more labour-efficient—farmers needed to pursue agriculture as a full-time job. Beyond this the aim was to increase productivity by introducing modern farming—improved seed, chemical fertilizers and insecticides, with the introduction of modern equipment (e.g. tractors) as an eventual aim. Farmers were to rethink their activity as one of growing crops for sale on the market rather than

producing primarily for subsistence and selling any surplus.

The successive Agricultural Policies and Strategies have subsidised the improvement of land quality, the introduction of new varieties of crop that thrive in Rwanda, the direction of effort towards growing ‘officially approved’ crops judged to be needed and saleable on the internal or external market and the consolidation of the traditional small dispersed plots into larger farmable areas (Rwanda did not remove people from their land but it induced/incentivised farmers with adjacent plots to farm them jointly). Additional measures have been irrigation, terracing, tree-planting and the provision of extension services and post-harvest handling and marketing services (and the eventual mechanisation of farming was part of the plan, but there is little evidence yet of any having taken place). The main strategy for improving agricultural productivity is the Crop Intensification Programme (CIP) launched in 2007, to which land consolidation was added in 2008. Farmers who obey the instruction to consolidate their land and grow a priority crop as directed by the District are provided with subsidised improved seeds and chemical fertilisers for one planting; thereafter they are expected to purchase fertilizer and seeds from the profit, they make (Kathiresan 2011).

It is not clear, however, that any element of the programme except perhaps land consolidation and the associated direction on what to grow has had any sustained impact on productivity. There is no evidence, for example, that GDP per capita increased as a result of the introduction of the CIP in 2007–8; it has increased steadily over the whole of this century (Fig. 5.2). The *rate* of increase went up noticeably between 2007 and 2008 (Fig. 5.3), against the general sub-Saharan trend, but it fell even more noticeably in the following year. Further, the programme has not become self-sustaining. The use of improved inputs may increase yields, but farmers generally use them only when they are subsidised (USAID Land Project 2014). The increase in priority crops on local markets brings down the price, so income from the surplus is not seen as sufficient to purchase fertilizer and improved seeds (Abbott and

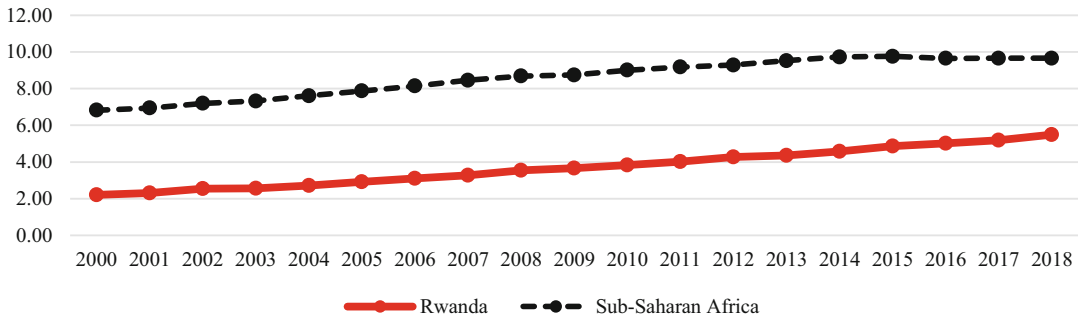


Fig. 5.2 GDP per capita (constant 2011 \$ppp) (source: World Bank, WDI). Note: the figures control for population growth, fluctuation in exchange rates and differences in country purchasing power. The international poverty line is set at \$1.90 per day

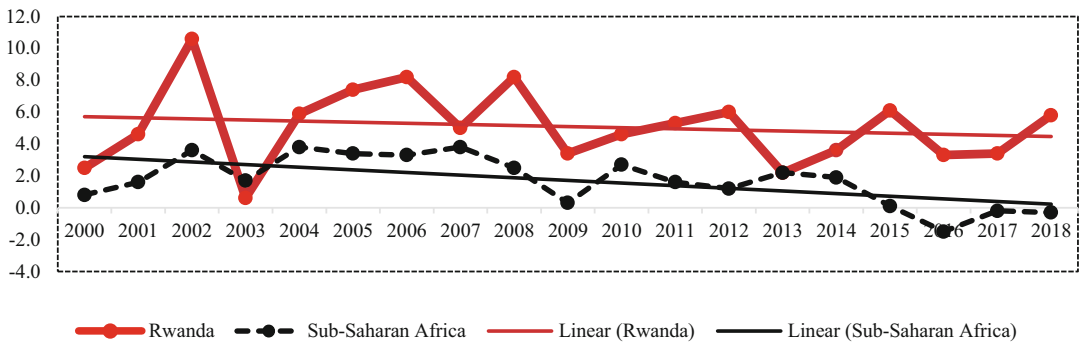


Fig. 5.3 Annual rate of GDP growth per Capita in Rwanda and Sub-Saharan Africa (%) (source: World Bank, WDI)

Malunda 2014) while also feeding the family, paying health insurance for all of them and sending the children to school.

5.3.2 Building a Market Economy

The percentage of population in waged non-farm work as their main occupation increased from 7% in 2000/2001 (EICV 1) to nearly 21% in 2016/17 (EICV 5). If we include ‘independent’ non-farm work (mostly ‘household enterprises’) it increased from 11% in 2000/1 to 30% in 2016/17 Men are significantly more likely than women to be employed in non-farm work, 42% of men compared with 19% of women in 2016/17.

However, while there has been a noticeable shift in the proportion of the Rwandan labour force in non-farm employment, much of it is in

the informal sector’, with only 8% of women and 12% of men employed in the formal sector (RLFS 2018). Furthermore, while official unemployment is 14%, if discouraged workers and those potentially available to work are included it stands at 48% with, in addition, 32% of employed workers being underemployed (RLFS 2018).

To fund the social changes to which it has committed itself, the Government needs GDP growth. The economy is certainly growing (Figs. 5.2 and 5.3). The growth rate averaged 5.1% per annum over the 19-year period 2000–2018 and 4.4% between 2012 and 2018. However, in 2012 it was estimated that growth of 12% per year would be required to achieve Vision 2020; the current discussions of Vision 2050 put the 2020 target off to 2035 and talk about sustained growth of over 10% per year (World Bank Group and Government of Rwanda 2019).

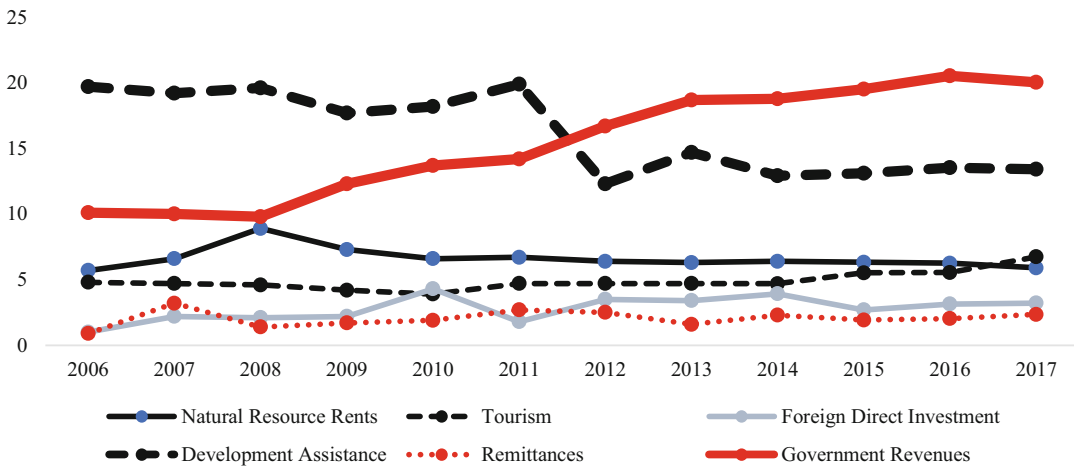


Fig. 5.4 Economic and political rents and government revenues (% GDP) (source: World Bank, WDI, OECD)

Overall there has been a movement away from raw agricultural products since 1996; manufactured goods are increasing as a proportion of exports—from less than 2% in 1996 to over 12% in 2016, and the Service sector has risen as a percentage of GDP from less than 40% at the start of the century to over 50% at the end of its second decade. Exports are rising, but the serious imbalance between imports and exports is a problem; on the whole imports exceed exports by more than 10% of GDP in virtually every year of this century. This increases the need for foreign currency to redress the balance, and Rwanda has tried a variety of sources. Foreign Direct Investment (FDI), for example, has shown a considerable increase over time as a share of GDP, from less than 1% in 2000 to 3% or a little more at the end of the second decade. However, FDI still forms not much more than 3% of the available annual resources, and the modest growth in trade and industry as a whole, which is what foreign investment funds, has been in sectors such as telecommunications, retail and construction rather than the production of goods and services; agricultural produce and minerals still make up the bulk of the exports. Remittances also bring a little money into the country, important at the level of the families receiving it but not a great deal in national terms. Tourism is a growing source of outside funds, from less than 5% of GDP in 2006 to more than 7% in 2018; again

these figures are not large enough to make much of a difference (Fig. 5.4), but the growth in the sector has at least created much-needed employment.

Overall, therefore, Rwanda is moving in the direction that it needs to take in order for its population to be economically secure, but progress is slow and too few jobs are being created to absorb school leavers coming onto the labour market, let alone absorb the unemployed and under employed labour force.

Government's domestic revenues have doubled since 2006 (Fig. 5.4), from around 10% of GDP to 20% (not including natural resource rents, which contribute a fairly steady 6% each year). However, the balancing term is still developmental aid, although it has declined over the period from 20% of GDP in 2006 to about 13% in 2017. However, revenue growth will take a long time to replace aid at this pace, and what the aid buys is crucial to Rwanda's political settlement and the promotion of Social Inclusion and to Empowerment.

5.3.3 Welfare and the Social Wage

5.3.3.1 Poverty Alleviation and Social Protection

One urgent reason for seeking economic growth was to generate resource which could be used to

narrow income inequality, lift people out of poverty and increase economic security and social inclusion. Here Rwanda would claim substantial success, though there is still much to be done. Using the World Bank absolute poverty line (\$1.95 per day in ‘international dollars’—i.e. correcting for purchasing power), the proportion of the population in poverty fell from 77% in 2001/2 to 55.5% in 2016/7. Based on the national poverty line (lack of the ability to purchase the basket of essential goods) poverty has fallen from 60% in 2000/1 to 39% in 2016/17, and *extreme poverty* (inability to feed the household) fell from 40 to 16.3%, meeting the 2015 Millennium Development Goals (MDG) target for extreme poverty but not for poverty as a whole. There was, however, no decline in poverty between 2013/4 and 2016/7 and there has been some controversy as to whether poverty really fell between 2010/11 and 2014/15. Another MDG target was the malnourishment of children. The proportion of underweight children is now less than a third of what it was in 1992 and the MDG target of 14.5% had been reached by 2010/11. However, stunting (being under height for age), which was not an MDG target but is a Sustainable Development Goal, remains a serious problem which limits people’s potential to develop capabilities in the Empowerment quadrant of Fig. 5.1 because it is associated with the risk of irreversible cognitive impairment. Nearly half of Rwandan children under 5 were diagnosed as stunted in 2000, and in 2015 the figure was still almost 38% (RDHS 2014/15). Furthermore, a survey in 2015 (CFSVS) found that only 40% of households were fully food secure; 40% were only marginally food secure, 16.8% food insecure and 3.2% severely food insecure.

A reduction in the percentage in poverty does not necessarily show a reduction in inequalities when an absolute poverty line is used—people can move out of poverty while inequalities become more extreme. Rwanda’s GINI coefficient for 2000 was 48.5, rising to 52 in 2005 but gradually dropping to 43.7 by 2016 (WDI). This is higher than other East African countries, but not by a great deal, and it appears to have remained steady or declined over time. However,

there are suggestions that the GINI may be a poor estimate of the real inequalities experienced by some demographic groups (see, e.g., Ormert 2018): a better but more cumbersome approach might be to look at access to a wide range of particular goods and services.

Another major component of economic security is dealing in a socially inclusive manner with risks across the life-course. This implies a health service (discussed below) and a social security system. Rwanda’s social security system works through a devolved decision-making process (*Ubudehe*) by which a subvention for the alleviation of poverty is distributed locally in the form of subsidies for healthcare and schooling costs where needed plus paid work on public projects wherever possible or direct financial support where no-one in the household can work. There is also a contributory retirement pension scheme for those in non-farm employment. Beyond this, emergencies are funded from personal savings or loans, and the government has encouraged local cooperative savings banks—the *Umurenge Sacco* scheme (AFI 2014)—and regulates their operation; these make it easier for people to save relatively small amounts safely to cover relatively small emergencies. In 2016 only 12% of the adult population did not save at all during the year (Murenzi 2016), down from 29% in 2012. Thirteen per cent saved with a bank (and perhaps also elsewhere), 36% with another registered institution such as a SACCO, 27% as part of an informal savings group (‘Tontine’) and 10% ‘at home’ (‘banking’ with another family member). However, the main driver of saving was for ‘planned emergencies’—over 70% of those who saved did so to cover expenses when times were hard, which leaves little for unplanned emergencies such as major health problems in the family.

5.3.3.2 Healthcare

Access to healthcare is critical for QoL, adding to households’ economic security and ensuring children can meet their full potential. Rwanda is reasonably well provided by African standards with public health infrastructure (clean water and reasonably safe disposal of effluent):

provision has increased steadily over the years (EICV). General health has improved: life expectancy has risen from 47.6 years in 2000 to 65 in 2017 for men and from 49.2 to 69.2 for women (WDI). The infant mortality rate declined from 107.7 in 2000 to 28.9 in 2014/5 and the child mortality rate from 181.4 to 37.9. Maternal mortality also declined over the period, from 1071 per 100,000 births in 2000 to 210 in 2014/15. AIDS is being kept in check: the prevalence rate has been stable since it was first accurately estimated in Rwanda, in 2005; the current prevalence rate is about 3% (Nsanzimana 2019). Access to antiretroviral drugs was 95% of those eligible for treatment in 2014 (RDHS) and is currently estimated at 82.7% (RBC 2017). Measles immunisation has reached 98% of children in their first 2 years, as compared with a sub-Saharan average of 73%, and general vaccination rates rose from 75% in 2005 to 92% in 2014/15 (RDHS).

Access to basic healthcare has been provided nation-wide since 2005 by the *mutuelle de santé* insurance scheme, which provides a basic package at all levels of health care. There is a graduated membership fee based on *Ubudehe* category, with the poorest exempt from payment, and a small user fee (10% of the cost) for treatment and medicines. Membership of the scheme has been compulsory since 2007 for those not covered by other schemes. However, in 2016/17 only 70% of households were members, with a further 5% being covered by other health

insurance (EICV5). Although the fee is per person (including children over 6 months), all members of the household have to be insured for services to be provided.

5.3.3.3 Educational Provision

Education is important for empowerment, opening a route to new capabilities and ways out of poverty, and equitable access to it is important for social inclusion. The Government has funded fee-free education up to the end of primary school since 2003, lower secondary school ('9-year basic') since 2009 and '12-year basic' (end of senior secondary) since 2012. This does not totally abolish the costs for poor families (Williams et al. 2015) but does reduce them substantially. Net primary-school attendance stood at about 74% in 2000 and has hovered between 86 and 90% since 2005/6 (EICV). However, there are high repetition and drop-out rates, and our best estimate of the proportion who go through primary school and complete at the right age is 17% (Abbott et al. 2015). Around 50% complete primary by age 19, the age at which young people should have completed senior secondary.

In order to build a middle class engaged in decent non-farm work and to attract investment, secondary and even tertiary education are important. Both the gross attendance rate (all children attending irrespective of age, as a proportion of children of secondary-school age) and the net rate are low (Fig. 5.5). The expansion at secondary

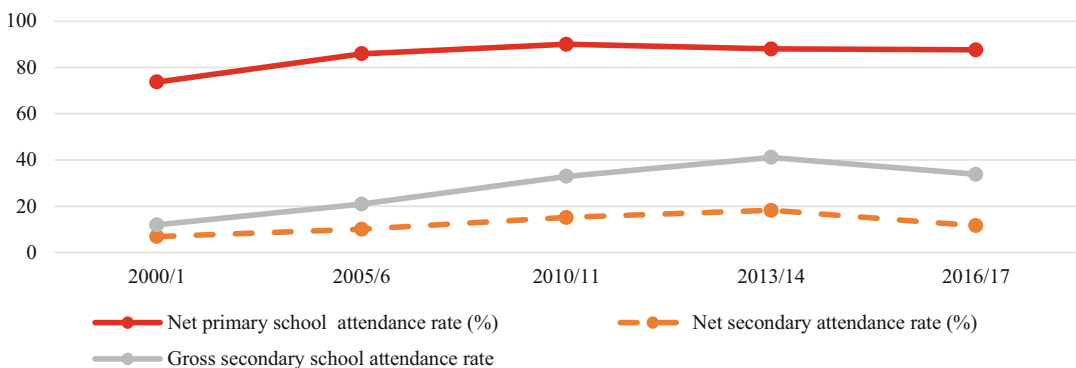


Fig. 5.5 Primary and secondary school net attendance and secondary school gross attendance (%), 1990–2017 (source: EICV)

level (and, subsequently, tertiary) is powered by the extension of fee-free secondary schooling and has declined in recent years. This may be because of the difficulty educated young people have experience in getting decent employment.

Serious doubts have been raised about the quality of education provision, from primary schooling upwards. The Government ‘scores points’ with its populace and with the international community by expanding educational opportunities and getting children/young people to enrol, but there is strong survey evidence that the education is not very good (DeStefano and Ralaingita 2012; ICAI 2012; Upper Quartile 2015). This is true across much of Africa, but in Rwanda a specific additional factor is the shift from French to English as medium of instruction without a corresponding shift in teachers’ linguistic competence.

Rwanda has also paid little attention until recently to providing pre-school education and care despite its known benefits (Abbott and D’Ambruso 2019). Adult basic education has also received little investment despite the known benefits of education for poverty reduction and improving people’s QoL and the Government’s own target of eliminating illiteracy by 2018 (Rwandan Ministry of Education 2014). Little progress has been made in reducing the illiteracy rate over the last 15 years and a third of adults do not have basic capabilities in reading and writing (Abbott 2019).

5.3.4 Cohesion, Empowerment and Governance

The quadrants of *Economic Security* and *Social Inclusion* are explicit goals of Rwandan government policy—making life better for citizens, lifting people out of poverty, creating decent jobs and a middle class while at the same time ensuring that improvements are shared inclusively and equitably. The underlying principle of ensuring that genocide does not happen again entails creating a unified Rwanda in which everyone has some sense of ownership. This section of the chapter turns away from economic provision

and the social wage to look at the other side of Rwanda’s social engineering—issues of *Social Cohesion*, the creating of new Rwandans for a new Rwanda, and the sociopolitics of *Empowerment*.

The social infrastructure for these quadrants has already been considered in the more economic discussions above—economic security, including insurance against expensive life-stages and unforeseen emergencies. Education is also important for empowerment and equal access to it is part of social inclusion, which is in turn a prerequisite for social cohesion, and adequate health is a prerequisite for empowerment and the ability to acquire and display competencies. Clean government and the rule of law are important in all quadrants.

5.3.4.1 The Quality of Governance

Rwanda is well policed and has relatively little crime. The administration of the legal system is seen as fair, the courts have the trust of a remarkably high proportion of the population (WVS6) and while, the judges are government-appointed, it is possible to take the government to court and win. Elections have generally been deemed fair ‘at point of delivery’ by international observers, though the size of the majority in presidential elections reinforces our belief that opposition is systemically inhibited. There are limits set in the Constitution on the extent to which any one party can dominate the Government in terms of ministerial appointments, and the United Nations Conventions on Human Rights have been adopted into Rwandan law. Gender equality is enshrined in the Constitution, a quota system ensures that women are strongly represented in the Parliament, the Cabinet and the civil service, and there is a Minister for Gender and Family Promotion and a Gender Monitoring Office. Monetary corruption has been more or less eliminated, and even Ministers go to jail when convicted of it.

Rwanda’s performance scores reasonably highly on the Worldwide Governance Indicators, the most frequently used of the international measures of quality of governance (Fig. 5.6). It does very well on control of corruption, scores

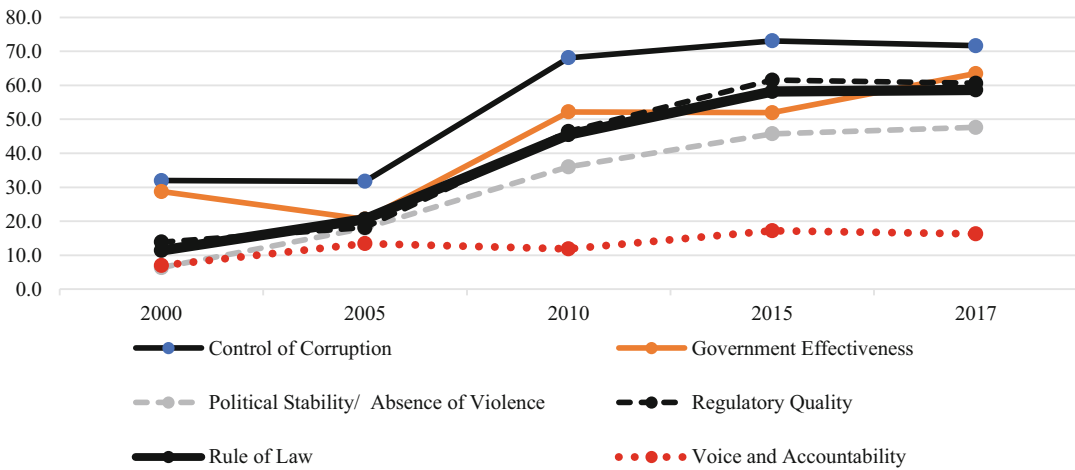


Fig. 5.6 Worldwide governance indicators for Rwanda 2000–2017 (percentile rank) (source: World Bank, WWGI)

above the world average on regulatory quality, the rule of law and government effectiveness and shows a reasonably adequate performance on political stability and the control of violence but with a slower rate of improvement over time.

These would appear to be favourable conditions for QoL, expressing both social cohesion—equal treatment under the law—and the empowerment of citizens. However, the score on ‘voice and accountability’—the freedom to criticise government policy and the transparency of government actions—is very substantially below the world average. This variable can be used as a proxy measure of democracy: free and fair elections and basic civil and political rights are usually seen as the minimum for a government to be seen as democratic (i.e. polyarchic). Rwanda does not encourage pluralistic politics. The Rwandan social order is underpinned by a commitment to non-adversarial discussion, backed by control of ideologies and the mechanisms for their dissemination. ‘Dialogue and consensus’ is written into the Constitution and is espoused in both national and local politics. This is discussed further below.

5.3.4.2 Consensus, Cohesion and Control of the Norms of Thought

Rwanda has the trappings and rhetoric of a democracy, but its Government has stressed and

indeed enforced consensus in decision making, local responsibility and personal commitment to the country’s success, both in its ideology and in the structures which have been put in place. While it has recruited its citizens as agents of change, what it has *not* done yet is to empower them to take personal or collective responsibility for planning and debating the country’s policies and goals. At the national level genuine multi-party competition for political power is rendered difficult by laws which ban divisive ideology (fuzzily defined), a system of party registration which makes it difficult for those who oppose RPF policies to stand for election, and control of the media exerted by government and/or ‘self-imposed’ by editors and reporters. Civil society organisations which in a more democratic society might be lobbying government or trying to influence public opinion are also subject to registration and often tend to restrict themselves to the role of service provider.

The institutionalised requirement for value consensus goes down to the level of villages, households and individuals. Consensus about values is manufactured in *Ingando* (solidarity camps/retreats where ‘Rwandan values’ are inculcated or reinvigorated), *Itorero* (civic education sessions) and the discussions which follow the monthly *Umuganda* (volunteer labour on local infrastructure). These institutions help to bind citizens into the collectivity of the nation.

Active citizenship is a strong part of the message; for example, *Umuganda* labour is required by law but also characterised in Rwandan rhetoric as the mobilisation of the population *in the service of the nation* (though it is not clear that this is always how citizens actually think about it) *Imighigo* is another example—the ‘performance contracts’ whereby the implementation targets for the year are agreed at all levels from the household and the employee to the district administration and the ministries.

Rwanda’s policy is to decentralise where possible, ostensibly to give local people more faith in decisions and advice which come from people who know them well rather than from some remote bureaucrat but constituting an effective way of encouraging citizens to blame local government for poor service delivery rather than central government policy. Decentralisation begins with the Districts, responsible for service delivery and held to account by performance contracts (*Imihigo*), which deflects attention from central government to local performance. *Ubudehe* works at the village level (the smallest of the administrative divisions) and determines who needs social security support; it thereby diverts any dissatisfaction from the centre to the locality (Abbott et al. 2014).

At the same time, some of the mechanisms for improving QoL move control from the periphery to the centre. Because the District ‘contracts’ with Government the targets it will fulfil in the next year, the targets are those set centrally by Government; decision-making is top-down. The process whereby Districts determine what shall be grown by households that want the benefits of the CIP effectively allows the state to determine the use of household land (Ansoms and Cioffo 2016). Key organisations—‘National Councils’—to protect the rights of vulnerable groups (women, youths (which for this purpose means people between the ages of 18 and 35 in Rwanda), handicapped people) were set up by the Government as part of its commitment to social inclusion, but their effect is to ‘crowd out’ genuinely independent NGOs that might have fulfilled this function and ensures adherence to Government

policies rather than facilitating grass-roots advocacy (Abbott et al. 2016).

5.3.4.3 Capturing the Discourse

The Dialogue and Consensus approach ‘captures the discourse’ so that the rightness of decisions ‘stands to reason’. Within a given discourse there are propositions which people automatically support—they ‘stand to reason’—and against which it is difficult to argue without appearing perverse. What can be more natural, for example, than that your neighbours who know you, rather than some faceless official, should be responsible for deciding whether you need social protection/support and what form is appropriate? What could be more natural than that the *Abunzi*, as elected local ‘consensus brokers’ in e.g. land disputes, offer you a compromise even if the letter of the law would give you a better outcome? The land consolidation policy is justified by its ‘obvious’ efficiency, which pushes resistance to the difficult extreme of opposing rationalisation and therefore standing against economic growth. What could possibly be wrong about a caring state setting up national organisations to protect the interests of those whose voice is seldom heard? It stands to reason that people will work on the roads and drainage, because they live in the village and know it is expected. In all these cases it is not a question of what the Government wants you to do; rather, it is assumed without debate that you yourself will want to do it.

There is nothing unusual in this process of capture—all states which depend on the support of the governed use it and all moral arguments depend on it—but its role in Rwanda should be noted. At the community level, therefore, part of the force of ‘community involvement’ is based in cultural norms but it also owes something to the deliberate shaping of the discourse. Government policies enjoy hegemony: they allow only one way in which to think.

An example would be the spirit of ‘working for Rwanda’ which has been taken up and fostered by the Government as a way of ensuring that a decent life is provided and that QoL is improved. In this they are going with the current

Table 5.1 The two most important aims for country and respondent, in Wave 6 of the World Values Survey (%)

Aims for the country				Aims for the respondent			
	1st	2nd	1st or 2nd		1st	2nd	1st or 2nd
High levels of economic growth	69.1	6.3	75.4	Maintaining order in the nation	73.9	12.6	86.5
Strong defence forces	15.2	24.5	39.7	Fighting rising prices	10.5	54.3	64.8
People having more say	12.0	39.7	51.7	Giving people more say	14.4	20.3	34.7
				Protecting free speech	1.2	12.8	14.0

Source: WVS6

of a society in which family and community are part of one's identity. Richer members of the family, established in good jobs, will expect to pay a share of expenses towards other family members' marriages, childbirth, education, sickness and funeral expenses. The middle class not infrequently spend part of their salaries sponsoring orphans and street children through school or university or even adopting the orphans themselves. One important reason for parents owning land is to be able to give their children land on which to build a house (Few can now do this because of the shortage of land and the restriction on splitting plots which are less than a hectare in area, but some parents see investing in their children's education as equivalent—see Abbott et al. 2012). Responsibility becomes everyone's, not just the state's, and this is entirely typical of the Rwandan style of government.

5.4 Subjective Quality of Life and What the People Want

Finally, how do the Rwandans feel about their lives? The World Happiness Reports present a data series from 2011 to 2018 for 156 countries (sometimes one or two more) on the Cantrell's Ladder question used by the Gallup World Poll, which asks respondents to place their lives somewhere on a continuum from 0 (the worst possible) to 10 (the best possible). On this measure Rwanda is consistently near the bottom of the world, on average in 152nd place (once 151st but once 154th). Their average scores range from 3.33 to 3.72 over the period, with at best only a very slight increase over time. Putting this in context,

in 2018 only four countries ranked lower—neighbouring Tanzania (3.23), Afghanistan (3.20), the Central African Republic (3.08) and South Sudan (2.86). The top seven countries, mostly Scandinavian, scored in the range 7.34–7.77. So, with everything that has been achieved or attempted, the population of Rwanda still do not regard their QoL as improving significantly (They are not out of line with other sub-Saharan countries in this respect, however. The highest-ranking sub-Saharan country in 2018 was Nigeria (85th—below the half-way mark), followed by Ghana at 98th.)

Respondents to the 2013 wave of the World Values Survey (WVS) were asked what the aims of the country should be for the next 10 years, and three quarters of them nominated economic growth (69% as first choice) and about 40% nominated strong defence forces (15% as first choice)—see Table 5.1 for first and second choices. It would be a mistake, however, to suppose that Rwandans care only for their material wellbeing and do not particularly worry whether they are empowered politically. Twelve per cent (one person in eight) said 'people having more say' was the *most* important choice for the nation, and over half placed it first or second. Asked about what affected *them personally*, three quarters nominate 'maintaining order in the nation' (rising to 86.5% if we include second choices) and two thirds nominated 'fighting rising prices'. Fourteen per cent (one person in seven) nominated 'giving people more say' as first choice, and if we include second choices the figure rises to about 35%. Similarly, not much more than one person in a hundred noted 'the protection of free speech' as the most important

personal factor but including second choices raises the count to 14%. It is clear that a significant minority are concerned with rights, despite the presence of economic or defence options on the lists, and while we may conclude that economic concerns are the most salient we may not conclude that political rights are unimportant, despite the extent of Rwanda's ideological control. This pattern is not uncommon in countries which are in developmental transformation (Teti et al. 2019).

5.5 Discussion: Engineering the Quality of Life

Rwanda has been presented as a case study of recovery from disaster and the re-engineering of a shattered society—planning for social quality. Two main areas of action have been identified—the economic and the discursive. These two strands are involved in all four quadrants of the Decent Society Model but often express different aspects of them. Mostly the concern of the chapter is with what facilitates QoL and whether the Government has succeeded in achieving it. However, state control of 'hearts and minds'—the discourse, what people believe, what they take for granted and what they value—may also have negative consequences, for empowerment and for QoL.

5.5.1 Economic Security and Social Inclusion

There is no doubt that social provision has improved in Rwanda over the past 20 years and continues to do so. Housing and health provision have improved steadily, communication links by radio, telephone and/or the internet cover virtually all the country, fee-free education is available from age 7 to completion of secondary schooling, health is covered by an insurance scheme, HIV, malaria, measles and tuberculosis are kept under control and there is a social security net for the poorest and a pension scheme for those in formal employment. It is important to government that

everyone share in these benefits. Outright poverty and therefore exclusion from the mainstream is still high and raising people out of it is one of the government's priorities.

There is evidence, however, that economic improvement is stalling, with aid reducing, FDI levelling off and the reduction of poverty rates slowing down. The problem is that welfare provisions are mostly not self-funding and collectively they are still beyond what can be paid for out of taxes and other Government revenues.

The Rwandan state is ingenious in its use of the decentralisation principle to pass on unaffordable costs to local volunteers and at drawing on community spirit and 'sensitising' people to what 'a good Rwandan' will naturally do, with the state providing (or eliciting from donors) materials with which to do it. When schools had to be expanded to meet the needs of fully inclusive education or to expand pre-school provision, for example, it was seen as natural by the parents themselves that they would build the extra classrooms.

To improve the diet of children and mothers-to-be, the Government does provide a universal supply of some supplements to pregnant women and targeted supplements and even tinned food to children who are malnourished (see RDHS); there is also regular weighing of all young children to make certain that they are not malnourished. However, the 'mainstream' Rwandan solution has involved:

- Sensitisation of mothers to the importance of a varied diet for young children, through Community Health Workers (see below),
- Encouraging Rwandan women to make the land around their houses into kitchen gardens where greens and root vegetables can be grown for the table (with perhaps a surplus for sharing or sale), and
- Providing a cow (donor-funded) to poorer households who could demonstrate they had sufficient land to feed it, which produced milk for the family and perhaps again a surplus to share or for sale (and calves from the cows were supposed to be passed on to other poor households and extend the network).

Primary health care reaches out to the villages because of elected volunteer Community Health Workers, who are compensated for their time—partly in the form of provision for a cooperative to cover their living costs (perhaps a gift or loan of land by the state).

The battle to build a sustainable economy has not yet been won at the level of Economic Security across the life-course. Families with children under 15, lone mothers and elderly people, especially women (see Sabates-Wheeler et al. 2018), remain at greater risk of poverty (and by ‘poverty’ here we mean not having enough to eat). The Rwandan Government has taken several steps to regulate inequalities between genders, including legislating for the inheritance of land by daughters and by women in officially registered marriages as well as by men (Abbott et al. 2018), but economic security across the life course remains an issue, especially for girls and women.

5.5.2 Social Cohesion and Political Empowerment

An overwhelming imperative in Rwandan politics, sometimes explicit but always tacitly present, has been to create new citizens, replacing sectional identity with national identity—‘we are all Rwandans now’. To further this aim, strong measures of social control have grown up which reach down into the villages and even households (see e.g. Purdeková 2011). The institutions through which the process works are structured to create consent to state policies and thus to present and reinforce state ideology as expressing the will of the people, or at least what the will of the people *should* be (Abbott et al. 2014).

Key to the institutional implementation of a ‘one nation’ rhetoric is the notion that government shall appear to be carried out, at least in part, not by remote central ministries and agencies but by people known in the community. The particular form that is used has particular effects, however. Dispute resolution, and community action to ‘police’ disapproved behaviour such as failing to send children to school, would normally take

place in the first instance through action by the elected village leaders or by discussion in ‘councils’ (generally *ad hoc* meetings) of family or neighbours. The *Abunzi*—volunteer mediators, also locally selected—have as their task the production of consensual solutions to disputes *before* and *instead of* putting them to the courts—a prime example of the ‘dialogue and consensus’ principle (Abbott et al. 2018) which weakens the authority of the law, which becomes just the starting point for negotiation.

The monthly *Umuganda* community labour is the most obvious of the ‘ideological institutions’ at village level. The work sessions of *Umuganda* are normally followed by meetings which act as the interface between the local and the central. Government policy is promulgated and explained by local leaders and information about health, child-rearing and the avoidance of AIDS is delivered by Community Health Workers. The format of *Umuganda* meetings lends itself to top-down sensitisation rather than bottom-up discussion (Hasselkog 2015: 161–2). The consensus which is reached is the Government’s consensus, and partnership very often means a commitment to implementing the Government’s policies. The Women’s National Council and National Council of Youth reach down to the lowest level of organisation and are in a position to carry the grassroots views up the chain to central government, but in practice messages go down but there is little scope for messages to go back up. In other words, they act as agents of hegemony rather than political empowerment.

Finally, ‘dialogue and consensus’ has a different understanding of politics from multi-party democracy. At a fundamental level Rwanda’s stance makes radical opposition—i.e. having a *different vision* of the country’s future—broadly unthinkable: how can you dissent from what has been established already as a consensus? At the level of national politics there can indeed be enough dissent or difference to allow a competing party to constitute itself (though only the RPF has adequate funding for political campaigns), but the broad principles *constitute* the society, so that dissent from them can be read as an attack on

Rwandan unity in the interests of some faction. “Simply put, in Rwanda opposition is not tolerated” (Friedman 2012, p. 268).

5.6 Conclusion

The case of Rwanda illustrates what can happen when a government sets out to engineer a decent life for citizens. In economic terms, the political settlement which forms the implicit contract between government and citizenry is one of developmental neopatrimonialism, with accessible resources ploughed back into QoL and people’s capacities rather than into shorter-term rewards for supporters and buying off opponents. This can readily be seen as a sustained attempt to create Social Quality through investment in infrastructure and a social wage.

To debate here whether these are the tactics of a party which wishes to remain in power or an altruistic concern for wellbeing is a pointless exercise; there are always elements of both in any government’s planning. For example, it is equally true of English and French employers during the earlier phases of the industrial revolution (a) that they built model housing for their workers and gave them access to healthcare and education out of a philanthropic/Christian desire to ‘do the decent thing’, and (b) that they quite consciously offered these benefits to reduce labour mobility, improve the health and therefore the efficiency of the workforce and ensure a succession of exploitable labour—see e.g. Donzelot (1977). For citizens, the improvement in the quality of life is the same whatever mix of motives may underlie it.

Immediate targets in Rwanda are the alleviation of poor QoL and raising people out of poverty, which in turn may mean reshaping the whole of the society. It has meant working towards a predominantly waged economy, extending the role of the market, increasing and ‘industrialising’ agriculture, building industries and services which can contribute to the resourcing of the population but also generate tax revenues to fund public provision, and the funding of accessible healthcare, plus education and training to upgrade the workforce is and attract investment.

Affordable access to healthcare and education and a welfare safety net for the sick, disabled and elderly form a ‘social wage’ which contributes to QoL, and they become part of the visible benefit of the political settlement. They provide social inclusion for the poor and needy by empowering people to (continue to) take part in the normal activities of the society and to exercise their capabilities.

All of this has been attempted, and it has had its effect, but the process will clearly take longer to complete than had originally been hoped. Global economic conditions have not been favourable, and while Rwanda’s economy is growing, it is not yet growing fast enough to take over the burden of supporting education and healthcare (or indeed agriculture, infrastructure and many other things) without dependence on international development assistance. This is a problem, given that willingness to give aid has been tending to decline in recent years.

Social inclusion is particularly important to Rwanda because of the Genocide. If economic and social progress could occur fast enough, then the new generation would consist not of fractions competing for scarce resource but of people embracing a national identity. Rwandan social engineering depends on a re-education of the population to see Rwanda as a single tribe or community, not an amalgam; the Government manipulates the collective consensus to ensure that divisive ideologies cannot emerge again. They may be right that this is necessary; it is clear even from survey research that Rwanda’s internal divisions have not gone away. A significant proportion of Rwandans still fear civil disorder (see Table 5.1) and a majority think that there are still cleavages between groups. It is unclear what will happen if the political settlement is broken and social progress dries up for lack of financial underpinning.

Underneath the practical and economic problems lies the deeper problem of the amount of control and state involvement entailed by the combination of economic adversity, a deep-felt need for close social cohesion and the totalising way in which the Government is trying to build a new kind of citizen. ‘Dialogue and consensus’ is

put forward as an African solution to political problems, a non-adversarial approach to taking decisions which does not leave space for feeling disadvantaged or discriminated against, leading to a generation which regards dedication to the future of Rwanda as a foundational norm against which resistance is not only unacceptable but largely unthinkable. However, the consensus which is Rwanda is largely produced at the centre and conveyed to the grass roots for implementation. Controlling both actions and ideology 'for their own good' was undoubtedly an effective way to re-establish a broken Rwanda and start the healing process, but it is a powerful horse with a will of its own and one that may prove very difficult to dismount. The evidence of attitude survey data is that the economic situation is the most salient and widespread issue for most people but that politics is not dead and there is also a substantial desire for improvement of political rights. Educating the population, in Western style, to question taken-for-granted practices and espouse new ways of doing things may be what is needed for Rwanda to join the ranks of middle-income market economies, but it also leads to successive generations who may not accept that leaders and the Government know best what is good for their well-being.

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Sources of Data

- CFSVS—Comprehensive Food Security and Vulnerability Survey. <http://www.statistics.gov.rw/datasource/comprehensive-food-security-and-vulnerability-and-nutrition-analysis-survey-cfsva>
- Development aid. <https://stats.oecd.org/qwid/>

Rwandan social policy and attitudinal and sociopolitical change in MENA after the Arab Uprisings. His books include *Life-Sentence Prisoners: Reaction, Response and Change*, *Community Care for Mentally Handicapped Children*, *Women and Social Class*, *Data Collection and Analysis*, *Survey Research* and *the Decent Society*:

Planning for Social Quality. Current work includes papers in progress on trust in government in MENA, corruption and democratization, Rwandan discourses and social policy and an improved Decent Society Index.



A Theoretical Reflection Based on Children's Opinions About Their Safety to Rethink Different Dimensions of Sustainability in Cities

Damián Molgaray

6.1 Introduction

In the last years, the scientific and professional community has grown increasingly interested in knowing what makes children feel satisfied and what gives them a sense of well-being. The *Centro de Investigación en Ciencias Sociales [Social Science Research Centre]* of the *Universidad de Palermo*, Argentina, carries out active research concerning the different dimensions of well-being among Argentine children. In this chapter, the opinions of a group of children will be considered, regarding aspects they themselves identify as unsafe phenomena in their neighbourhoods—particularly using the reference to a cemetery, which coincidentally appeared in several pictures the children drew during the research experience. Based on this input, a theoretical reflection will be displayed so as to shed light on some possible meanings or connotations of that fear the children expressed regarding a specific dimension of their lives, such as safety.

Research carried out by the author in the Centro de Investigación en Ciencias Sociales [Social Science Research Centre] of the Universidad de Palermo (Argentina) 2018–2019. It is based on one of the author's written productions for his final thesis within the Master's Degree Program in Social Sciences at the same university

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The figure of the cemetery will be the core of this chapter, in an attempt to thoroughly analyse the several rich conclusions about sustainability of cities and sustainable development of peoples, which may be inferred from this spatial unit. In order to do so, the setting observations gathered during fieldwork will be taken into account, as well as the data later obtained from the cemetery premises.

Thus, it is expected that this reflection provide an innovative key to delving into two aspects: First, into the veiled meanings that might be involved in the children's sense of unsafety. Second, into the obstacles and possibilities that an environment filled with fear and uncertainty might entail for a kind of development that claims to be sustainable.

6.2 On Fear and Unsafety from the Children's Perspective: Some Preliminary Observations

First, it is important to point out that the children who took part in the research made explicit reference to their sense of civil defencelessness while speaking. That is to say, they feel their own physical integrity is under threat, as well as their families' and their property or personal belongings, thus hindering their well-being. Castel (2015) distinguishes two main types of generic protection. On the one hand, social protection, which protects individuals against the

risks of biological degradation or other vulnerabilities in their lives. On the other hand, civil protection, which ensures fundamental freedoms, property safety and physical integrity of persons.

The children who took part in this research mentioned several circumstances that made them feel unsafe in their city. Drunk drivers exceeding the speed limit, recurring fights and exchange of gunfire with the police are among the factors that made them consider the street a most hazardous place. The strategies and recommendations given by their families in order to endure these safety hazards in their neighbourhoods could be noted in their speeches. Besides, they depicted their civil defencelessness, which is also connected with broader unsafety phenomena in their neighbourhood: drug dealing and youth unemployment.

In theory, well-being is both a broad and a complex term. It needs to be approached in a multicultural and multidisciplinary way, taking into account the opportunities provided by both the community and the society so that each person achieves their personal goals (Tonon et al. 2017). As well-being is intrinsically connected with the cultural values of a society that either hinders or facilitates the attainment of personal goals, the notion of well-being cannot be only conceived from a personal perspective; it always needs to be contextualised within communities and their interests, as well as within an interdependent space.

After these first reflections on the unsafety acknowledged and experienced by the children from Grand Bourg Buenos Aires Province in their neighbourhoods, we will move on to the second part of this chapter with a view to provide some keys to delving into the analysis of the empiric results of this research.

6.3 Method, Sample Peculiarities and Details About the Place Where the Group Experience Took Place

Carrying out a descriptive study based on an interactive, flexible and qualitative method

design, the research was focused on a set of interpretative practices aimed at understanding and analysing the phenomena from the meanings given by the subjects themselves. Thus, the research made the most of this method's potentials in an attempt to understand the safety-related situations and sensations experienced by children, told by them in first person upon forming research groups in which they were the main protagonists.

The research group, carried out in the city of Grand Bourg, was composed of six children, three girls and three boys, between 10 and 12 years old. Grand Bourg is a city in the Malvinas Argentinas District, Buenos Aires Province, located in the mid-north of Greater Buenos Aires, 36 km. away from the Federal Capital City. It is a mid-lower class residential area. The children who took part in the group came from the same neighbourhood and knew one another because they used to play together. Most of them attended state schools, and did not use to take part in after-school activities.

The first task of the meeting consisted of drawing two places: an ideal one, where they would like to be, and a frightening one, which made them feel frightened or they did not like. As for the frightening place, comments about the neighbourhood cemetery could be heard, since it is a few blocks away from the venue for the meeting. After drawing, each boy and girl were asked to fill in incomplete phrases about their likes and interests. The cemetery was also mentioned this time, when the children were asked about what frightened or scared them.

6.4 The Cemetery from a Social Perspective

It was decided to incorporate the children's drawings due to the fact that most of the participants coincidentally identified a municipal cemetery as a frightening place. It turned out interesting, then, for the ongoing research, to find out whether that fear embodied by the figure or territory of the cemetery might be giving some clues as to the children's sense of civil unsafety, beyond the 'fantasy' fear, i.e., the fictional fear

that might be originally linked to the cemetery, as a place that holds monsters or supernatural beings.

Needless to say, spotting an emotionally charged geographical space—as is the case of a cemetery—in the graphic reference shown in the drawings made it suitable to delve into the complexity of the children's statements from a contextualised (localised) approach, combining the spatial analysis of the cemetery territory with the other social dimensions stated by the children.

6.4.1 From the Landscape to the Place: Finding the Cemetery

By and large, the concept of landscape refers to certain subjective images by means of which the world is perceived (Laboratoire Thema 2008). In a rather broad sense, it might be said that landscapes are 'scattered' everywhere, as if waiting to be discovered. Despite always being embedded in a geographical space, landscapes cannot be transformable into a pre-set appearance. More often than not, landscapes can be recognised in artistic expressions. It was thus, actually, by means of the expressions drawn by the children from Grand Bourg, that several cemetery landscapes were obtained, upon the children's responding to the task of portraying a frightening place. It could be told, from the captions on the drawings and the conversations the participants engaged in, that the landscape corresponded to the local municipal cemetery.

The coincidence in their pointing at the cemetery as a frightening place was disregarded by the ongoing research at first, considering it was almost exclusively related to the children's imaginative capacity, as part of the maturational development of children's psyche. Although these aspects will be discussed later on, it is important to point out that it seemed interesting to try a new interpretation of the children's special perception of the cemetery. Could the figure of the cemetery stand as a metaphor of the unease that seems to pervade the neighbourhood where these children live? Thoroughly answering this question might

be rather difficult, especially because this was not one of the main questions in the dialogue held with the children. Besides, according to Bédard (2006), it is necessary to systematically gather several samples in time in order to carry out a detailed analysis of children's drawings. Nevertheless, it seems at least interesting to consider the place where the cemetery is located as an empirical object from which to display a theoretical reasoning fostering further thought on the complex and tangled meanings that might be implied in such a setting of violence and civil unsafety as the one described by the children.

In theoretical terms, to talk about the cemetery as a place implies considering it a primary—basic—spatial unit. Also, the place takes part in the construction of memories and it projects a long-lasting effect into the future (Clerc 2004). It might as well be worth questioning which space we are talking about when referring to the cemetery as a spatial unit. This will be dealt with in the following section, keeping the focus on the figure of the cemetery, but taking the conceptual abstraction level from a notion of place to that of territory and space.

6.4.2 The 'Two' Cemeteries: A Burial Place and a Space of Fear

Space can be understood in a twofold sense. From a passive dimension, as the mere reflection and/or field of social practices; otherwise, as a stage of the whole social life. In Santos' words, (1990, p. 165) "space is, then, an active dimension in the development of societies." The created or inherited space forms can adopt autonomy in existence but never in behaviour, for they are always related to the other multiple social dimensions of people's lives.

All things considered, the figure of an urban cemetery could be interpreted in two ways. On the one hand, from a material perspective—following Giménez (1999)—the spatial unit of the cemetery could be seen as a kind of territoriality—or "territorial package" (p. 28)—that holds a set of social relations, and, therefore, as a resource tool, since it is a place of cultural imprint inherited

form social practices. On the other hand, there is another perspective that—also in line with Giménez (1999)—may see the cemetery as a space embedded in a “potential field” (p. 27), i.e., within a wide variety of possibilities regarding its use value.

From the first perspective, it may be worth remembering the origins of this territorialised space: the cemetery. According to Brel Cachón (1999), burial practices started being regulated by modern States during the Enlightenment (in the Western World), when the uses of the territory were revised. These first regulations intended burials to be carried out in the outskirts of large cities instead of areas surrounding parishes or communal chapels. According to Segurola Jiménez and Muro Arriet (1993), it must have been due to the rise of enlightened hygienists and the fight against epidemics that death turned into an undesirable destiny and walls were built around cemeteries—like barriers—to keep them diligently isolated from the eyes of urban residents.

Moving on to the other perspective, the cemetery might be seen as a “geosymbol” (Giménez 1999, p. 29) that is defined and redefined depending on the subjects as a whole and on their historical time. In other words, it might be interpreted as a result of human practices and also as the way subjects are perceived. Therefore, referring to the “lived-conceived space” (Lindón et al. 2006, p. 12) seems to be a rather suitable notion to label cemeteries, mainly focusing on the subjects’ point of view and their articulation with different urban imaginaries. The cemetery, then, ends up being represented as a text, as a set of meanings connected with everyday life practices, even beyond its traditional function of systematically and bureaucratically burying corpses of the community it is located in.

It is important to state that, though antagonistic as they may seem, both views of the figure of the cemetery end up being intrinsically related. According to Segurola Jiménez and Muro Arriet (1993), the fear and concealment of death that cemeteries used to represent might have been one of the causes that led to labelling cemeteries as obscure, distant and gloomy lands. According

to Lindón (2008), violence and fear turn out to be inseparable feelings and experiences by definition, with the peculiarity that they can also be spatially located.

Therefore, it is possible to make a first attempt at explaining the generic fear of cemeteries: the perception of death as something distant, surprising, and somehow sentencing corpses to ‘ostracism’, sending them to a place located in the outskirts of the city. This could be the first appreciation of the symbolic meaning of the fear cemeteries entail. Seen from the children’s viewpoint, the space of the cemetery might be perceived as a space of fear by nature. This is mainly because, according to Valiente et al. (2003), among the most common fears children experience, the one related to the fear of suffering an aggression or even dying is the most predominant. It goes without saying that fears are habitual sensations experienced during childhood and adolescence, showing evolutionary characteristics, adopting a strictly biological meaning and being essentially associated with the survival of the human species (Valiente et al. 2003).

Thus, the relation between the notions of territory, space/lived-conceived space around the figure of the cemetery leads us to brood upon the grounds that somehow account for the pictures of the cemetery drawn by the children when asked about the places they found frightening. Now, does the recurring appearance of the cemetery as a frightening place in the children’s pictures only mean that this biological-evolutionary fear is ever present in them because of their proximity to the cemetery? Or could there be something more related to the criminal practices they witness in their neighbourhoods?

As Lindón (2007) clearly points out, the key to qualifying the spaces in the city is found in urban imaginaries. The imaginary being not something surreal, but the incessant creation of meanings, constructions and deeply subjective representations of a fact or given element (Castoriadis 1985 in Hiernaux 2006). The notion of urban imaginaries is most relevant to the analysis of the results obtained from the experience with the group of children because imaginaries

are directly linked to symbols. In their capacity to link elements, symbols have the potential to be abiding, thus linking elements that were initially separate (Lindón 2007; Lindón and Hiernaux 2007).

6.4.3 Ongoing Questions After the Visit to the Cemetery

Taking into account what Lindón and Hiernaux (2007) stated regarding social imaginaries leaving marks or imprints in the territory, the municipal cemetery was observed, in order to track down some clues in the territory that might suggest a connection between the sense of unsafety felt by the children from Grand Bourg and their drawings of the cemetery.

Connecting these two dimensions was not an arbitrary idea. Firstly, because, while talking to the children, information could be obtained about how seriously unsafe the neighbourhood was and how deeply unsafe those children felt—just as has already been stated in the first section of this chapter. Secondly, following Guerrero Valdebenito (2006), because the fact of relating the landscape in the drawings with the geographical place proper stemmed from the idea that unsafety—being it the representation of several collective fears—always tends to find ways of naming and materialising those fears.

In Martel and Baires' words (2006), the fear imaginaries have to do with the personal (or collective) perception of the city. In this sense, and according to Lindón (2007), the same fraction of a city can be perceived differently depending on the different viewpoints of its residents.

According to Guerrero Valdebenito (2006), the meanings of unsafety are grounded in social and territorial experiences pursuant to the possibilities of each group. It is thus worth highlighting the relevance that most of the drawings gave to the gate of the cemetery. One of them shows a large cross with a simple line that reads: 'cemetery'. Other two, however, show a clear perimeter, at the centre of which it reads: 'Grand Bourg Cemetery'. This is interesting, as

there is no sign there displaying a cross, nor is there any reference to the city. Being a municipal cemetery, it only displays emblems belonging to the state administration of Malvinas Argentinas District. This shows that the cemetery is an unavoidable reference point in the city, an element which was also highlighted in the dialogue with the children. To be 'on one side of the cemetery or the other' is a traditional kind of cardinal reference used by the local neighbours. The boundaries of the cemetery that the children seem to perceive in their drawings are to be paid close attention, though.

While observing the territory, it was noted that, apart from the front fence, the perimeter of the cemetery is surrounded by tall walls, adjacent to some family homes or narrow streets, creating rather deserted alleys where the wall stands out. Foucault (2008) highlights the opening and closing capacity of the heterotopias that cemeteries represent, being able to 'isolate' themselves from the space surrounding them. Urban segregation, like the one set forth by the cemetery, makes it possible to progressively consolidate a "border city" model (Guerrero Valdebenito 2006, p. 109). Since its historical origin—both material and symbolic—the cemetery has been a continuum of limits and new limits, a constant demarcation of places located around a sombre atmosphere which is not only heightened by the unsafe environment described by the children, but also by the violent memory the Grand Bourg Cemetery evokes. In Lindón's words (2008), this deepens the fragmentation, given the everyday social experience in that neighbourhood where the cemetery is located.

It is possible to talk about a violent memory, as mentioned in the previous paragraph, because the Grand Bourg Cemetery is mentioned in the *Nunca Más* report (CONADEP¹ 2003, p. 243). It appears there because nearly three hundred

¹ Acronym standing for Comisión Nacional sobre la Desaparición de Personas (National Commission on the Enforced Disappearance of Persons), created by the constitutional president of Argentina on 15th December 1983, with the purpose of investigating the several reported cases of human rights violations committed during the dictatorial period known as National Reorganization Process.

unidentified corpses were buried in about ninety mass graves. They were discovered in the early 1980s and reported by Human Rights organizations, after having confirmed the whereabouts of the corpse of a union activist who had been illegally arrested and assassinated by the security forces back then.

The case of the unidentified corpses in the cemetery was one of the key episodes in the quest for the truth about the execution of thousands of arrested citizens, victims of enforced disappearance, in Argentina during the 1970s and 1980s. Judicial investigations were initiated with the Grand Bourg case, even during the last period of the de facto government dissolution (Gandulfo 2012).

The dark history of the cemetery may lead to brooding upon the effect that such cruel events, like the ones revealed in the *Nunca Más* report, might have had in the lives of more contemporary societies inhabiting Grand Bourg to this day. Thus, as Javeau (2000) states, the cemetery stands as a place of remembrance. It is possible for a conventional place, seen by passers-by as an utterly common and everyday landscape, to be sometimes charged with a strong evocative force for having staged an event that bears connotation in the lives of certain actors, evidencing a “pure indexicality” (p. 172). It is then worth resuming that ingenious resource stated by Lindón (2007), originally taken from Navarro (quoted by Lindón 2007), about social holograms in order to label sites such as the Grand Bourg Cemetery. In line with the photography technique that gives name to this resource, a (social) hologram enables understanding of the multiple levels of reality involved in the socio-spatial construction of a given place.

It is clear that none of the aforementioned elements could respond, on their own, to that original question regarding the underlying causes of the children’s fear represented in the figure of the cemetery. Surely, it would be necessary to ask the same group again, delving into the figure of the cemetery, so that they themselves could provide more keys to interpreting their drawings. It is evident that the images of cemeteries, particularly the image of the Grand Bourg Cemetery, turn out

to be interesting resources to be absorbed as socio-spatial holograms from which to enquire into those ‘other places’—imaginary, symbolic—or, in the end, those certain social practices that do not fit a conventional level of analysis.

6.5 The Figure of the Grand Bourg Cemetery and the Challenge of Sustainability: A Theoretical Link to Think New Ways Towards Development in Cities

The figure of the Grand Bourg Cemetery poses a theoretical challenge to sustainability. Bearing this cemetery in mind, there are different angles from which sustainability and sustainable development can be questioned. It is necessary to clarify some concepts, however, before proceeding with this analysis.

The notion of sustainable development emerged in a rather complex context in the early 1980s. As stated by Duran et al. (2015), the idea of sustainable development entails the durability of an eco-friendly process of economic growth, as well as the systematic progress which—holistically speaking—incorporates the cultural and social dimensions associated with it. In other words, it could be stated that the notion of sustainable development was progressively installed as a response to the problems that arose during the contemporary era, in which diverse societies around the world were involved after the post-Cold War industrial and technological boom. This, therefore, set forth the need to reach a real balance between entrepreneurial ambitions, the progress of mankind and environmental impact.

The current paradigm of economic growth—damaging for the environment—started being debated in the 1970s in diverse international conventions focused on the protection of the world’s renewable and non-renewable resources. However, not until late twentieth and early twenty-first centuries did the notion of *Sustainability Transition* take shape (Günter Brauch and Oswald Spring 2016). This idea of transition aimed at a new era of human

civilization transformation involving the lifestyle and values of societies to overcome the ecological, social and political problems of the contemporary world. Thus, sustainable development could be understood as a way rather than a given or static situation, since the very meaning of the expression points at a new way of long-term development, with a view to implement it globally (Duran et al. 2015).

Should the notion of urban sustainability be specifically considered, its situation is similar to that of sustainable development: there is a lack of conceptual accuracy and, at the same time, its definition is questioned (Williams 2010). Nevertheless, it is clear that, when used, the term somehow refers to a certain ideal or common—practical—objective that leads to discussing and debating different future visions as to how a city may become sustainable (Williams 2010). Urban management entails huge challenges in a world whose population tends to become urbanised at a fast pace. Thinking about urban sustainability, then, urges for a broad, multidisciplinary approach that boosts a theoretical and—essentially—practical reflection to tackle the urgency posed by the social, economic, environmental and spatial fronts, among others (Keivani 2010).

It is interesting to notice that the notion of sustainability may be translatable into Spanish with two different terms, whereas there is only one in English [*sustentabilidad*, used for the 'former' notion of sustainability, and *sostenibilidad*, understood as the 'most recent' notion of sustainability transition]. It is much easier, then, to tell the semantic shades of sustainability in Spanish, given the nominal difference the two words present. However, as both terms in Spanish have been used interchangeably or overused (even in scientific literature), and their semantics is rather dynamic—typical of recently coined terms—the notion of *sostenibilidad* is blurry and, as far as this research is concerned, it still does not show its potential to 'break forth' or 'transition to' the new approach that calls for the construction of a 'new', more sustainable world.

The international 2030 agenda launched by the United Nations (UN) revalued the meaning of sustainability in the countries' national and

international political agenda, as well as in the technical or specialized debates (UN 2015). Proposing seventeen Sustainable Development goals, the UN tried to show the scope of an ambitious new universal agenda intended to resume the Millennium Development Goals and achieve the ones they had not attained yet. Likewise, the 2030 Agenda presented an implementation plan for sustainable development proposals so as to no longer consider sustainability as a mere dream, aiming at a systematic series of attainable commitments instead.

As mentioned before, the figure of the cemetery may contribute to the debate on the scope of the concept of sustainability from three dimensions: spatial, symbolic and political. As for the spatial dimension, in previous sections, the figure of the cemetery has already been highlighted as an example of those territories deliberately founded by modern States in isolated areas, where to keep the corpses that might carry contagious diseases. Likewise, the figure of the cemetery as a source of fear and unsafety suggests, in Guerrero Valdebenito's words (2006), that social imaginaries coexist, accounting for the unsettling ways in which the sense of urban inhabiting is elaborated. Addressing the ways spaces are used, taking into account the lifestyles developed in them, may lead to gathering clues about all the obstacles that hinder the development of sustainable life paths in a given time and place. In the case of Grand Bourg, the cemetery appears as just another piece in a setting that is prone to instilling several fears in an evidently violent urban context.

Achieving sustainable cities and communities is one of the goals agreed upon by the community of nations in the 2030 Agenda for sustainable development. The eradication of violence and the promotion of social cohesion are two goals contemplated in the international plan, even when, currently—and especially considering Argentina's reality, violent situations, and sensations of violence and civil defencelessness linked to them are ever increasing in many cities, according to their inhabitants. This situation was clearly evidenced in the dialogue with the children considered in this research.

When asked about places or things they considered unsafe, the children coincidentally pointed at the street as a dangerous place. According to Lechner (1990), at the end of the day, fears set forth the order issue as a political topic par excellence. It is practically impossible to focus on the problem of violence and safety among citizens without taking into account the problems derived from economic growth and inequality. Fears and safety are a social product (Lechner 2002/2015).

According to Lechner (1990), the discourse on order in Latin America always contrasts with a history of invasions, a continuous and reciprocal “territory occupation” (p. 91). No borders or boundaries provide safety. Everyone lives in terror of their own selves being affected or their property being stolen. The children seem to experience hostility in their closest surroundings within the city, where the street is revealed as a hostile territory. This atmosphere inevitably reinforces people’s seclusion in private environments. As stated in the studies considered by Ortiz Guitart (2007), public spaces are turning into spaces for adults, children’s access being restricted. *The report on the State of the World’s Children 2012*, published by the United Nations Children’s Fund (UNICEF), suggests how growing up surrounded by community violence problems can lead children to internalise certain problematic behaviours, like peer aggression or addiction, apart from leading to a progressive erosion of social cohesion.

The goals set by the 2030 Sustainable Development Agenda explain the commitment of the signatories to end all types of violence against children while promoting more fair and peaceful societies. Violence, in all its forms, including the ones coming from spaces where children coexist, has a general negative effect in societies. Violence affects children’s development and wellbeing. In his foreword to the report on *The State of the World’s Children 2016*, Anthony Lake, the Executive Director of UNICEF, pointed out that if children are given a fair chance at health, quality education, and protection from harm, they can, as adults, not only make their own lives better, but also contribute to make

their societies richer. Therefore, there might be multiple, blurry grounds for fear in the cemetery; however, it is evident that, in the broader context of this city, the figure of its cemetery sets as gloomy a panorama as the imaginaries that cemeteries were assigned since time immemorial.

Moving on to the symbolic dimension, it has been stated that the marginal terrain of the cemetery, being it an imaginary of division and boundary, appears to be a peculiar representation of the unknown otherness of death. At this point, it is worth mentioning that death arises as an underlying phenomenon that might fuel a two-fold existential curiosity: on the one hand, ‘natural death’; on the other hand, violent death. While studying the cemetery of our concern, as stated before, no explicit traces of people killed in acts of violence were found, but references were made to violent memories connected to a dark time in Argentina’s recent history.

This last remark seems to display a complex scenario from which the figure of the cemetery can be reassessed for the analysis that intends to relate it with sustainability. As Lechner asserted (2002/2015, p. 219), “fears speak for us” and, in this case, the children’s opinions seem to show several aspects about Argentina’s biography.

Although the children did not make express reference to the military dictatorship imposed in Argentina in 1976, their reference to the Grand Bourg Cemetery enabled us to track down traces of State terrorism perpetrated back then—especially the memory of the clandestine burial of hundreds of unidentified corpses. In previous sections, it was analysed whether this latent memory of a violent past episode could somehow have an ‘everyday’ effect on the fears described by present generations. It is worth reflecting on this more deeply, wondering whether the memory of that fact (thoroughly knowing what the crimes of the dictatorship meant) might be another factor either hindering or—in a best-case scenario—improving sustainability in the city.

Before the proposed reflection is unfolded, it is worth pointing out that the cases filed for the enforced disappearance of persons that took place during the last military dictatorship in Argentina are still open, seeking justice against

crimes against humanity. The deprivation of basic rights on the identity of the victims is directly referred to upon mentioning the cemetery—not only their assassination, but also the lack of official identification of their corpses. Lechner (1983/2013) referred to human rights as a political category asserting that persons are deprived of their human rights when actually deprived of their right to have rights. The figure of the cemetery, after all, shows how this kind of traumatic events in the political life of a society can cause serious harm in a people's trajectory, leaving an open wound in the nation's extended social framework.

Nonetheless, the well known historical incident in the Grand Bourg Cemetery that helped hasten the fall of the military dictatorship in the early 1980s seems to be blurred in Argentinians' everyday memory. What is more, the workers at the cemetery did not even know where the gravestone standing as a memorial to the massacre caused by the dictatorial regime is located, as could be proven during the observation carried out for this research. The cemetery surroundings do not display physical references commemorating said event. It seems to have been absorbed by the collective memory of the neighbourhood, and the criminal act seems to have been strangely naturalised.

According to Lechner (2002/2015), memories—even violent ones—are collective creations unfolded within a social setting. Memories, then, can be understood as temporary flows that shape the ways of living a certain social order. Using them may account for the repetition of the past or it may legitimate present transformations, always envisioning the future ahead. It could be said that the peculiarities of the democratic transition in Argentina at the end of last century seemed to be focused on collectively shaping a future set on redeeming the sad tragedies of the past so as to reach a 'new' present, sustainable in the everyday and commonplace lives of its citizens. However, the scarcities still present among all those who live under a so-called democratic political regime seem to urge for what Lechner (1983/2013) called: the utmost right to citizenship as a prior condition to individual rights.

What does this have to do with the narrative of the cemetery, then? In another section of this chapter, the cemetery was referred to as a social hologram, since, from it, it is possible to interpret and decode symbols, social practices, veiled scenarios, or those other places that become invisible but contribute to the identity of a place marked by the subjects' own experiences. A new symbol of this peculiar cemetery has been just posed for theoretical consideration: the potential to find a violent identity in the memory it evokes, traceable in the lingering violence perceived in the urban context where the cemetery is located—just like the aftershock of a still-active volcano. Apart from that, the memory of the cemetery triggers further thought on the possibilities for that memory to become the key to a different future for the subjects living in the surroundings.

As if in a fit of animism, the Grand Bourg Cemetery seems to be giving some keys, taken from its own history, which might turn out to be useful to face the civil violence that challenges the social cohesion of its current urban context. One of these keys could be: never again supporting a political void. As stated by Bauman (2013), supporting a political void leads to enforced negotiation, an attitude which somehow reminds us of the worst authoritarian eras Argentina and the rest of the world have experienced.

Therefore, the ways of processing the past seem to have an aftershock effect in the future options available. Considering sustainability as a future promise did not seem to suggest, at first, the need to revise the peculiarities of societies' pasts, nor the ways peoples process their history. However, given the reference pointed out by the children, the cemetery phenomenon suggests the possibility of at least thinking about this alternative. Both in the subjects' personal lives and the lives of communities and nations, the past shapes the future. Memory offers a kind of filter to process those possible future scenarios, since developing a historic memory and envisioning potential future scenarios are combined actions—i.e., two sides of the same coin (Lechner Lechner 2002/2015). The way of living the social order,

according to Lechner (2002/2015) is related with the ways in which the subjects put the present under constant tension between their past and the future. In simple words: the ways in which the subjects process their past exert an activating force on the present, as well as the future of their lives. Exploring the violent memories of societies might not only entail the healthy mission of finding the links between them and current violent practices, but also—and even more interestingly—it might lead to working in different courses of action aimed at not repeating past traumatic experiences and, at the same time, finding potentials among abundant scarcities. Historical memory, then, may become a catalyst for the sustainability of cities' vital trajectories.

Unsolved crimes and historical wounds that are still open, damaging the social past and present, become a threat to the basis of those peoples that try to consolidate themselves as peaceful societies. The history of the Grand Bourg Cemetery sends out a message that, evidently, does not go beyond its walls: the lack of justice means that conflicts remain unsolved and, when political institutions are not law-abiding, they become prone to arbitrariness and abuse of power.

In the end, memory is a tool with which the society portrays those materials provided by the past to build a possible future (Lechner 2002/2015), and the Grand Bourg Cemetery seems to synthesise that idea. The Grand Bourg Cemetery embodies—at present—the sum of all fears: its walled perimeter witnesses violence and the collapse of the city's social cohesion. Meanwhile the ghostly imaginaries of death intermingle inside with the memory of violent assassinations and the criminal hiding of the dictatorship. Linking sustainability with the historical reality evoked by the cemetery paves the way for a glimmer of hope amid chaos.

6.6 A Final Reflection: Rethinking the Role of Childhood in Sustainability

Sustainability, like childhood, bears a promise for the future. Arendt (1996) stated that action is

intrinsically related to the very human condition of birth. Sustainability somehow urges current generations to adopt habits and set forth public policies enabling the birth of a 'new', more balanced and inhabitable world.

Linking this kind of 'future projection' with both the concept of childhood and of sustainability turns out to be rather curious; especially if taking into account that the idea of a relation between the potentialities behind the violent memory of the Grand Bourg Cemetery and the notion of sustainability was inspired by the reference provided by the children who live in that neighbourhood.

Casas (1998) stated that the etymology of the term childhood in Spanish (*infancia*) comes from the Latin term *in-fale*, which means: 'the one who does not speak', and, over time, the expression seems to have derived into 'those who do not deserve being listened to'. This vision evidences that, actually, childhood has scarcely been represented as something valuable itself, consciously appreciable. Nevertheless—for the sake of this research—they have been bold enough to "mention their fears" as a clear exercise of democratic coexistence (Lechner 2002/2015, p. 193). Mentioning those fears implies leaving room for subjectivity so as to acknowledge everyday experience as part of life in society.

In second place, it is worth stating that, while historical memory can become a catalyst or an inhibitor for a more sustainable future, childhood undoubtedly plays the role of transmission belt in that process. Childhood tends to play a supportive role in the apparently noble inheritance of the past and, at the same time, it is always in charge of dealing with a heritage that—most of the time—ends up being overwhelming. From a biological point of view, childhood tends to be represented as the hope for continuity, for subsistence and even for redemption of any social group. Childhood bears the yearning for a better future, as if the sweet, short age of the subjects belonging to this group were isolated from the interactions that inevitably take place between the other social groups that any society is composed of (Gaitán Muñoz 2006).

Actively listening to the children's stances implies seeing them as a laboratory of the different social uses currently in force in their daily lives, set in a given time and place. Paying attention to what children say implies consciously taking this complex and dense challenge into account, making an effort to spot in their speech all those tangled realities—either connected to childhood or not; real and symbolic; current or prospective; present in their daily lives.

Childhood may play an important role in the arduous task of achieving sustainability in cities. The very logic of starting a sustainable development process demands taking measures at present while strengthening sustainability towards the future. It is there where childhood might play a key role. Children, as shown by the ones from Grand Bourg, give valuable clues to understand—and address—the violent present of cities. Besides, this chapter shows how the reference to a given space, like the cemetery, portrays—almost like an inter temporal mirror—both the identity and the trajectory of several wrongs that, certainly, deserve being paid close attention to for their political management and solution. All in all, both dimensions suggest nothing but the huge challenge of achieving real urban sustainability in societies like South American ones.

The most reassuring aspect is that, despite the dark panorama and the disheartening realization of the long way ahead towards a sustainable present, the solutions might be found in the children's spontaneous opinions and deprived looks. Their participation might mean a breath of fresh air from which to examine new future alternatives.

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The Nexus of the UN Sustainable Development Goals and Their Link to Quality of Life: A Case of Urbanization in Ethiopia and India

7

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7.1 Sustainable Development Goals Cross-Impact Matrix for the Case Ethiopia/India

Ethiopian, Indian and European universities work on integrating social and ecological aspects and participatory approaches in university curricula for architects and urban planners. By that, they contribute to the achievement of selected targets of the Sustainable Development Goals (SDGs) of the United Nations, like SDG 1 No Poverty or SDG 11 Sustainable Cities and Communities. The interrelation of the different targets is evaluated in a cross-impact matrix, which may be used as a basis for efficient resource management and priority setting by decision makers. For monitoring the progress on SDGs and their targets, a framework of 232 indicators is provided

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by the UN. Currently this framework does not list quality of life or subjective well-being assessment. An extension by adequate tools for assessing quality of life could enable a more comprehensive evaluation of progress on different SDGs and targets.

7.1.1 Capacity Building on Social Inclusion in Architectural and Planning Education in Ethiopia and India

It is assumed that today more than 1 billion people are living in urban slums worldwide. While many, mostly socio-economic root-causes contribute to the emergence of these often informal, insecure and unhygienic residential quarters all around the globe and particularly in large megacities of the Global South, they nevertheless predominately pose challenges with regards to spatial planning, housing and infrastructure. Building professional capacity in higher education of future architects and planners therefore constitutes an indispensable prerequisite in attempting to ameliorate housing conditions in affected regions.

Therefore, three large-scale projects under coordination of this chapter's authors explicitly target architectural and planning education in both India and Ethiopia with funding by the EU Erasmus plus/Capacity Building in Higher

Education program.¹ With the production of Open Educational Resources (course descriptions, following MIT's OpenCourseWare model) and region specific case studies, these projects increase the relevance of architecture and planning studies by introducing multidisciplinary topics such as social inclusion, sustainable housing, participatory mapping and environmental risk assessment into universities' curricula.

To complement the vertical policymaking in both India and Ethiopia with a horizontal exchange of good practices, these projects aim at fostering collaboration between Indian and Ethiopian as well as European Higher Education Institutions (HEIs). Furthermore, they strengthen the relations between HEIs and their wider socio-economic environment by arranging information, consultation and feedback mechanisms with different social actors during case studies, by providing external trainings to stakeholders in each of the target cities, by organizing local dissemination workshops and national conferences, and by sharing complementary materials via project websites.

7.1.2 UN Agenda 2030 for Sustainable Development

In 2015, all 193 member states of the United Nations agreed on 17 Sustainable Development Goals (SDGs) for the transformation of our world by the Agenda 2030 for Sustainable Development. Compared to the former eight UN Millennium Goals focusing on developing countries, the SDGs have to be implemented in all UN member states, therefore also in developed countries until 2030. The 17 SDGs with 169 targets and 232 indicators focus on the reduction of poverty and hunger, on health, well-being, high-quality education and gender equality, on the way to a sustainable economic growth and to decent work,

with clean water, affordable and clean energy, sustainable infrastructure and cities as well as responsible consumption and production. Global partnerships, less inequality and a peaceful and inclusive society may strengthen these goals, also regarding measures for climate protection and for the sustainable management of the planet's ecosystems. Figure 7.1 gives an overview of the 17 SDGs.

7.1.2.1 Sustainable Development Goals in Ethiopia and India

As a member of the United Nations, Ethiopia as well as India have accepted and support the 2030 Agenda for Sustainable Development and the SDGs with national commitments. In their Voluntary National Reviews (VNR) 2017 to the UN, both countries refer to a number of consultations ensuring the involvement of all relevant stakeholders, the government, the private sector, the civil society, NGO, business etc.

The Ethiopian VNR 2017 (Federal Democratic Republic of Ethiopia 2017) shows the findings of the assessment concerning six sets of SDGs, namely Goals 1, 2, 3, 5, 9 and 14. Therefore, the main Ethiopian's focus regarding the SDGs is on ending poverty and hunger, ensuring health and well-being, achieving gender equality and empowering women and girls, building resilient infrastructure, on promoting inclusive and sustainable industrialization and fostering innovation, as well as on conserving and sustainably using the water eco-system. The report lists drought as one of the main challenges for implementing the SDGs, because of climate change and its negative impacts on the economy, on well-being and quality of life. It indicates the need for more and stronger global partnerships, as well as for the mobilizing of financial resources by the international community to support the implementation of the SDGs in least developed countries (Hörtl et al. 2018). As a less urbanized country, in 2018 Ethiopia showed an urban growth rate of 4.8% (The World Bank Group 2019) which is one of the highest in the world. Albeit other SDGs like SDG 9 (Industry, Innovation and Infrastructure) have a strong linkage to that issue, it is remarkable, that SDG

¹ "Building Inclusive Urban Communities" (BInUCom 2015–2019, <https://mdl.donau-uni.ac.at/binucom/>) / Social Inclusion and Energy Management for Informal Urban Settlements (SES 2016–2020, <https://mdl.donau-uni.ac.at/ses/>) / "Building Resilient Urban Communities" (BReUCom 2019–2021, www.breucum.eu).

SUSTAINABLE DEVELOPMENT GOALS



Fig. 7.1 Sustainable Development Goals of the United Nations (Source: United Nations 2018)

11 (Sustainable Cities and Communities) is not on the list of Ethiopia's in-depth review of SDGs for the 2017 VNR report. However, in connection with SDG 3, to the extent the country's resources permit, government's policies aim to provide all Ethiopians access to housing. One approach to alleviate housing problems, the government builds urban condominiums. Thirty percent are allocated to women to support gender equality and empower women and girls (SDG 5). India was actively involved in the formulation of the SDGs and has a strong commitment to their achievement. The Indian VNR 2017 (United Nations 2017) of SDG implementation concentrates on the Goals 1, 2, 3, 5, 9, 14 and 17, emphasizing the strong interconnections across all 17 SDGs and thereby the involvement and promotion of other Goals as well. Therefore, India focuses on the same Goals as Ethiopia, with the additional aim of strengthening global partnerships with SDG 17. Like in the case of Ethiopia, also India's VNR doesn't show a main focus on SDG 11, although in 2018 urbanization with still 2.3% growth rate (The World Bank Group 2019) is an important issue in that country

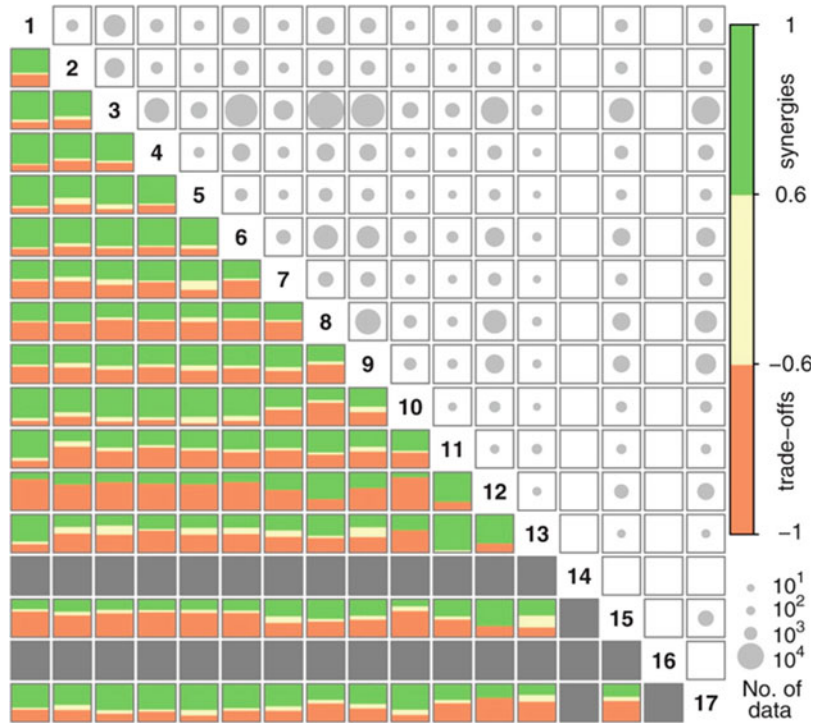
too. But in that context the Indian VNR 2017 states the ambitious goals of universal rural electrification, or sanitation and housing for all. Therefore, for Ethiopia as well as for India no detailed information about specific action plans and efforts concerning SDG 11 are available in the VNRs.

7.1.2.2 The Nexus of the SDGs

One challenge regarding the implementation of the SDGs is the interaction of the 17 Goals and the 169 targets. To know more about these interactions is important on the one hand because of the actual effectiveness of different measures for reaching the SDGs depending on related synergies and trade-offs, and on the other hand because of limited budgets and thereby the necessity to assign priorities. Hence, these interactions may depend more or less on the specific circumstances of a country, a region or on the current question like the upgrade of slums.

Boas et al. (2016) refer in this context to the increased requirements for the nexus approach. The concept emphasizes the need of respective governance in case of the intrinsically

Fig. 7.2 Synergies and trade-offs within the different SDGs, light grey means synergies, white nonclassifieds, grey trade-offs, and dark grey means insufficient data, see especially SDG 14 and SDG 16 (Pradhan et al. 2017, 1173)



interconnection of different issues. The nexus approach has its origin in relation to resource security (food, energy, water, climate) and has been adopted in the context of sustainable development, because it provides a basis for an increased awareness of the interconnection of the different SDGs and different policy domains.

Based on data series of 227 countries between 1983 and 2016, Pradhan et al. (2017) provide an overview of synergies and trade-offs of the SDG interactions. Figure 7.2 shows the interrelations between the 17 SDGs by three categories: synergies, no classifieds and trade-offs. These interrelations indicating e.g. mainly synergies between SDG 11 (Sustainable Cities and Communities) and SDG 13 (Climate Action) or almost the same extent of synergies and trade-offs between SDG 7 (Affordable and Clean Energy) and SDG 15 (Life on Land).

According to Nilsson et al. (2016) policymakers need a scheme for thinking systematically concerning the interactions of the different targets. This scheme can be further developed

continuously by empirical experiences. The authors propose a so-called “Goal scoring” with seven categories regarding the interaction of Goals or targets (see Table 7.1).

Weitz et al. (2018) use the seven-point typology and associated scoring of Nilsson et al. (2016) and the cross-impact matrix, for a system analysis of the interaction of 34 selected targets for Sweden. The scoring is always guided by the question: “If progress is made on target x, how does this influence progress on target y?” They emphasize that the analysis of the systemic properties of the SDG targets may differ according to involved stakeholders, decision makers or experts, thus point out the need for the refinement of the targets according to the respective circumstances or settings. In addition, it is clear, that policymakers have to balance interests and priorities. Based on network analysis and a clear scheme for interactions, the authors suggest a practical approach for a systemic perspective on the SDGs, which may be adopted irrespective of data availability. Weitz et al.

Table 7.1 Goals scoring scheme for SDGs

Interaction	Name	Explanation
+3	Indivisible	Inextricably linked to the achievement of another goal.
+2	Reinforcing	Aids the achievement of another goal.
+1	Enabling	Creates conditions that further another goal.
0	Consistent	No significant positive or negative interactions.
-1	Constraining	Limits options on another goal.
-2	Counteracting	Clashes with another goal.
-3	Cancelling	Makes it impossible to reach another goal.

Source: Nilsson et al. (2016, 321)

(2019) give a brief overview for a practical way to understand the interactions of SDG targets in a specific context. In a three-step process the interactions of SDG targets are collaboratively analyzed. In step 1 “customization”, the most relevant targets for the specific question or situation are selected. The selected subset of targets is entered in a cross-impact matrix with a corresponding scoring in step 2 called “scoring interaction”. For that, engaging a broad group, including scientific experts, is recommended. Step 3 means an “analysis beyond direct interaction” by identifying patterns or clusters of synergies or trade-offs or other effects beyond the direct interactions. In Sect. 7.1.4, a cross-impact matrix according to Weitz et al. (2019) is presented for selected targets of the case Ethiopia/India.

7.1.3 Sustainable Development Goals and Quality of Life

According to Skevington and Epton (2018) subjective well-being or quality of life are not part of the SDG list of 232 indicators, which focus primarily on objective (living) conditions. They recommend the WHO quality of life measure WHOQOL-BREF for evaluating subjective quality of life and thereby assessing SDG targets regarding their contribution to subjective well-being.

“WHO defines Quality of Life as an individual’s perception of their position in life in the context of the culture and value systems in which they live and in relation to their goals, expectations, standards and concerns” (World

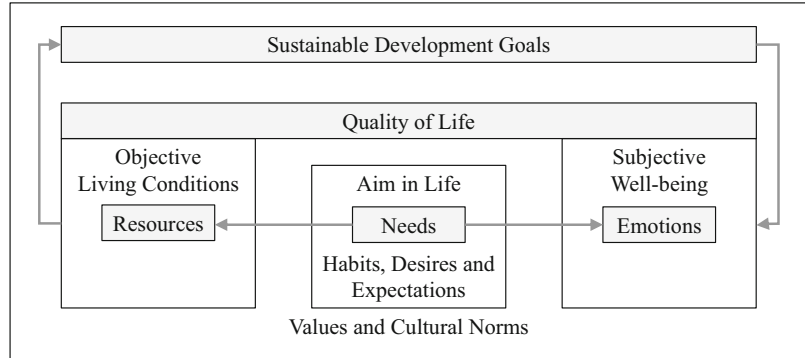
Health Organization 2019). Four major domains are assessed by the WHOQOL-BREF: physical, psychological, social relationships and environment.

Costanza et al. (2007) provide an integrative definition of quality of life, considering subjective as well as objective conditions:

QOL is the extent to which objective human needs are fulfilled in relation to personal or group perceptions of “subjective well-being” (SWB). Human needs are basic needs for subsistence, reproduction, security, affection, etc. (. . .). SWB is assessed by individuals’ or groups’ responses to questions about happiness, life satisfaction, utility, or welfare. The relation between specific human needs and perceived satisfaction with each of them can be affected by mental capacity, cultural context, information, education, temperament, and the like, often in quite complex ways. Moreover, the relation between the fulfillment of human needs and overall subjective well-being is affected by the (time-varying) weights individuals, groups, and cultures give to fulfilling each of the human needs relative to the others (2007, p. 269)

On the basis of objective living conditions and subjective well-being, Quendler (2011) combines quality of life with Sustainable Development. She emphasizes that “development” in terms of “sustainable development” is more a question of quality than of quantity, and so a question of quality of life. In Fig. 7.3 the interrelations are shown according to Quendler (2011), here replacing Sustainable Development by the Sustainable Development Goals. In this approach the individual aim in life influences the specific needs regarding the objective living conditions as well as the subjective well-being for evaluating one’s own quality

Fig. 7.3 Sustainable development goals and quality of life (Source: according to Quendler 2011, 36)



of life. It shows the link between the SDGs and quality of life by indicating, that the objective living conditions strongly support or influence the achievement of the SDGs, and this subsequently may affect the subjective well-being. So the SDGs are on the one hand strongly linked to the objective living conditions and may on the other hand influence significantly the subjective well-being.

7.1.4 Sustainable Development Goals and Quality of Life in the Case of Urbanization in India and Ethiopia

The case Ethiopia/India concentrates mainly on eight out of the 17 SDGs, namely SDG 1 No Poverty, SDG 3 Good Health and Well-being, SDG 4 Quality Education, SDG 7 Affordable and Clean Energy, SDG 11 Sustainable Cities and Communities, SDG 13 Climate Action, SDG 15 Life on Land, and SDG 17 Partnerships for the Goals. Based on Weitz et al. (2019) the interactions of selected targets, which have been concerned in the projects with Ethiopia and India, will be presented in a cross-impact matrix.

Step 1: Customization

The selection of 16 targets (see Table 7.2), which are most relevant for the projects, is the result of a 3 years collaborative work between European, Ethiopian and Indian universities, together with

further experts from regional governments and administration, or architects and urban planners.

Step 2: Scoring Interactions

In the next step the scoring of the interactions between the 16 targets, selected in a participative process, is evaluated on the basis of the question: “If progress is made on target x (rows), how does this influence progress on target y (columns)?” For making this step manageable, the focus here is always on the direct influence from efforts on one target to another target. Expert interviews, focus groups and conferences enabled the substantiated creation of a cross-impact matrix shown.

By those qualitative methods, subjective well-being and quality of life could be considered to a certain extent, which enables partially closing the gap of quality of life or subjective well-being assessment regarding the SDG indicators, mentioned in Sect. 7.1.3. However, a structured framework for assessing quality of life regarding progress on SDGs and their targets would be necessary for a more comprehensive evaluation.

The cross-impact matrix in Fig. 7.4 is more or less the result of the three-year Erasmus plus projects with Ethiopia and India. It shows for example, that a progress on target 1.5 (build the resilience of the poor) strongly supports the achievement of target 13.1 (strengthen resilience to climate-related hazards), or a progress on target 7.1 (increase renewable energy) may limit options to target 15.5 (halt the loss of biodiversity). However, as Weitz et al. (2019) mention, the final

Table 7.2 Selected SDG targets in the Erasmus plus projects Ethiopia/India

Target number	Target description (shortened)	Issue/Connex to the projects
1.4	. . . all men and women have equal rights to economic resources, basic services, ownership and control over land and other forms of property, natural resources . . .	Insecure legal position concerning property of land is at the root of informality
1.5	. . . build the resilience of the poor, reduce their exposure and vulnerability to climate-related extreme events and other economic, social and environmental disasters . . .	Settlements of the poor are often located in vulnerable areas, e. g. at risk of landslide caused by deforestation
3.9	. . . reduce the number of deaths and illnesses from hazardous chemicals and air, water and soil pollution and contamination	Air pollution by the indoor use of charcoal for cooking, water and soil pollution due to a lack of infrastructure
4.3	. . . ensure equal access for all women and men to affordable and quality technical, vocational and tertiary education, including university	Adequate housing and living conditions are a basis for enabling education
4.7	. . . ensure that all learners acquire the knowledge and skills needed to promote sustainable development, through education for sustainable development . . .	University courses concerning sustainable housing and planning are developed in the projects
7.1	. . . ensure universal access to affordable, reliable and modern energy services	Sometimes no access to electricity, mostly no energy services are available in informal settlements
7.A	. . . enhance international cooperation to facilitate access to clean energy research and technology, including renewable energy, energy efficiency . . .	Technologies to be adapt to specific needs, projects induce further international cooperation
11.1	. . . ensure access for all to adequate, safe and affordable housing and basic services and upgrade slums	Huge topic, high levels of informality, the main focus of the projects
11.3	. . . enhance inclusive and sustainable urbanization and capacity for participatory, integrated and sustainable human settlement planning and management . . .	Integrate participatory planning and sustainability in university curricula, raise awareness of all stakeholders
11.7	. . . provide universal access to safe, inclusive and accessible, green and public spaces . . .	Lack of public spaces for low income groups
11.B	. . . increase the number of cities implementing integrated policies towards inclusion, resource efficiency, mitigation due to climate change, resilience to disasters..	Increased vulnerability of low income households in case of extreme climate change induced weather events
13.1	Strengthen resilience and adaptive capacity to climate-related hazards and natural disasters in all countries	Many informal settlements are located in such areas
13.3	Improve education, awareness-raising and human and institutional capacity on climate change mitigation, adaptation, impact reduction and early warning	Topics integrated in university courses designed in collaboration
15.3	. . . restore degraded land and soil, including land affected by desertification, drought and floods, and strive to achieve a land degradation-neutral world	Informal settlements often located in such areas, deforestation increased by burning of firewood
15.5	. . . reduce the degradation of natural habitats, halt the loss of biodiversity and protect and prevent the extinction of threatened species	Deforestation due to the need for firewood, planting of fast-growing trees instead of indigenous species
17.9	Enhance international support for implementing effective and targeted capacity-building in developing countries to implement all the sustainable development goals . . .	New university curricula for capacity-building for sustainable cities, consider technical as well as social aspects

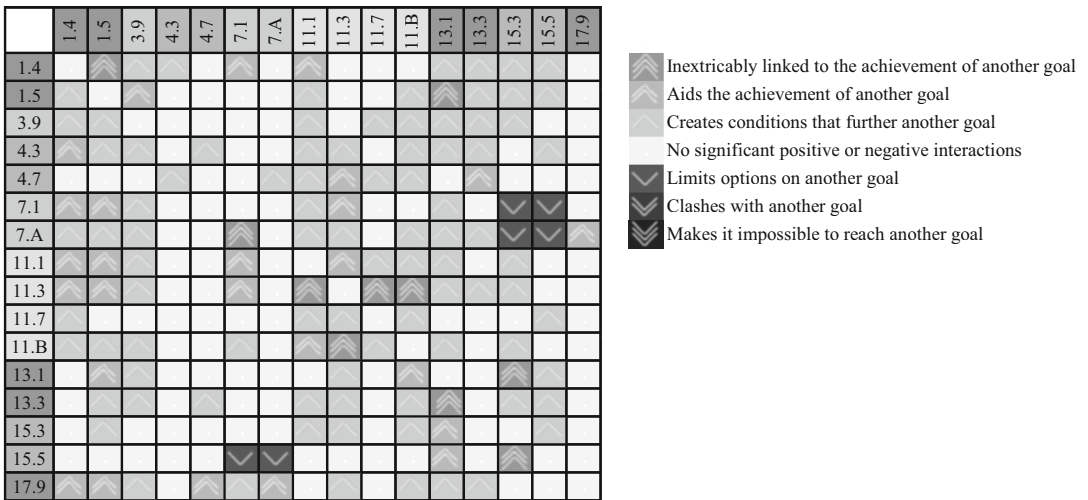


Fig. 7.4 Cross-impact matrix for the case Ethiopia/India (Source: according to Weitz et al. 2019, 2), number (1, 2 or 3) and direction (up is positive, down is negative) of the chevrons indicate the interaction scores, the impact of

progress towards the target listed on the left on progress towards the target listed along the top; a dot means no significant interaction

decision on scoring has to be made by the decision makers for implementing the assigning of priorities in the current housing policy.

Ethiopia/India may contribute by field trips, city profiles, case studies, conferences, dissemination workshops and new university courses to the achievement of these Goals.

Step 3: Analysis - Beyond Direct Interactions

After scoring the direct influences between the different targets in the cross-impact matrix, the next step is to go beyond these direct interactions for identifying evident synergies, feasible priorities or main directions for policy implementation. What is evident from the matrix is the trade-off between SDG 7 and SDG 15, therefore, as an example in programs regarding renewable energy attention has to be turned to nature capital and biodiversity. The selected targets of SDG 11 (Sustainable Cities and Communities) show a more or less strong positive interrelation. Also the targets of SDG 1 (No Poverty) are appreciably positive influenced by progresses on targets of SDG 11, meaning that investments in sustainable and affordable housing may reduce poverty significantly.

The next parts of this chapter will provide deeper insights into the related SDG 4 Quality Education, SDG 11 Sustainable Cities and Communities and SDG 17 Partnerships for the Goals, in showing how the projects of the case

7.2 National Policies for Affordable Housing in Ethiopia and India: A Comparison in Terms of Quality of Life and Inclusivity

At the beginning of the twenty-first century, many developing countries and emerging economies alike see themselves confronted with massive and rapid urbanization as well as growth of urban population, which pose considerable challenges for their societal, economic and—most prominently—infrastructural systems. This severely affects residents’ day-to-day quality of life in multifold ways, be it lack of water and sanitation or access to electricity, road networks and social facilities as well as public and recreational green spaces.

Especially when it comes to low income strata of urban society, lack of basic amenities and its negative impacts upon quality of life intrinsically

point to stark inequalities. Thus, the quest for improved quality of life is strongly linked to SDG 11, especially target 11.1 that demands to ensure access for all city residents to adequate, safe and affordable housing and basic services and to upgrade slums. Likewise, enhanced inclusive and sustainable urbanization and capacity for participatory, integrated and sustainable human settlement planning and management (target 11.3) and universal access to safe, inclusive and accessible, green and public spaces (target 11.7) are crucial in this respect. For several decades already, nation states as well as regional and municipal authorities have endeavored to tackle slum like housing conditions in cities with a multitude of approaches in order to improve living conditions and livelihoods of low-income groups. This chapter compares experiences gained and difficulties encountered in these endeavors for the specific cases of India and Ethiopia.

7.2.1 Housing Programs in Ethiopia

Until long after World War 2, quasi-feudal property structures prevailed in Ethiopia in which a few groups and individuals controlled most of the land. 70% of arable land was held by just 1 percent of the population and around 80 percent of the overwhelmingly rural farming population rented their homes. In the capital Addis Ababa, 55% of the inhabitants were renters by 1962 (UN-HABITAT 2010). Unmet housing demand existed already then, however, the national government under the autocratic rule of Emperor Haile Selassie did little to counteract. Thus, first informal housing solutions date back to this era.

7.2.1.1 Regime of the Communist Derg Generals

In 1974, communist generals, known as “Derg”, took power under the leadership of Mengistu Haile Mariam. They soon enacted a comprehensive nationalization of urban land in an effort to achieve a more fair redistribution of property. At the lowest administrative level, the so called “kebele” (comparable to a municipality or an urban district) existing housing stock was rented

out as “kebele houses” by the municipality who was also in charge of maintenance. This type of accommodation covered most of urban rental housing. The majority of urbanites remained residents in this type of housing throughout the 1980s. However, little was built during this period and as rents for kebele houses were purposefully kept low funds were lacking for maintenance, up keeping and renewal. This caused large parts of the kebele housing stock to gradually deteriorate and dilapidate. During this period, the lack of ownership encouraged residents to extend, build and make changes informally in those kebele houses which also contributed in deteriorating the kebele houses. The private sector was barred from entering the construction industry during these years.

7.2.1.2 Developments Since 1991

The Dreg’s reign was largely characterized not only by internal political terror but also by upheaval and protracted warfare with rebel groups in several parts of the country until Mengistu was finally toppled in 1991.

The winning “Ethiopian People’s Revolutionary Democratic Force” (EPRDF) took over and has since stayed in power despite contested elections in 2005, continuous allegations of human rights violations and growing civil unrest which caused serious clashes and two national state of emergency periods since 2016. In 2018, Abiy Ahmed became prime minister, being the first member of the country’s largest ethnic group of Oromo people in this position. He has since tried to introduce reforms, freeing political prisoners and signing a peace agreement with neighboring Eritrea.

Land tenure has remained nationalized since 1991 whilst housing construction was largely left to the private sector, which, however, proved unable to fulfill expectations despite generous funding made available (United Nations Human Settlements Programme—UN-HABITAT 2010).

EPRDF followed a developmental approach in which the state controls and plays an autonomous role in housing and infrastructure development. However, lack of capacity and corruption attenuated the government’s effort. By contrast,

Table 7.3 Current share of different housing types in Ethiopia's housing market (tentative proportions only)

	Real estate developments	Low cost condominium	Public rental housing (<i>kebele</i>)	Cooperative houses	Private houses	Informal houses
Estimated share in urban housing stock	<1%	<5%	>60%	>15%	?	?
Resident groups	Upper class	Middle class + some lower class	Lower class+ some middle and upper class exceptions	Middle class, of same kind (e.g. civil servants)	Upper and middle class	Lower class, migrants
Location	Suburbs	Originally suburbs, now also centres (after demolition)	Inner city areas	Divers	All over the city	Divers, suburbs

Author's compilation, based on discussions with scientists of University Gondar and Addis Ababa

Abiy Ahmed's current government is more open to national and international organizations developing social housing.

Thus, the nation state remains the sole most important proprietor in the housing market as can be seen in Table 7.3. Housing conditions in *kebele* houses are generally insufficient, rated as "slum condition" according to UN-HABITAT's definition (United Nations Human Settlements Programme—UN-HABITAT 2010). Meanwhile, housing need in the bigger cities is substantially covered by informal construction.

7.2.1.3 Integrated Housing Development Program (IHDP)

In the wake of 2005 election, the ruling EPRDF saw itself threatened by growing demands from urban residents mainly in Addis Ababa; consequently, the government came up with the so called 'Integrated Housing Development Program' (IHDP) to tackle housing and employment backlogs. It aimed at constructing 50,000 housing units annually, thereby reaching an overall goal of 200,000 units in total (Haregewoin 2007).

The details of how far this goal has been achieved are somewhat inconsistent; Keffa (2014) indicates that the first half of the planned number has already been handed over to the residents and the second half is under construction. Nigist (2015) mentions 110,000 completed housing units in 2010. UN-HABITAT (2010) refers to a target of 400,000 residential units nationwide, of which only about 80,000 had

been built by the middle of 2010, above all in Addis Ababa.

The main objective of the IHDP program was to create low-cost housing in condominiums for low income recipients. As a result, construction costs were kept very low at an average of ETB 1000 (USD 77) /m². This was achieved by multi-storey buildings with standardized apartment layouts. The majority of the apartments has less than 45 m² of living space. Table 7.4 shows the costs and terms of payment of the different types of apartments offered.

Although the slightly relaxing effects of this massive housing program on the housing market are recognized especially in Addis Ababa (Nigist 2015) there are still difficulties to be identified:

- The vast majority of housing units have so far been built on outskirts of the city, where they are far removed from public transport, employment and earning potential. In the meantime, inner city *kebele* houses are being demolished to create land for condominiums. In these cases, however, it is not always ensured that the people who originally lived here also receive an apartment in the new building.
- Despite low construction costs, the apartments are still unaffordable for the lowest income bracket—in addition to the initial down payment, loan repayments and operating costs must also be serviced. Many of the homeowners have rented or sold their homes

Table 7.4 Costs and terms of payment of different types of apartments under IHDP

Unit type period	Selling price in ETB (USD)	Down-payment	Interest rate	Repayment period
Studio	16.000 (1.230)	10%	0%	20 years
1-bed	18–27.000 (1.380–2.070)	10%	2%	10 years
2-bed	33–50.000 (2.530–16.660)	30%	7.5%	15 years
3-bed	>50.000 (16.660)	30%	7.5%	10 years

Source: According to Haregewoin (2007, 13)

- to better-off households, and live in other kebele houses themselves (Nigist 2015).
- The multi-storey construction is difficult to reconcile with the traditional lifestyle and many income-generating activities of the residents; for example: the preparation of the country-specific bread *injera*—which is often also produced for sale – is feasible only in large clay furnaces, which are usually located outdoors; Also, the widespread husbandry and slaughter of livestock in multi-storey facilities is a problem (Keffa 2014). Therefore, some informal extensions and buildings are observed in condominiums. Finally, the urban coexistence of different ethnic groups from all parts of the country raises new questions.
 - In many cases, higher-level management for maintenance and servicing in the condominiums is largely missing. The functioning of basic infrastructure is thus endangered in the long term as well as the maintenance of open spaces and community facilities (Abate 2011).

7.2.2 Housing and Government Programs in India

In 2010, about 300 million Indians lived in cities—that is about 30 percent of the total population. In the next 40–50 years, this figure is estimated to grow to 700 million city dwellers (Satterthwaite et al. 2007).

7.2.2.1 Slums: Categorization and Legal Status

Unlike in Ethiopia, the majority of urban poor in India do not live in formally recognized

buildings, and a significant percentage of low-income households in Indian cities live in housing produced outside the state and the formal private sector (Indorewala 2019). There are broad ranges of types of ownership and rental accommodation, which are highly dependent on the applicable legal framework and local ownership. The associated degree of “legality” of settlements and buildings influences the extent to which they are supplied with or excluded from basic infrastructure by the local authorities and service facilities. As per one estimate, between 33% and 47% of housing stock in Indian cities can be considered ‘informal’ if we combine ‘slum’ settlements (about 17%) with unauthorized housing (Jain et al. 2016).

As per the Census of India, a ‘slum’ is defined as:

residential area where dwellings are unfit for human habitation by reasons of dilapidation, overcrowding, faulty arrangements, and design of buildings; narrowness or faulty arrangement of streets; lack of ventilation, light, or sanitation facilities; or any combination of these factors which are detrimental to safety and health. (REF)

Three criteria are identified by the Census for a settlement to be classified as a slum:

- Notified slum: a neighborhood that is notified as such by the state, union territory (UT), or local government under any Act (such as the Slum Act)
- Approved slum (“recognized slum”): (one that is not ‘notified’ as a slum under any Act) is termed so by the state, UT, or local government, housing and slum boards
- Identified slum: is a compact area with a population of minimum 300 or having 60–70 households of poorly built, congested tenements in an unhygienic environment,

usually with inadequate infrastructure and lacking in proper sanitary and drinking water facilities.

The relatively high minimum number of inhabitants of 60–70 households carries the risk of a significant underestimation of the actual numbers of slum residents (Bhan and Jana 2013). Given these inaccuracies, the estimated nationwide number of slum dwellers as of 65 million (Office of the Registrar General & Census Commissioner, India 2013) in 2011 (of which more than half live in legally unsecured “identified slums” and thus can become victims of forced evictions) is also to be regarded with caution.

7.2.2.2 Slum Policy: Interventions, Innovations and Limitations

Since independence in 1947, various efforts have been made in India to improve the living conditions of the urban poor. However, there are substantial divergences in approaches to urban slums in various states of India, and to go into details and peculiarities of these programs would extend beyond the scope of this chapter. Broadly speaking, there have been five approaches of the various state governments to prevent the proliferation of urban slums and to further improvement of slum housing:

- Slum Clearance: clearance of a slum and relocation and rehabilitation of residents to other properties.
- Slum improvement: Provision of basic services, land titles and credit to slum dwellers to improve settlement conditions on site.
- Aided self-help: provision of serviced sites, materials and/ or credit to poor urban dwellers to build their own homes incrementally.
- In situ (on site) Slum redevelopment and rehabilitation: Demolition of slum houses and new construction on site without cost sharing of the residents (Chatterjee 2016).

- Slum resettlement: Demolition of slum houses and relocation of slum dwellers to another site in formal buildings.

In recent years, however, slum redevelopment and resettlement has become the preferred approach of slum policy, especially in metropolitan cities. Removing slum settlements from high-value urban areas to clear land either partially or completely for so-called ‘higher and better uses’ is the aim. The process is facilitated through increases in permissible intensity of development (Floor Area Ratio or FAR increases), relaxation of building and planning standards, and offering development rights incentives to private developers (such as Transferable Development Rights or TDR).

Although an overall assessment of the programs presented here is not possible at this point, a number of difficulties can be cited that often occurred during their implementation (Kamath and Yacoub 2015, 17f):

- TDR s have been widely used by investors and real estate developers to maximize their profit, while slum dwellers are housed in confined, overcrowded spaces and constructions of poor quality (see Fig. 7.5).
- Slum dwellers are relocated to low-cost and therefore peripheral land. Thus, those affected are resettled in locations that are not only far removed from their previous living environment, but also from their jobs and sources of income. Cheap and effective public transport is often not available. Their already precarious economic situation may continue to deteriorate as a result of this deprivation of livelihoods.
- Most of the eviction and relocation measures were carried out as top-down processes, and with little or no participation by those affected.
- The most vulnerable populations, such as pavement dwellers often do not have any entitlements under these programs (Kamath and Yacoub 2015).



Fig. 7.5 Extreme compaction in multi-storey housing after slum rehabilitation (Source: Peter Morgenstein)

- For determining entitlements under these rehabilitation schemes, many cities set up datelines (called ‘cut-off dates’) that exclude dwellers who fall outside the datelines.
- The situation of tenants who live on rent in these settlements is almost always ignored; these usually live in individual rooms, which are rented out by slum dwellers to generate additional income (Mahadevia 2015, 48 ff). Since only one household is entitled to relocate per plot, tenants normally lose their accommodation.
- In general, housing programs are strongly geared towards home ownership and do not provide for rented housing. However, this would be important for lower income groups and newcomers who cannot afford the acquisition of property yet.
- The form of rehabilitation tenements (often multi-storey apartment buildings) make it difficult or impossible for dwellers to continue occupations that depend on land or the earlier informal settlement fabric.

7.2.3 Ethiopia and India: Similarities and Differences in Housing Supply

In summary, in Ethiopia and India, there are similarities between the housing situations of low-income population groups on the one hand and state measures to improve the same on the other:

- The living conditions of inhabitants of kebele houses in Ethiopia and informal settlements in Indian cities are similar. Here and there, the lack of basic infrastructure represents a daily challenge for inhabitants and considerable threats to their health (Pankhurst and Tiumelissan 2013).
- The imminent danger of evictions does not only affect informal settlers in India, but also inhabitants of the actually formalized kebele houses in Ethiopia, if they are to be replaced by condominiums. Complete lack of

participation marks this often yearlong situation of insecurity (Kamath and Yacoub 2015).

- If eviction and relocation take place, they tend to be to peripheral locations in both countries, and those affected find themselves far from their jobs which can further deepen their poverty.
- There are difficulties in the management of large, multi-storey residential buildings: Competences and responsibilities are unclear, which means that maintenance and repair are neglected and community infrastructures are quickly damaged or even become dysfunctional (Abate 2011, 67 ff).
- Apartments in the new housing estates are still too expensive for the lowest-income groups, regardless of whether or not they may receive the apartments for free (as in the case of slum rehabilitation in India). Many cannot afford to pay the monthly operating costs and therefore choose to rent out the apartment while moving to other kebele houses or slums themselves (United Nations Human Settlements Programme—UN-HABITAT 2010).
- The situation of tenants in both countries is similar: they are the most vulnerable groups of inhabitants and in the case of evictions they usually lose their accommodation.

However, there are also some clear differences between the housing situation and the approaches to improvement in both states:

- While in Ethiopia land and buildings are state-owned and the central government implements a comprehensive housing program, the role of state agencies in India is much weaker. The private sector is heavily involved in new residential construction in the form of public private partnerships (PPP). The role of the Indian central government is more likely to be seen as that of a facilitator rather than an actor or even a building provider.
- In contrast to Ethiopia, there are at least occasional experiences in India with in situ upgrading, which usually represents the socially more compatible option (as compared to resettlement) for the affected inhabitants.

Such projects are complex and expensive (Desai 2016) and most municipalities do not have the necessary staff.

- In addition, India's system of cross financing via TDRs is unknown in Ethiopia. The experience gained in India shows that, in principle, it is a viable method of using private investment for social housing if a strong real estate market exists - and thereby relieving public budgets; However, in India, the limits and weaknesses of the model, especially with regard to the quality of the housing provided, are also evident.
- Thus, for Ethiopia—as for others, especially African countries where rapid urbanization is a comparatively recent phenomenon—there is a possibility of using experiences gained in India concerning incorporation of the private real estate sector into social housing. These experiences highlight difficulties with regard to residents' quality of life and their livelihoods, which run danger of being more precarious after interventions than before. Such kind of interventions therefore threaten attempts and achievements related to SDG 11, especially target 11.1 on adequate, safe and affordable housing in inclusive cities.

Affordable housing solutions in line with SDG 11 thus need to focus on residents' quality of life with respect to:

- Suitable housing conditions for physical and mental health.
- Locational aspects in context with livelihoods, jobs and accessibility by public transport.
- Basic service provision.
- Social fabric and security.

7.3 Empowering Key Actors to Achieve SDGs and QoL: Experiences of Curricula Developments in Ethiopia and India

This section looks at the question of how Higher Education can contribute to the achievement of

the Sustainable Development Goals and Quality of Life through curriculum development. It explores how the partnership between the universities in Ethiopia, India and Europe has shared understanding and expertise to engage and empower key actors in shaping educational processes. In doing so the partnership has produced examples of how Higher Education can impact on the achievement of SDG's and QoL through the inclusion of the community and other stakeholders in developing courses close to the needs of the people. Moreover, reaching marginalized groups with quality education or incorporating the issue of informality into the curricula.

7.3.1 Competences Based Approach

The emergence of new societal challenges ranging from climate change, exploitation of natural resources, migration or increasing social divide triggered the UN Decade of Education for Sustainable Development between 2005 and 2014 led by the UNESCO (UN Educational Scientific and Cultural Organization). As the core of any curricula are the competences Higher Education institutions agree on to transmit and thereby, set the course for future developments, a discussion about key competences for ESD (Education for Sustainable Development) evolved. Several authors engaged into this discussion (and the definition of key competences/ies for ESD or integrating those competences/ies into a normative framework as sustainability (Rieckmann 2012). In order to address environmental and global challenges, the concept of EDS demands to encourage a change of consciousness of individuals, the ability to reflect their action and awareness of their global consequences (Sipos et al. 2008; de Haan 2010; Wiek et al. 2011; Rieckmann 2012; Lozano et al. 2017). Furthermore, due to the increase of complexity of societal challenges, competences to solve complex real-world problems are in discussion (Steiner et al. 2013) and thereby contributing to the achievement of the SDGs.

In 2017 the UNESCO identified crucial key competences which support the promotion of sustainability and the achievement of the SDGs (UNESCO 2017). Then in 2018, the OECD elaborated with the Learning Compass 2030 in which a vision of the future desired by individuals and collectives in respect to well-being is taken into account. By aligning the OECD Better Life Index with the UN Sustainable Development Goals a Higher Education institution could move towards the achievement of these goals embedded in the desired vision of well-being by its stakeholders (OECD 2018).

The competence concept is highly controversial. Western literature dominates the discussion about competences or competencies and only a few studies discuss comparisons in other geographical or socio-economical context, which raises the question of whether they are universal or context specific (Mochizuki and Fadeeva 2010; Rieckmann 2012; Demssie et al. 2019). As we are facing global challenges, our the European funded partnership and projects identified the need to direct the discussion regarding competences towards a more regional as well as globally integrated community level.

Our approach has been to compare and contrast work undertaken in a range of regional settings. Demssie et al. (2019) investigated sustainability competencies in the base of the pyramid (BoP) context within the Ethiopian setting. As their investigation demonstrates, an outreach of international and cultural-diverse academic collaborations and comparisons could either add to the assurance of current key-findings or add new dimensions to our understanding. While in the case of the European projects SES, BInUCom and BReUCom, two countries from the base of the pyramid were in the focus, raising the question which competences, are relevant in the BoP and urban development context. This 3 years European funded collaboration identified 16 targets as most relevant including target 4.7. As demonstrated in Sect. 7.1.4, progress in target 4.7 leads to progress in target 4.3, 13.3. as well as 17.9 (see Table 7.5).

Table 7.5 Target 4.7 in the Erasmus plus projects Ethiopia/India

Target number	Target description (shortened)	Issue/Connex to the projects
4.7	... ensure that all learners acquire the knowledge and skills needed to promote sustainable development, through education for sustainable development ...	University courses concerning sustainable housing and planning are developed in the projects
4.3	... ensure equal access for all women and men to affordable and quality technical, vocational and tertiary education, including university	Ensuring accessibility of courses and programs in the context of housing and economic challenges of disadvantaged students
13.3	Improve education, awareness-raising and human and institutional capacity on climate change mitigation, adaptation, impact reduction and early warning	Topics integrated in university courses designed in collaboration
17.9	Enhance international support for implementing effective and targeted capacity-building in developing countries to implement all the sustainable development goals ...	New university curricula for capacity-building for sustainable cities, consider technical as well as social aspects

While it is clear that Higher Education is a significant actor in the work to tackle mankind's most complex problems as poverty, climate change or the loss of biodiversity, the effectiveness of its contribution in supporting others is dependent upon answering the question `which competences should be taught` in order to address these challenges.

In respect to the education of architects and urban planners, our projects have identified the most relevant targets, which provide us with opportunity to match them to existing or developing of competences. We are also able to develop a more global approach through regional comparison and cross evaluation. For example, the Ethiopian context the sustainability competencies identified by Demssie et al. (2019) could work as a starting point for discussion as they were developed in a BoP context. These competencies were identified on the basis of preceding work by Wiek et al. (2011), Roorda (2013), Osagie et al. (2016), Heiskanen et al. (2016) resulting in 15 competencies, 7 from the literature being generally important to sustainable development and further 8 relevant to the Ethiopian setting. Table 7.6 opposes the targets identified by the projects and the competencies proposed by Demssie et al. (2019). Consequently, these findings could contribute to our understanding about key competences for sustainable development and to further knowledge about effective

teaching content tackling complex real-world problems we are facing today.

7.3.2 The Indian Case by Means of the Development of the Architectural Curriculum in the Indian Sub-Continent

Architectural education in the Indian subcontinent started in 1896 with a two-year draughtsman course by the Government of Bombay (Manjari 2015). It was only 5 years later in 1913 that Architecture as a distinct discipline was recognized and a separate department of architecture was established at the Sir JJ School of Art. India, being a colony of Great Britain embraced the course introduced by the Royal Institute of British Architects (RIBA) and conducted the examination with representatives of the RIBA and the Bombay Architectural Association (officially registered as The Indian Institute of Architects in 1929). A 4-year course was organized at the Bombay School of Architecture on the lines of the RIBA examinations.

The Bombay School of Architecture was the first school outside the British Isle and earned rank 12 in the list of 34 schools present. It was only 28 years later in 1941 that another school, The School of Planning and Architecture had a modest beginning as a Department of

Table 7.6 Issues in the Erasmus plus project and competencies needed

Target number	Target description (shortened)	Issue/Connex to the projects	Sustainability competencies according to Demssie et al. (2019)
1.4	. . . all men and women have equal rights to economic resources, basic services, ownership and control over land and other forms of property, natural resources . . .	Insecure legal position concerning property of land is at the root of informality	1. Systems thinking competence to understand complex sustainability issues
1.5	. . . build the resilience of the poor, reduce their exposure and vulnerability to climate-related extreme events and other economic, social and environmental disasters . . .	Settlements of the poor are often located in vulnerable areas, e. g. at risk of landslide caused by deforestation	2. Disciplinary competence in sustainability-related fields
3.9	. . . reduce the number of deaths and illnesses from hazardous chemicals and air, water and soil pollution and contamination	Air pollution by the indoor use of charcoal for cooking, water and soil pollution due to a lack of infrastructure	3. Interpersonal competence to facilitate collaboration of sustainability stakeholders
7.1	. . . ensure universal access to affordable, reliable and modern energy services	Sometimes no access to electricity, mostly no energy services are available in informal settlements	4. Action competence for sustainability interventions
7.A	. . . enhance international cooperation to facilitate access to clean energy research and technology, including renewable energy, energy efficiency . . .	Technologies to be adapt to specific needs, projects induce further international cooperation	5. Anticipatory competence to predict future sustainability issues
11.1	. . . ensure access for all to adequate, safe and affordable housing and basic services and upgrade slums	Huge topic, high levels of informality, the main focus of the projects	6. Strategic competence to devise sustainability interventions
11.7	. . . enhance inclusive and sustainable urbanization and capacity for participatory, integrated and sustainable human settlement planning and management . . .	Lack of public spaces for low income groups	7. Normative competence for sustainability goals
11.B	. . . provide universal access to safe, inclusive and accessible, green and public spaces . . .	Increased vulnerability of low income households in case of extreme climate change induced weather events	8. Transdisciplinary competence to collaborate with diverse sustainability
13.1	. . . increase the number of cities implementing integrated policies towards inclusion, resource efficiency, mitigation due to climate change, resilience to disasters..	Many informal settlements are located in such areas	9. Flexibility and continuous learning competence for sustainability
15.3	. . . restore degraded land and soil, including land affected by desertification, drought and floods, and strive to achieve a land degradation-neutral world	Informal settlements often located in such areas, deforestation increased by burning of firewood	10. Communication and information acquiring competence for sustainability
15.5	. . . reduce the degradation of natural habitats, halt the loss of biodiversity and protect and prevent the extinction of threatened species	Deforestation due to the need for firewood, planting of fast-growing trees instead of indigenous species	11. Stakeholder and policy coordination competence for sustainability
			12. Resource utilization competence for sustainability
			13. Social justice and inclusion competence to promote sustainability
			14. Competence to balance sustainable development dimensions
			15. Competence to utilize indigenous resources for sustainability

Architecture of Delhi Polytechnic School. All the subsequent schools of architectural education across the sub-continent conducted a similar

course to the one at Bombay School of Architecture and Delhi Polytechnic. The art and craft of construction was always held to be a prerequisite

for architectural training as most of the schools had a strong technical component and all the schools such as the Bengal Engineering College at Calcutta, Baroda's Kalabhavan including Delhi's Polytechnic, were primarily technical institutions with a department of architecture. Thus, engineering and construction subjects became a major part of course curriculum. The Council of Architecture (COA) constituted under Architects Act 1972, in parliament is responsible to regulate architectural practice and education in India. It is only in 1983 that the courses for study were formulated. Until that year, a large portion of the syllabus followed what was laid down by the RIBA. Later on, the content of the various courses did not have a paradigm shift and had not moved away from the course content laid down earlier by the RIBA. This exam-oriented system did not give room for academics involved with the teaching program to evolve courses based on the contemporary needs of society.

Owing to the program for action 1992 based on the national policy of education 1986, there was a growth in the number of private architectural schools in the country from 20 in number in 1982–1993 in 1998, a short span of 16 years. All these schools were aligned to the idea of inclusive education for all sections of society in a diverse country like India. Another factor that can be attributed to the growth of architecture schools in the country is the policy of liberalization in India post 1990. The number of architecture schools in the state of Maharashtra correspondingly increased in the same period from 3 schools in 1982 to 30 schools in 1998.

The Government of India through Ministry of Human Resources acknowledged in its report that "The global statistics on education reveal that different nations are at different stages of development in terms of access to higher education. While the world average of the Gross Enrolment Ratio (GER) in higher education is around 26.7%, the average of the developed countries is approximately 57.7% and that of the developing countries is nearly 13%. Our Gross Enrolment Ratio in higher education, which is 12.4% (as per 2006–2007 data) needs to be raised to a significant level in a time bound manner to

15 percent by the end of XI Five Year Plan and to 21 percent by the end of XII Five Year Plan (National University of Educational Planning and Administration 2010). In order to reap benefits of demographic dividend of India, access, equity and quality have been major concerns of the Government in the higher education sector. This is the next phase of growth of architectural colleges in the country. The number of colleges increased in the rest of the country but did not see a drastic increase in the number of colleges in the state of Maharashtra. Maharashtra sees the next phase of growth only in the year 2011–2015.

All these policies and resultant increase in number of architecture schools indicates a steady growth of institutes thus fulfilling the mandate to make architectural education more inclusive. This is one of the key points of the Sustainable Development Goal 4 on Education and the Education 2030. The framework for action emphasizes inclusion and equity as laying the foundations for quality education. Reaching excluded and marginalized groups and providing them with quality education requires the development and implementation of inclusive policies and programs (UNESCO 2017).

Educating an architect in contemporary times is a challenge and the focus will be on the architectural education under the aegis of Mumbai University. In contemporary times, critical thinking is of utmost importance and the learner must be able to evaluate the context to make appropriate interventions. The increased number of architecture institutes affiliated to the Mumbai University from 3 institutes in the 1980s to 14 in 2010 (Fig. 7.6) required a revision of the syllabus owing to the diverse issues. In 2011, the architectural syllabus recommended was flexible and individual institutes of architecture were free to interpret it based on the vision statement of their respective institute. This was a major paradigm shift from the set guide lines laid down in the syllabus. This allowed faculty formulate courses relating to various issues of housing in informal settlements in Mumbai, using a multi-disciplinary approach so as to inform critical thinking. Thus, the student developed the ability to avail of ideas from several allied fields that they were exposed

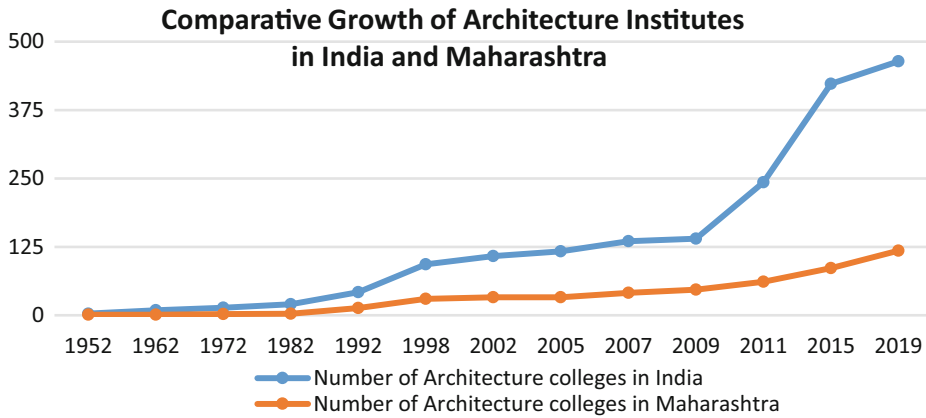


Fig. 7.6 Number of architecture institutes in India and Maharashtra (Source: illustration by Ainsley Lewis)

to during their education. These courses with clear pedagogical intent, intended to create professionals who are better equipped and aware of issues related to architecture and urbanism in urban communities.

The BInUCom project is based on the premise that Indian Higher Educational Institutes are not well equipped to meet the demands defined by the Indian government in “Housing for All” (PMAY 2015), since curricula in architecture and urban planning predominantly focus on technical and design skills. Despite of several institutes undertaking research work and conducting courses of international repute, there seems to be no cross learning within the institutes in India.

During this project, the Indian partner institutions have identified the following areas of improvement for HEIs in terms of curricula and teaching methods that constitute the key objectives of the project:

- Strengthening relations with the wider economic and social environment (public authorities, companies, community organizations and NGOs) to exchange experiences, build awareness, meet societal needs and accomplish their social responsibility.
- Introducing interdisciplinary and trans-disciplinary aspects in their curricula for architecture and planning.

- Upgrading educational resources, which reflect the specific Indian context for sustainable housing and inclusive community development.

India as a developing country is well aware of its need to focus on a more inclusive education policy for institutes of Higher education. The several policies and subsequent action plan that are pro-inclusive indicate a steady growth of architecture institutes across the country thus making Higher education more assessable to all sections of society. This is harmonious with the United Nations Envision 2030 Goal 4: Quality Education that emphasizes inclusion and equity as laying the foundations for quality education.

The BInUcom program funded by the Erasmus + Program was an important well-structured program that produced new knowledge by faculty at KRVA through case study work. This became the springboard for development of new courses on relevant contemporary issues in informal settlements. The conducting of the course at the institute for final year students made them aware of various issues in informal settlements in the city of Mumbai thus fulfilling the objectives of the BInUCom project. The stakeholder engagement through workshops in these communities was a mandatory part of the course. This helped educate marginalized section of society through non formal engagements. This is in synch with the United Nations Envision 2030 Goal 4: Quality

Education that emphasizes inclusion and equity as laying the foundations for quality education. The long term benefits of such courses is that the students of today will be policy makers in the future, and will thus respond to the issues seen in marginalized communities. These engagements and partnerships with all stakeholders will help build sustainable cities and communities.

7.3.3 The Ethiopian Case by the Means of Curriculum Development in Respect to Social Inclusion of Informal Settlements

The trends of urbanization indicate that the informal housing sector is growing at a faster rate than the formal housing growth rate (Butera et al. 2016; Belete 2019) in developing countries. Similarly, urbanization in Ethiopia has been increasing mainly due to rural-urban migration, which is also the main driver of informal settlement. Thus, provision of services for this huge number of population is a big deal in terms of meeting the SDGs. Thus many poor households will remain inadequately serviced and without formal housing in the long-term (Butera et al. 2016).

It is argued that higher education is considered influential in realizing objectives of poverty reduction and increased socioeconomic development in developing countries (World Bank 2000). Similarly, it is believed that the main targets of higher education in Ethiopia are teaching and learning, supposed to produce qualified graduates in various fields of studies. Moreover, research and community service through community engagement are also most important focuses of universities (Federal Democratic Republic of Ethiopia 2009). Based on these targets, higher education will take the highest responsibility to solve societal problems.

Informal settlements are among the serious societal problems in big cities of Ethiopia, which needs multidimensional perspectives and attention to improve the existing informal settlers' livelihood and to suggest sustainable solutions for

urban planners and policy makers. Moreover, changing the attitude and perspectives of the society is also very important through continuous support system. Qablan (2005) pointed out that the five components (knowledge, skill, value, perspective and issues) must all be addressed in formal curriculum that has been reoriented to address SDGs in general and urban sustainability in particular.

Holmes (2013) and Aghion et al. (2009) further explained that higher education can be seen as having positive influence on economic growth in three main ways: accumulation of productive skills and capabilities, the generation of new knowledge using innovation, and enabling faster adoption of existing technology. According to Montanini (2013), higher education institutions are regarded to have high responsiveness and the capacity to identify strategic needs and to develop relevant human skills to solve societal problems.

Contrary to this fact, our assessment of the curricula in many courses related to urban issues indicated that the deficiency they have in addressing informal settlement, which is a very serious problem of urbanization with its increasing trends. It is crucial to note that understanding the key trends of urbanization likely to unfold over the coming years should be taken into account for the successful implementation of the 2030 agenda for sustainable development (UN 2018; Larson et al. 2019) through formal and informal education.

The gap of curricula attention of informal settlement is also leading to weak policy formulation and practices in Ethiopia despite the fact that large number of population is living in informal settlements. For instance, considering the policy and legal aspects of land in Ethiopia can be taken as the best example.

Despite high rate of urbanization in Ethiopia, both the land lease policy and condominium housing strategies could not satisfy the poor who are living in informal settlement areas (Belete 2019) as it was stated in Sect. 7.2 of this chapter. This is mainly because a plot of urban land through a lease contract or a condominium unit requires a significant amount of lump sum fee

or initial/down-payment. The allocation of plots through lease contract and allocation of condominium flats seem to provide greater benefits to the urban middle and higher classes not to the low-income communities (Belete 2019). The insensitiveness of the formal land and housing supply for the poor as well as poor economic opportunities has led to the explosion of new informal settlements in the peri-urban areas (UN-HABITAT 2011) where the residents live without security of tenure and limited access to basic infrastructure (Penrose et al. 2010). This has adverse impacts on the life of informal settlers and urban development (Abebe et al. 2019).

All the above explanation tells us that the strategies applied by the government have not gone based on informed decisions that necessities consultation of multidisciplinary experts including higher education researchers in the area. This needs thinking outside the box as explained by Adam (2019) instead of political interests in policy formulation and implementation. Young (2005) explained that utilization of research and evidence in development policy and practice can help save lives, reduce poverty and improve the quality of life. This might include engaging the community and formulating evidence based strategies depending on the context of the cities. For this, universities in and around the cities should take responsibilities by doing research and bringing alternative solutions towards inclusive planning which can in turn contribute for SDGs.

As mentioned in the SDGs by the United Nations, social inclusion is the key indicator of social sustainability. Moreover, implementing and achieving SDGs are meaningful when all people experience a sustainable way of life, in which socio-ecological lifestyle is deeply tied with their livelihoods and natural environment (Wang and Wang 2019). However, the issue of sustainability cannot be built without sustainable educations systems. For sustainability, it is believed that education develops critical thinking and skills which are important to make life long decision about the nature of the world (Fine 1993). Likewise, Orr (1994) asserts that education should focus upon encouraging students to

think out of the traditional ‘box’ if they are to fit in to societal needs of tomorrow, be successful as adults and have the ability to achieve a sustainable future through informed and effective decision making.

The current ignorance of informal settlement by just labeling them as “illegally settled” in the education curricula may certainly lead to very complicated problems in urban areas of Ethiopia. The complexity of the problem is explained as the jigsaw pieces of building, demolition, re-building or regularization, which do not form a coherent whole, resulting in unplanned sprawl, poor quality shelter, and a heightened risk of land-related conflict (Desta and Grant 2018).

A study done in Gondar city through the SES project also confirmed that the provision of social service to the informal settlement areas is attached to the “illegal” nature of the settlements by both the researchers and government officials. Such kind of perspectives will not bring changes since the people will also feel excluded in any kind of services. It might be better to communicate with these people and share their ideas and opinions, which can push them to be part of the solution.

Unless we cannot change the perspectives of our graduates and appreciate the values of the society, the possibility of achieving the SDGs remains as big question in Ethiopian cities where the major portion of the society is living in informal houses.

7.3.4 SES Project for Bridging a Gap in Curricula of Ethiopian Higher Education in Areas of Inclusion as Main Agenda of SDGs

As stated earlier, many of the urban related courses in higher education institutions have not yet incorporated the issue of informal settlement. Thus, SES project addresses the need to revise the curricula and include the issue of informality including how we can deal with different aspects related to drivers of informality, social capital, quality of life and energy management in the three higher education institutions of Ethiopia. Hereby, the need by higher education to design

Table 7.7 Case studies in SES project and possible curriculum integration with various courses at University of Gondar, Ethiopia

No	Case studies proposed	Integration possibility (Department)	Course titles	Methodology of integration
1.	Drivers of informal settlement, trend, typology, socioeconomic profile	Population studies Geography and environmental studies	Urbanization in developing countries, seminar on contemporary population issues (undergraduate) Urban and regional planning (undergraduate) Contemporary issues in population (postgraduate)	Content modification Article review
2.	Quality of life in informal urban settlement	Sociology, social work	In diverse undergraduate courses Social and community development: Theories and practice (postgraduate)	Content modification Article review
3.	Social capital across different neighborhood settlements	Sociology, social work	In diverse undergraduate courses Social policy and program evaluation (postgraduate)	Content modification Article review
4.	Energy management in informal urban settlement areas, strategy and design	Geography and environmental studies	Urban and regional planning (undergraduate) Seminar on contemporary issues in urban and regional planning for sustainable development (postgraduate, MA and PhD)	Content modification (bachelor) Article review

their curricula based on competences, which enable graduates to address these issues, will have to follow and contribute to an improvement of the quality of life in Ethiopia.

Social Inclusion and Energy Management in Informal Urban Settlements (SES) is the consortium project among three Ethiopian universities and three other European universities, which was designed to capacity building and knowledge sharing as it was indicated in section one of this chapter. The main driving force of this project is to deal with the neglected issue of informality in Ethiopian curricula as well as policy aspects funded by European Commission. The experiences shared from European partner universities through different workshops and discussions helped Ethiopian researchers on how they can incorporate the issue of informality and energy management in their curricula.

This project supports a total of 12 case studies which are done by Ethiopian higher education institutions researchers. The result of the case studies will be published and used as a teaching material in both graduate and undergraduate level. Considering University of Gondar, the four case studies, which are at their final stage for publication, are integrated with the available course curricula as shown in Table 7.7.

SES also promotes the publication of case studies in open access journals and course descriptions as Open CourseWare. The publication and sharing of open educational resources will contribute to the collaboration between higher education institutions. Moreover, it can be considered as an important opportunity to strengthen the link between higher education institutions to their wider economic and social environment by providing relevant and easy accessible materials.

This in turn will help to familiarize the use of information technology tools, methodologies and pedagogies. The overall result of this project draws the attention of practitioners and policy makers to think about how informality by its nature should be considered for sustainable urban development.

7.4 Conclusion

In this chapter we have sought to demonstrate how inter-regional co-operation between Higher Education institutes can contribute to the sectors work in achieving United Nations Sustainable Development Goals, as well as Quality of Life,

through innovative approaches to curriculum development.

The partnership between universities in Ethiopia, India, and Europe has shown how through shared understanding and pooling of expertise academics have successfully engaged and empowered key actors. In so doing these stakeholders have been able to enrich strategies and learning programmes. However, probably the most important element of the partnership work has been the successful efforts to reach marginalized groups and in so doing bring them into the educational system and incorporate their issues such as ‘informality’ into the curricula. In Sect. 7.3.2, the Indian case study demonstrates how stakeholder engagement through workshops in communities as a mandatory part of the course help to improve the understanding for issues of informal communities. While in Sect. 7.3.3., the Ethiopian case study shows how the involvement of stakeholders and the inclusion of the topic about informality can improve the social impact by Higher Education.

Our partnership has focused upon one specific area on interest but has linked strategic global objectives with regional and local realities. This has enabled us to create direct two-way links, through educational institutions, between SDG implementation and the needs of the most marginalized of communities.

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Multiple Perspectives on the Meaning and Effects of Resiliency

8

Andrew Kim, Soomin Kim, and Stephen Buckman

8.1 Introduction

The concept of resilience is becoming increasingly prevalent among academics, businesses, human rights organizations, and policymakers. Whether a community faces devastating catastrophes such as a hurricane or tornado, the terrorist attacks, or meeting the needs of a sprawling urban population, a well-prepared community will have resilience to overcome adverse situations. In essence, resilience is a term used for communities, cities, and municipalities to recover from shock or stress events regardless of the magnitude of impact.

Moreover, how do resilient cities cope with the shock of migration in a short or long period? Resilience refers to equipping cities to face future shocks and stresses it may experience. For example, some of the shocks and stresses are climate change, pollution, disease outbreaks, and natural catastrophes. Therefore, resilient cities assess, plan, and act to prepare for and respond to future shocks and stresses that are better positioned to

protect and enhance the livelihood of people and infrastructure of the city.

Resilience has been defined as the amount of stress a system can absorb and still remain within the same state or better than before, and the degree to which the system can build and increase its capacity for learning and adaptation (Folke 2006). When a community loses its resilience, it is more susceptible to failure as it cannot absorb instabilities as it previously could.

Experiences from recent catastrophes highlighted the role of individuals and community's role following the event. When Hurricane Harvey passed over Houston, Texas in the United States of America on 2017, first responders were inundated with calls and were unable to help everyone. Residents were trapped in their flooded homes and could not find a way out.

Resilience is exemplified when compatriots from different cities and different states came to rescue them with boats and jet skis. During Hurricane Harvey, trapped residents called the local restaurant manager because they were the only means of social support. In another example, a surgeon canoed to perform an emergency surgery because the streets and highways were flooded. Paradoxically, residents from within the community not only helped with the rescue efforts, but citizens from different communities and different parts of the country helped with the rescue efforts (Squitieri 2017).

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Resilience can be seen in communities helping one another. During the September 11th attacks in New York City, USA, ordinary citizens heeded the call to help fellow citizens and their city in need. There were several accounts of heroism. One account, Willes Crowther or “The Man in the Red Bandana” carried a woman 17 flights of stairs while leading 18 people to safety only to go back up and look for more survivors. He was last seen doing so with members of the Fire Department of New York City before the South Tower collapsed ultimately losing his own life (Kilgannon 2017). There were other accounts of ordinary citizens driving to “ground zero” to assist with finding survivors when the towers collapsed. Actions taken before, during, and after events, whether it be a natural disaster or an act of terror, can clearly mitigate damage, unite communities, and help individuals heal. The aftermath is that communities can flourish more so than before.

The focus of this chapter is to provide a comprehensive review of the literature on resiliency. Recent studies and events will be used to give multiple perspectives on resiliency, the methodology, and recommendations to the issue. Moreover, a need for strategies and systems thinking as a framework for resilience present a challenge through the needs of individuals and communities in catastrophic events in urban settings, implications for policy, and intervention gaps that help shape policymakers’ decisions to promote resilience.

8.1.1 Background

As natural disasters, phenomena’s, and catastrophes have happened throughout history, resilience is a paradigm for many disciplines. Strengthening a community cannot be looked through one lens but through multiple lenses where holistic and sustainable interventions are applied at the individual and community level.

Throughout time, various disasters have taken place. Various entities such as Government, NGO’s, and other organizations implemented policies to strengthen health resilience (National

Resolution Council 2012). The public health of a community is essential for emergency preparedness and being able to withstand disasters. However, emergency preparedness has gone through an evolution of fundamental change over time. It has traditionally focused on reinforcing infrastructure, responding to immediate threats, and improving surveillance to detect dangers towards the community. When the public health needs are not being met in a community, then it is unlikely they will be effectively met during a disaster, even with the support of national, state, and local aid. A cities resilience is based on many variables and factor. These are political, economic, and social factors that can make some cities more resilient than others. For example, a city with a strong economy, will rebound more quickly than a city with a weak economy (Campanella 2006).

More recently, resiliency has been applied to different areas of study where the term has a different meaning and application. For example, resiliency was defined in the area of psychology to withstand hardship by repairing oneself (Higgins 1994; Wolin and Wolin 1993). In the field of human development, resilience is defined as to successfully cope with adversity (Werner and Smith 2001). The definitions of resilience from these fields are from an individual perspective.

Resilience came into existence from the field of Ecology (Holling 1973; Adger 2000; Turner et al. 2003) and has been applied to the systematic understanding of the relationship between humans and their environment. This understanding has evolved into the field of preparedness and emergency when extreme events affect the interactions between non-human and human environment. Although different disciplines define components of resiliency differently, the core concept of resilience remains the same. As time progresses, the meaning of resilience becomes more complex. The evolution of resiliency combines all aspects from multiple disciplines to have a holistic understanding in the field.

8.2 Literature Review

The United States faces challenges by the changing social demographics of the elderly population. A generation called the “Baby Boomers” (1944–1964) are entering into retirement. Cowie (2012, pp. 57) called this generation the “Old Fashion Heroes of the New Working Class”. These people were composed of coal miners in West Virginia, steel shop workers in South Chicago, Chevy plant workers in Lordstown, Ohio, the grape industry in Delano, California, and garment factory workers in El Paso, Texas, etc. Images portrayed the normality of the American family. Unfortunately, however, their work did not promise the comforts of retired life that they imagined. The American dream was what many in the working class aspired to. It included freedom, opportunity, and upward mobility towards prosperity and success. The promises and policies from public administrators campaigned on became fruitless for the working class over time. Without the funding or infrastructure in education, healthcare and social programs, the working class could not prepare for the changing times.

Cowie observed the middle class throughout 1970s and 1980s and particularly focused on the public administration of Detroit and New Orleans. In Detroit, the labor population increased which resulted in a lack of resources for housing (Sugrue 2005). The Detroit city administration made a rash decision to allocate their resources around the suburbs while miscalculating the cities community asset. Not only did this decision ignite social issues, such as racial segregation or the creation of urban ghettos, but it also hindered the possibility for diverse communities.

When automobile manufacturing business left, Detroit lacked social, community and local economic assets. As a result, the city and suburb population were vulnerable. Due to the lack of resources and support from administration, Detroit has a low level of resiliency. The city of Detroit funding through social or economic assets remains low and faces grim prospects presently.

Although there are communities that lack certain assets, other means, such as faith, can drive towards solutions and resilience. Hochschild (2016) observed local parishes in the State of Louisiana, having higher rates of mortality than other communities do. The people in the community refused to protest due to their background, traditions, and faith. This came to be known as ‘Cancer Alley’ in New Orleans. The city has a vast array of economical, historical, community assets to support resiliency. However, there are other factors in a community aside from tangible assets. The underlying problem may go beyond politics and can be embedded through the culture and physical environment. Planners and policy makers will face the pushback from communities with strong social capital. For public administrators, it is an ethical dilemma whether to impose policy over people’s beliefs unless it was immoral. (Hochschild 2016).

Wilson’s (1996) observed issues pertaining the migration of youths from rural to urban communities. Migration is ubiquitous, especially in developing countries but the promise of a better life is not often fulfilled. Unemployment, crime and juvenile delinquency, limited access to education, the spread of infectious diseases, homelessness, high rates of unprotected sex, weak families and social institutions, poor labor market prospects, are growing concerns of the common difficulties experienced by poor young people who grew up in cities which contributes towards a weakening resiliency.

8.2.1 Social Connectedness

Moreover, social connectedness has its roots in resiliency. Social Capital is a well know topic in the area of social sciences. It is understood as the relationships among people who live in a particular community, enabling that community to function effectively. For example, community interventions on promoting healthcare in rural America is stigmatized due to the nature of foreign intervention. Rather, communities in rural America are interconnected relationally through

their family, traditions, neighborhoods, and civic and religious affiliations. (Crosby et al. 2012). Hundreds of studies have been conducted on social capital and its important in understanding its effects with individual and group differences which is essential towards policymaking (Durlauf and Fafchamps 2005). The results of studies show recovery from large-scale traumatic events building social capital are relevant to emergency preparedness. Furthermore, studies have showed forming strong social networks and developing sustainable programs with local neighborhood groups is essential towards emergency preparedness.

Building social capital involves fostering neighbor-to-neighbor ties, improving communication, and fostering multilateral relationships between the local municipality, faith-based organizations, businesses, and local neighborhood organizations. These actions range from getting to know people in your neighborhood and taking part in local community initiatives. (Aldrich and Meyer 2014) Finally, one of the most important building blocks in building resilience through social capital is incorporating equity.

The most likely person to provide immediate assistance in an emergency is immediate family, friend, or co-worker rather than first responders. Colleagues and community groups are also often called on to provide emotional, and in many cases physical, support after traumatic events.

After the terrorist attacks on Sept 11th, many civilians aided first responders at the scene. In some cases, civilians came to the aid of one another immediately after the attacks happened. There were accounts of Co-workers coming to the aid of one another. Benfente and Hollander (2011) shared his account of how he saved a wheelchair-bound woman: "I saw horrible things that can't be unseen or unremembered, but I also saw remarkable acts of helpfulness, selflessness, and generosity. That's what I focus on to get through the memories", Michael Benfente, Jr.

As Benefante and his colleagues descended down the world trade center, On the 68th floor, he noticed someone who was immobilized in a

wheelchair. They stopped and decided to help her and continued their descent as they eventually escaped.

Empowering individuals to have equal access to healthcare puts that community in a better position of withstanding the effects of a disaster. By building social capital amongst and developing relationships between people and organizations within a community can develop the necessary means for resilience.

8.3 Fukushima Daiichi Nuclear Disaster

The Japanese government is well known for their disaster preparedness system. No one knew how the idea of 'respect' resulted as a horrifying, silent, lurking death: radiation.

The Fukushima Nuclear Disaster is complicated. It is a historical lesson that natural disaster can be summed up worse within several aspects of society. Our study was conducted to understand lessons that came from the Fukushima nuclear disaster—in economic, sociocultural and political aspects. Our study sought adequate solutions for such nuclear disasters.

8.3.1 Lesson Learned: Economical Structure of Disaster

Fukushima is one of the most unique cases which was solely affected by one company. Most of the residents in Fukushima region are rice farmers. The region itself had nothing to offer except rice and sake as commendable goods. Moreover, the community needed many social services which required an enormous local budget, such as medical service or cultural events. The Japanese government spent less on Fukushima compared with other urbanized areas like Tokyo or Sendai.

The Tokyo Electric Power Company (TEPCO) became a dominant entity in the region. Geologically, Fukushima was the closet area for nuclear plant next to the Tokyo. Because Tokyo is the capital city of Japan, the Fukushima plant needs

to produce a vast amount of electricity. Most of the locals accepted TEPCO's massive nuclear plant construction without contest. Moreover, TEPCO's incentivized the locals with investments on social services and entertainment events. The Japanese government and local government were pleased with their investment because they can allocate funding towards other needs. TEPCO built Schools, hospitals and theaters and became a part of the community in Fukushima.

However, this was the well-prepared strategy of TEPCO. Similar to the imperial conquest in seventeenth century Europe, TEPCO became an essential part of daily life in Fukushima. The local government shut down on some days because TEPCO undertook services such as road construction and senior counseling service. Because TEPCO is a private company, they started to develop the whole region for their benefit. Business profit came first before safety.

Me and my crews warned headquarter about the earthquake and Tsunami. After all, we are scientists and that's our job. We recommended relocating the plant. But they won't listen. Not only they ignored our analysis, they ordered us to erase every data relate to ongoing disaster.—Kei Sugaoka, TEPCO's formal senior chief of engineering & construction lab, interview with Zweites Deutsches Fernsehen (German Public Broadcasting ZDF 2013).

TEPCO not only dictated the local government in Fukushima, it committed atrocities that infringed on the welfare and safety of its people. Gunewardena and Schuller (2008) introduced two cases where private companies take over the local community after calamities. One account is Honduras' coastal communities were left vulnerable after the Hurricane hit. The tourism industry took a toll but came back due to investments by private companies. The same account happened in Sri Lanka. Recovery operation in Fukushima was operated by TEPCO and it only focused on the rebuilding nuclear plant to solve their losses.

8.3.2 Lesson Learned: Politeness with Bureaucracy

Japanese people commonly understand that speaking his or her idea is considered nor proper etiquette. In other words, the idea of politeness suppresses the discussion on greater good such as public safety or collaborative operations by diverse governmental factions or departments.

Because of the geological landscape, Japan frequently experienced earthquakes. Since the 1950s, after WW2, Japan's was able to mitigate damage from earthquakes and maintained most of their infrastructure. This was due to comprehensive construction rules and safety regulations. However, Fukushima's weakness was its administrative policy. Urgent response was needed when disaster happened. However, too much time will have passed at the most crucial point in recovery efforts. The Japanese government may be strong at mitigation, but they are fundamentally weak at resiliency.

Moreover, the sociocultural perspective added layers of adversity. The Fukushima disaster was costly because of the 'formality' in Japanese culture. Hurricane Katarina already had shown the dark side of bureaucracy. When the flood came, the National Guard was fully operational and ready. However, they commence their rescue efforts because the Federal Emergency Management Agency (FEMA) and the state government were in control.

8.3.3 Politics and Media

The Fukushima plant avoided complex safety inspection from the Japanese Government. Jones and Murphy (2009) explained that the elite structure in society is not vulnerable to the abuse of power. TEPCO's supervisors and politicians in Japan parliament shared documents with each other. Several Japanese presses argued about the relationship between their relationship and Fukushima nuclear plant's safety inspection.

Several recovery efforts show how politic and media can be deceptive. On 2013, the Liberal Democratic Party (自由民主党, *じゅうみんしゅとう*, LDP) abused their majority in Japanese Parliament and passed the code of law called ‘The Protect Law for Specific Secret Conservation’ (特定秘密の保護に関する法律). Generally, this code of law implies that the Japanese government can refuse to open information which they deem harmful to society. In relation to the code of law, the government can punish whistleblowers for at least 10 years in jail. The Fukushima disaster is the first case where this law has been applied. Reporters Without Borders (RWB) blamed this decision and quoted the law as disgraceful against democracy. Based on this law, the Japanese government informed that they will no longer report the results of child cancer rates to the public.

As a result, Suzuki (2016) research shows an irregularity of health outcomes pertaining to Fukushima. He studied three million people under 18 years old since the Fukushima nuclear disaster in 2011. There were total 113 cases suspected as radiation exposure and cytology cancer until 2013. Suzuki’s report was supported by Fukushima Health Administration. In 2016, several nurses witnessed that the report excluded 74% of highly exposed coastal region’s population. The whistleblowers were worried about their family’s safety and fled Japan to other countries. Their interviews were recorded by several Non-Governmental Organizations (NGOS) in

United States and their names and positions at Fukushima were left anonymous.

At the same time, the Japanese government launched campaign and TV show called ‘Eat Together’, where celebrities ate vegetables and rice from Fukushima. Within a year, the show host died from cancer and guest members reported high radiation exposure inside their organs. Hoffman and Oliver-Smith (2002) explains that Media works as a tool to deceive people’s awareness of a disaster and made them to believe that there were no harmful effects from it.

8.3.4 PAR Model

There are various aspects related to the Fukushima disaster. The Pressure and Release Model (PAR Model) is a model that helps understand risk in terms of vulnerability analysis in specific hazardous situations (Wisner 2008). Furthermore, the PAR Model explains how disasters are shaped by structures and processes distant in space and time (Fig. 8.1).

TEPCO had full autonomy over the local administration in Fukushima. Most of the local people were farmers and the local economy was not valuable to Japan as a whole. After TEPCO came to the Fukushima in early 1970s, the local community started to rely on its economic and social benefits—schools, hospitals and theaters were built and real estate prices goes skyrocketed.

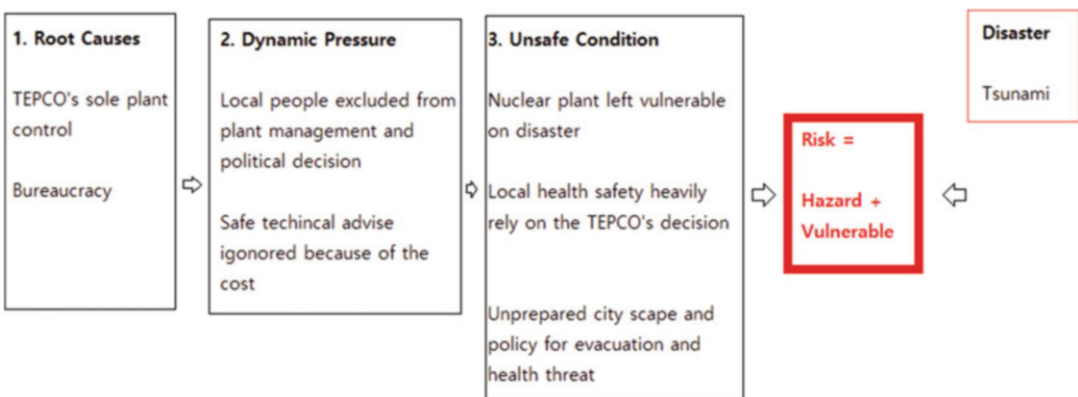


Fig. 8.1 PAR model

Local communities believed TEPCO and followed them without criticism. Bureaucracy was time consuming and caused weak resilience.

Meanwhile TEPCO engineers, architects, and scientists warned TEPCO and the local government about earthquake and Tsunami. They implored TEPCO and the local government to invest in preparedness and emergency response as a resilient community. However, they refused. Without any preparation, the Fukushima plant and region were left vulnerable. Local hospitals budgets, evacuation plans and compensation policies were decided by TEPCO. These factors kept Fukushima in an unsafe condition. Therefore, when the Tsunami came, the region was unprepared.

8.3.5 Solutions: Damage Mitigation

Many local communities—especially local communities in Fukushima region—were upset with political decision which assumes that the Japanese government will not provide information about Fukushima disaster. Some local cities and research universities in Fukushima region decided to not follow the law and conducted their research records anyway. In 2016, Kashiwa city—which is a small city of Fukushima region - announced that they already found 333 children were showing symptoms of cancer and refused to believe Suzuki's report. The data was disturbing because Kashiwa city has total 522 kids in their town. The Japanese government admitted that many children in Fukushima region needed urgent radiation treatment. Okuma beach has a 30 miles radius area where everyone is prohibited to enter. Refugees are stationed in city of Koriyama and Fukushima. There are nine cities which can provide radiation treatment to refugees, including major neighbor city Niigata. The Japanese government might be weak at fast resilience but well prepared with medical supply and staffs for a long time. They have enough resources to care for vulnerable population such as children and elders.

Another barrier is the cultural understanding in Japanese society. It is not proper etiquette to

confront one another. The Japanese social code allows bullying toward 'different individual'. This bullying culture is called *Ijime* (いじめ) and already causes serious issues in society. It is not different with Fukushima disaster. Children and young women ask for help from bullying only because they are from Fukushima. TEPCO has history with the victimized local community. Rajan (2002) suggested the 'missing expertise' in disaster. It may have been helpful if TEPCO and the Japanese government hired anthropologists and psychological therapists who could help communicate between several parties. Their expertise will help medical processes without being bullied nor harm neighbor community.

8.3.6 Solutions: Community Participation

Due to their customs and culture, the Japanese people believed their government and unlike those in Chernobyl (Petryna, 2004). After the nuclear explosion in Chernobyl, the people of Ukraine, especially local people in Pripyat region realized that the soviet ideology and Kremlin politicians will not save them. Petryna insisted on the change in definition of biological citizenship: the right to know their health risks.

In the PAR model, indifference was one of the important aspects which caused adverse consequences. TEPCO had full autonomy during the development of the Fukushima region. The Japanese law should change their code of law which would allow citizen to have the right to understand information - information which can be critical for their own safety during disasters. Also, to prevent private company's having complete autonomy, decisions should be divided to a committee. The committee included all three stakeholders—private company, Japanese government and local community. With the change of decision-making process, the local community can diminish the future risk of Tsunami or earthquake.

8.3.7 Solutions: Resilient Planning

It would be unreasonable if no changes happen after critical disaster. The bureaucracy in Japanese disaster protocol process is inefficient. The Japanese society and government culture of *Ichinmae* can impede on meaningful conversations and dialogue especially in recovery and rescue efforts. There needs to be more autonomy toward micro scale local community or local leadership to make decisions when they are experiencing an immediate threat.

The government plays an important role to support local participation and effective disaster prevention. At the same time, The Japanese government needs to limit private enterprises authority. To increase the resiliency, well-handled urban planning, advanced engineering and construction are inevitable. The private company has a responsibility to share costs in infrastructure and emergency preparedness.

I don't leave this place. My father and grandfathers cultivate rice and the same goes to me. This small piece of land belongs to my family. More than that: It is my history.

- Local farmer who refused to follow evacuation in Fukushima, interview with Korean Broadcasting Service (KBS), 2011.

The word 'home' comes with deep emotional stability. Tobin and Whiteford (2002) depict Ecuadorian refugees becoming depressed when they thought about home. It is inevitable to the displaced people in Fukushima to abandon their hometown based on current radiation indicating data. Six years passed after the disaster where no one openly recounts their experiences. The only data that exists is Fukushima city hall interview records in 2013. Surprisingly, 37% of total 1600 refugees said they 'gave up' their life and decided to follow orders from government.

Furthermore, the Japanese government seems uninterested in relocating people who were evacuated. Scientific studies or Journalism is strictly illegal. The Japanese government repeatedly announced that terra forming complete—which is the opposite of European journalists' accounts, who secretly entered the prohibited zone to calculate levels of radiation.

Many Asian countries' culture recommends people to follow hierarchy. In the end, it is always the people who can change the government's attitude through political action. The Fukushima disaster will be a first step for the civil political practice and participation. An anthropological approach is urgently needed in current sociocultural and political complexity.

8.4 The Effects of Migration Resiliency in Europe

Cities need migration, fresh blood. But when migrants come in, unless you are a Harvard professor, you start from zero and then you have to climb step by step. So there are two parties you need to consider. First, what is the willingness of the migrant themselves to be part of this new society? It is a mental switch. One you decide that you will invest in your own position, you will stand on firmer ground. But on the other side of the story it is not fair to ask migrants to burn all their vessels behind them. It is not ethical to do so.—Mayor Ahmed Aboutaleb, Mayor of Rotterdam, Piece from his interview in Forecast Monocle 2015, 21.

The recent phenomenon of migration in Europe brings challenges and opportunities for cities to implement resilient strategies.

A resilient city has the capacities in place to shift into a different state in the aftermath of a shock or disaster while restoring its functions and services. An 'unresilient city' has limited or restricted capacity to recover, and "has high poverty and crime rates and devastated natural environment, or 'a ghost town'" (Pickett et al. 2013, pp. 215). There are twenty-first century stresses for resilience across cities in Europe. Over time, the globalization of urban cities seen social stresses that include unemployment, urban poverty, migration, and limited access to reskilling and education/training programs. In addition, stresses rooted in cultural, religious, or ethnicity and involvement in criminal activities. All these stresses are related to each other which requires in-depth understanding of how to address it in a more systemic and integrative method. For example, urban poverty is not an issue of providing subsidies but rather implementing programs that

seeks to develop education and working skills in order to provide social mobility to help people who are ensnared in urban poverty.

The European Migration crisis saw a rise in the number of people displaced from the Middle East to the European Union. This is due to a myriad of factors, which include the displacement of Syrian war refugees, Afghanistan war refugees, and African and Middle Eastern migrants. According to Eurostat, EU member states received over 1.2 million first time asylum applications in 2015, more than double the previous year. With the number refugees and migrants rising, EU member states believe that the refugee population can significantly damage its infrastructure. The presence of refugees could increase terrorism, take jobs and social benefits away from resident members. European cities will have to cope with growing pressures, especially for resource supply. This raises issues of sustainability and the quality of life. The CEB (Council of Europe Development Bank) and Rockefeller center signed a memorandum of understanding to support and expedite resilience projects throughout Europe (Rockefeller 2013). Cities will undergo projects to build resilience to the physical, social and economic challenges of the twenty-first century.

The “100 resilient” was launched in 2013 to help cities around the world become more resilient to the major shocks and chronic stresses. One example is how the city of Paris has taken responsibility to improve its resiliency. It has implemented three-pronged resilience strategy to cope with shocks and stresses:

1. An inclusive and cohesive city, which builds on the strength of its residents to become more resilient
2. A city built and developed to meet the challenges of the twenty-first century
3. A city in transition that mobilizes collective intelligence, adapts its operations, and cooperates with its surrounding territories.

The city of Paris will examine different sectors to approach resiliency (Fig. 8.2).

The resiliency strategy takes much into account the Migration phenomena supported at the grass-roots local level.

In spring 2017, the International Rescue Committee, conducted a study on Paris’ current responses to migration issues various stakeholders. Short and long-term challenges were identified: promoting social inclusion at the local level through the involvement of local stakeholders, and public services at the micro-local level to propose integration measures (welcoming migrants, employment, housing, citizenship) and building people’s autonomy by ensuring safety, health and well-being, education, workforce integration, to allow everyone to choose their life paths in the city.

According to the United Nations, Climate change could cause the displacement of 250 million people by 2050 (UNFCCC 2017). Cities will have to be prepared to accommodate more migrants and face pressure on resources, and increased need for housing, infrastructure and services. The social and professional integration and the adaptation of urban projects to the migration challenges are resilience issues. The City of Paris has worked with seven other member cities from the 100RC network in Athens to define common principles and develop solutions.

Since 2015, Paris has been experiencing mass influx of people fleeing geo-political conflicts and climatic events. The City set reception centers to respond to this emergency. One of these centers is located at Porte De La Chapelle, which shelters more than 15,000 people. A plan to mobilize Paris’ community was adopted in 2015 and established several principles: equal rights and treatment of all people on the streets, Paris’ mobilization is that of the Parisians, and emergency response is interlinked with planning for the future.

To meet current challenges, the city of Paris is committed to dedicating 10% of its annual budget towards resilience-building activities and investments. It will continue its relationship with the 100 resilient cities network by exchanging knowledge of refugees and migrants, confronting terror threats, climate change and air pollution. The commitment to a new holistic and integrated

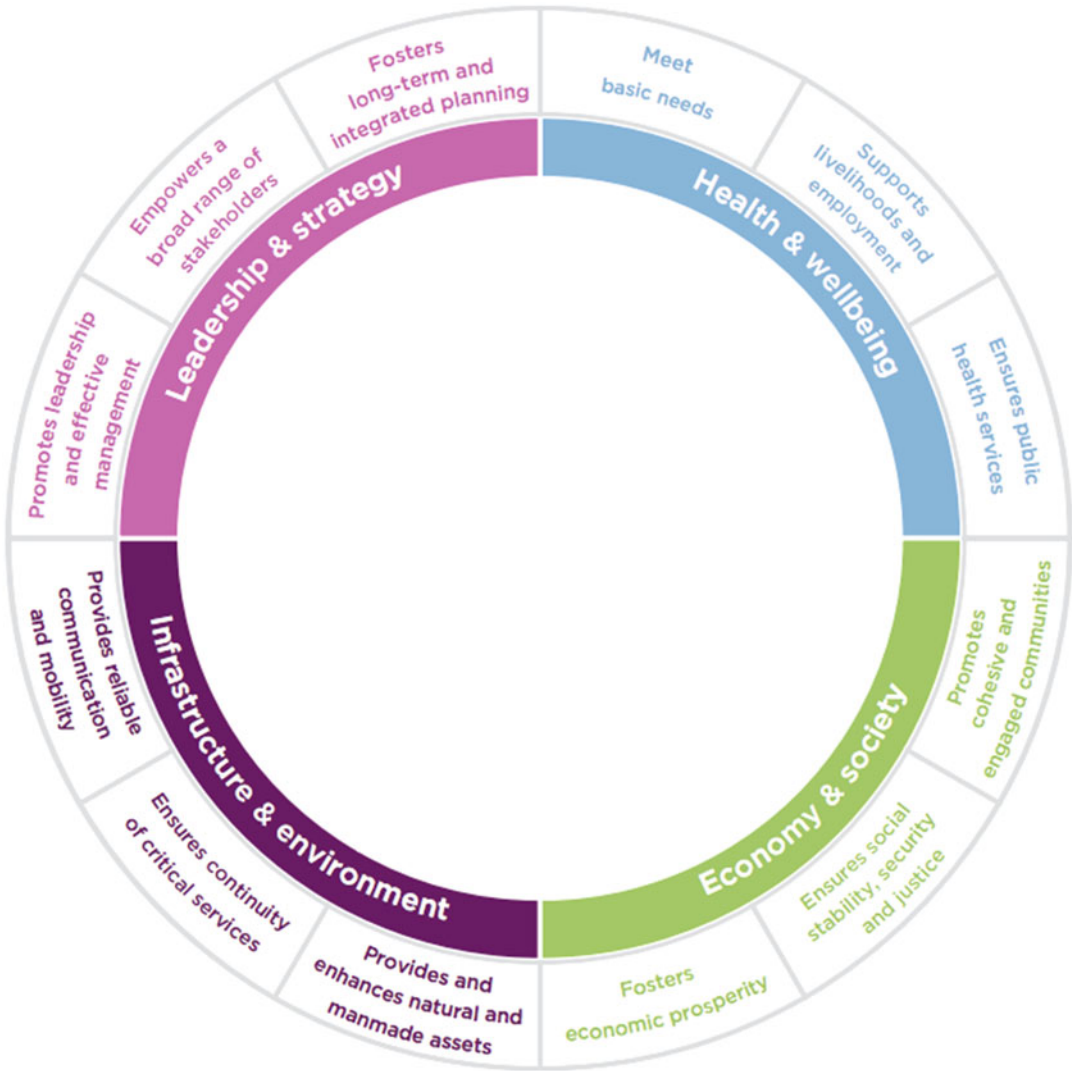


Fig. 8.2 Resilient 100 Paris strategy for the 21 century (Source: 100Paris 2018)

approach to resilience is the new frontier on resiliency for the twenty-first century and beyond.

8.5 Health Systems

The United States spends more per capita on healthcare than any other nation in the world (Weiser et al. 2015). However, despite its high spending, the United States’ health outcomes do on par if not worse than any other country. The

disparity in cost, access, and quality has spurred the health care reform in the United States (Rosenbaum 2011).

In 2010, The Patient Protection and Affordable Care Act (ACA) has expanded access and affordability of health care services to all citizens of the United States. Although access to health care is increasing, the health care system is plagued with meeting demands for services. Increases in the retiring working class and the shortage of physicians are the main causes for

the shortfall. It has been worsened with the increase to access of healthcare services through the ACA.

The ACA implemented a cohesive health system to alleviate fragmented healthcare, rising costs, and overutilization of healthcare. The ACA introduced Accountable Care Organizations (ACO) are groups of doctors, hospitals, and other health care providers, who come together voluntarily to give coordinated high-quality care to their Medicare patients. The purpose of ACO's are to ensure that patients receive the correct services while avoiding unnecessary services called never events.

Under the ACA, hospitals were mandated to comply under a quality metric rating system. This system would allow ratings of services which affected reimbursement to the hospital. In order to comply with the mandate, hospitals restructured their services. For example, the US health system used to be a fee for service. The ACA changed the payment models so that hospitals were rated for the quality of their services. For example, hospitals would be penalized if a patient was readmitted to the hospital within 30 days for any reason. There has been a paradigm shift from focusing on curing the disease to holistic patient care. For example, clinicians will have to diagnose patients social, psychological, and economic and connect them with the appropriate services outside the hospital. A resilience framework can help the health care system achieve cohesiveness rather than focus just on the role of individual healthcare organizations.

The healthcare system benefits from community-based provision of care from multiple stakeholders. Many hospitals are operating inefficiently that negatively affects the capability of facilities to meet additional disaster and emergency needs (Kaji et al. 2007). When a surge (capacity of a health care system's ability to expand quickly beyond normal services to meet an increased demand for medical care) takes place, hospitals need to mobilize resources, effectively, efficiently, and rapidly.

To support this approach, health care coalitions, a collaborative groups of local health care institutions and response agencies, have appeared throughout the United States that focus on working together collectively to prepare and respond to emergencies. Policymakers passed the Pandemic and All Hazards Preparedness Act of 2006 primarily due to the events of Hurricane Katrina in 2005 (Toner et al. 2017).

The purpose of the ASPR Hospital Preparedness Program (HPP) is to enhance the ability of hospitals and health care systems to prepare for and respond to bioterrorism and other public health emergencies.

Before the passing of the legislation, hospitals would traditionally prepare by reinforcing infrastructure and resources. After HPP was passed, a healthcare coalition would respond collectively forming a community wide health system resilience method when where is an emergency situation.

“Program priority areas include interoperable communication systems, National Incident Medical System compliance and training, bed tracking, personnel management, mass fatality management planning and hospital evacuation and shelter in place planning, medical surge capacity and resources, decontamination capabilities, isolation capacity, pharmaceutical supplies, training, education, drills and exercises. Hospitals, outpatient facilities, health centers, poison control centers, Emergency Medical Services (EMS) and other healthcare partners work with the appropriate state or local health department to acquire funding and improve healthcare system preparedness through this program” (California Hospital Association 2017).

HPP's emphasis on health care coalitions represents a shift towards a multidimensional response. Resiliency is shown when all health care facilities in the community work together to prepare for and respond to emergencies.

HPP was on full display through witnessed through a series of events. The HPP was first tested when the 2009 H1N1 “Swine Flu” pandemic swept over the United States. Collaboration between multiple agencies to swiftly test, diagnose, and treat an estimated 60 million

Americans, who contracted the disease, saved countless number of lives.

HPP came into effect when Hurricane Sandy descended onto New York City in 2012. Coalitions and partnerships through hospitals and other healthcare facilities in New York helped patients evacuate and brought in more than 2000 healthcare professionals (Doctors, Nurses, and Technicians) from other areas around the state.

The 2013 Boston Marathon bombing was a major terrorist attack after the September 11th attacks where HPP did not exist. Within minutes of the attack, hospitals around Boston went into emergency response mode. Due to the Hospital Preparedness Program, more than 140 lives were saved.

8.6 Resiliency in Surveillance

Surveillance is increasingly relied on as an instrument for resilience yet increasingly controversial when implementing policy (Berleur et al. 2010). Increasing funding towards immediate areas of threat, piloting new methods and tools and modifying existing policies to meet evolving threats. Coastal areas are of concern due to the rising seas and threats of hurricanes.

Burroughs (2011) proposed solutions related to coastal conditions which threaten local health. Proper sanitation policies and facilities for wastewater, oil draining technologies that administrators could consider, practical wetland preserving policies, understanding natural ocean spaces and ecosystem, bay, fishery management—these are all well written by him. Moreover, these are the critical factors support health resilience through such communities.

Ewing and Synolakis (2010) introduced the coastal resilience index (CRI) to enhance coastal community resilience. CRI is designed as a response for natural disasters which could threaten the coastal communities' livelihood or property. To achieve this objective, many aspects should be considered for reducing hazard. In addition, Ewing insisted that CRI will not be

enough if coastal community only considered about past disasters because of impending new coastal disasters. Therefore, idle coastal community model shows the increase of resilience. CRI not only evaluates formal disasters, but the concept of CRI includes the anticipation of the future possibilities in its six parts of resilience keywords. The resilience keywords of CRI will increase total capacity of the coastal communities when disasters strike.

Ewing's CRI has six parts: power, water, transportation, communication, emergency service and housing. These six categories are essential when disaster hits the coastal community. The more a community has of the CRI's six parts, the likelier it is for a community to survive. It will also help during the aftermath of rescue or recovery efforts. Ewing thought these six concepts are close a community vulnerability. Stabilizing these six parts will ensure high community resilience.

Beatley (2012) proposed how vulnerability and resilience are interrelated. The vulnerability will be a weakness for a community unless there is adequate planning in place to overcome hazards toward the community. There was not a reference for future anticipation for CRI, however, there was concern for future events which could harm coastal communities.

CRI is well designed for the coastal community resilience; however, there are issues within the model that could cause disaster. The concept of CRI centered on the coastal community security. This approach is not ideal, but it is the optimal option to prevent or diminish coastal disaster warnings. As Ewing mentioned, environmental changes such as sea level rise is rapidly expanding. The six CRI categories will partly help to prevent environmental hazards but because of the CRI's primary objective,—to protect coastal community from its vulnerability—CRI has a possibility to limit itself on short-term solutions. Threats to marine biology or sea resources are difficult to detect and adapt.

However, there is a high chance for this category to harm communities' economy or health condition. Furthermore, many vulnerable areas in coastal cities are abandoned. Local residents

show a distinctive lack of coastal disaster readiness. As a result, CRI cannot detect the vulnerable aspects of the community. Moreover, CRI cannot detect the vulnerability in social determinants. CRI is an index for calculation. It does not take into account social demographics.

When Hurricane Katarina descended on New Orleans, the aftermath exposed social disparities which was an urgent threat. CRI was not useful since it does not account for social variables. Arguably, it could have hindered the recovery and rescue efforts. There are outer issues a community faces which affects its resilience: rising sea levels and coastal problems. Policies that advocated for rising sea levels affected resilience negatively.

8.7 Conclusion

In order to comprehend the utilization of the chapter, the actions for strengthening resilience needs to be based on a holistic view of the context in which individuals, communities and systems cope with problems and thrive afterwards. Frameworks need to be designed in a way to strengthen resilience where pre-planned coordinated efforts are in place, communities more connected, robust, and people are able to handle minor or major catastrophe.

Resilience is a useful concept for planning and delivering twenty-first century health services and public health programs. Efforts will become more difficult as the effects of globalization, population growth, environmental change, and technology advancement progresses.

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Part II

Tools, Techniques, and Applications (Case Studies and Methodologies)



Are Expanded Resilience Capacities Associated with Better Quality-of-Life Outcomes? Evidence from Poor Households Grappling with Climate Change in Bangladesh, Chad, India and Nepal

Patrick Guyer, Caroline van Koot – Hodges,
and Boudewijn Weijermars

9.1 Introduction

Oxfam is a global movement working to fight inequality and end the injustice of poverty. Founded in the UK in 1942, Oxfam is now a confederation of 19 member organizations active in more than 90 countries around the world. Oxfam seeks to build the resilience capacities of people worldwide to thrive in spite of shocks, stresses and uncertainty, by empowering them to claim their rights and safeguard their well-being (Jennings and Manlutac 2016). Resilience is considered not an end in itself, but rather a means to achieve sustainable development, defined as “development that does not cause or increase risks, stresses and volatility for people living in poverty, and which makes progress towards a just world despite shocks, stress and uncertainty (Jeans et al. 2016, p. 6).” This article explores the concepts of resilience and Quality of Life (QoL), and identifies indicators of both concepts available in datasets from two recent Oxfam projects compiled in 2017 and 2018 in four distinct socio-spatial contexts in Bangladesh, Chad, India, and Nepal. We then explore the link between indicators

of resilience and QoL, constructing models with survey data to explore which factors are associated with better QoL outcomes and whether expanded resilience capacities are associated with better QoL outcomes. The role of gender is specifically explored in the models.

9.2 Quality of Life and Resilience in Poor-Country Contexts

9.2.1 Quality of Life

Quality of Life is a concept that is used by different disciplines and includes multiple dimensions. Many authors have designed concepts to define it, in objective and subjective terms. Objective measures of quality of life include observable indicators such as the number of meals consumed, or income. Subjective measures are related to perceptions of people on their satisfaction with their own lives. Indicators in this dimension include self-reported health, or well-being (Martínez et al. 2017). A third concept that defines quality of life are one’s personal values. The extent to which one’s objective and subjective terms will affect quality of life, depends on the values of that person. For example, earning a large amount of money will not improve the

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quality of life of a non-materialist (Felce and Perry 1995).

QoL has received increased attention in recent years, especially in social indicators research and public policy debates stemming from the rejection of classical economic metrics like Gross Domestic Product as acceptable measures of human well-being or societal progress (Stiglitz et al. 2017). Theorists such as Inglehart (2000) have argued that QoL is “postmaterialist” concern that only becomes relevant for citizens and policymakers after a society has reached an advanced level of economic development. Although some QoL innovations have originated in developing countries, Bhutan’s Gross National Happiness measure being one example (Tobgay et al. 2011), much research and discussion of QoL has so far focused on high-income countries (see for example the OECD Better Life Initiative 2019). However, we argue that QoL concerns are just as relevant, if not more so, for people living in poorer countries in communities characterized by high levels of poverty and marginalization.

Oxfam’s vision is a just world without poverty. Oxfam does not have a standardized concept or set of indicators for QoL, however a number of surveys conducted by Oxfam research teams have included QoL indicators. Based on these practical examples, QoL is defined broadly using a set of multi-dimensional poverty-related concepts: food security, social and political participation, access to basic services like health and education, resilience, well-being and sustainable livelihoods. Together, these provide a picture of the QoL of people living in poverty. A number of indicators related to these can be found in the datasets from the field research used for this paper. These are summarized in Table 9.1 below.

9.2.2 Resilience

Oxfam defines resilience as the ability of women and men to realize their rights and improve their well-being despite shocks, stresses, and uncertainty. This concept of resilience recognizes the inequities of power that contribute to poverty and

mean that the poorest people bear the biggest burden of shocks and stresses. Resilience is not seen as an end goal; rather, resilient development is seen as a key part of a continuous process towards defeating poverty and achieving the Sustainable Development Goals (Bahadur et al. 2015). Other definitions of resilience in common usage by other international development actors are broadly similar to that of Oxfam, for instance “Resilience is the ability of people, households, communities, countries and systems to mitigate, adapt to, and recover from shocks and stresses in a manner that reduces chronic vulnerability and facilitates inclusive growth (USAID 2012),” and “The ability of countries, communities and households to manage change by maintaining or transforming living standards in the face of shocks or stresses without compromising their long term prospects (DFID 2011).” Across these definitions we find common elements of the idea of the ability of countries, communities and households to recover from and continue to develop in the face of shocks and stresses.

Oxfam’s framework for resilience consists of three capacities. Absorptive capacity is the capacity to cope with shocks and stresses and recover, ensuring stability and reducing the negative impact of shocks. Building adaptive capacity is about proactively anticipating shocks and stresses and building an increased flexibility for the future. Transformative capacity is about changing systems that perpetuate or exacerbate risks and vulnerabilities (Jeans et al. 2016). The multi-dimensional conceptualization of resilience in terms of these three capacities is not unique to Oxfam (Béné et al. 2014; Folke 2006; Folke et al. 2010; Walker et al. 2004). Alternative frameworks in use by other actors are often tailored to the specific focus of that actor (DFID 2016). However no one framework has been adopted across the development sector, nor standardized indicators developed for each of the capacities.

Households are considered to have absorptive resilience to the negative impacts of extreme weather events when they are able to cope with periodic shocks to their access to water, income,

Table 9.1 QoL concepts and related indicators distilled from Oxfam’s existing field research

QoL concepts	Sample indicators related to QoL concepts
Food security Sustainable livelihoods	Number of times in the past 12 months when there was (in)sufficient food for members of the household
Empowerment	Level of agreement with the statement that women are just as capable as men in decision-making Self-reported level of self-esteem
Social and political participation	Level of agreement with statement ‘people like myself can generally change things in my community’ Percentage of people participating in community-level decision making in the past 30 days
Resilience	Level of agreement with statement ‘at this time I feel that my household is capable of coping with the risks of extreme climatic events.’
Education	Highest level of education (or years of schooling completed) by adult members of the household Percentage of school-aged children who attend school
Health	Self-reported overall health status
Well-being	Self-reported overall life satisfaction

Source: Adapted also from Oxfam (2013)

and crops as well as erosion posed by those events. Adaptive resilience of communities is achieved when they are able to take pre-emptive measures to arrange their livelihoods in such a way as to be able to withstand and even thrive despite (increasing) shocks caused by extreme weather events. Transformative resilience is when people and communities take steps to address the root causes of risk and vulnerability, like fighting for a more equitable distribution of wealth or demanding the including of women, youth and other marginalized groups in decision making around disaster planning and response. Table 9.2 below summarizes these three concepts.

The communities that comprise the sample of this study (Oxfam Novib Impact Measurement and Knowledge 2018, 2019a, b, c), encounter a number of challenges to their resilience and quality of life. Riverine communities in Bangladesh, India and Nepal that are the focus of the Transboundary Rivers of South Asia (TROSA) project face extreme weather events such as floods, heavy rain, or droughts (Oxfam Novib Impact Measurement and Knowledge 2019a, b, c). Oxfam, with local partners, aims to increase the participation of riverine communities in water governance, so they will be able to define

the government policies and practices that strengthen their coping mechanisms to deal with these extreme weather events.

Communities in the Lake Chad region served by the Employment, Resilience and Social Cohesion in the Sahelian Band and Lake Chad Region project (referred to as RESTE, the French acronym for the project title) are faced with increased food insecurity, and a growing number of conflicts over access to natural resources between sedentary farmers and nomadic pastoralists due to climate change (Oxfam Novib Impact Measurement and Knowledge 2018). The situation has further deteriorated since 2013 due to the Boko Haram conflict. Oxfam’s work in the Lake Chad region aims to build the resilience of communities by increasing equitable access to economic opportunities, particular of women and youth, improving food security by providing access to knowledge and materials for better agricultural practice, and supporting women and youth to take up new diversified revenue-generating activities. The project also reinforces the participatory governance of local development structures. In both examples, Oxfam and partners are addressing the absorptive, adaptive, and transformative capacities of communities.

Table 9.2 Resilience capacities defined in Oxfam’s resilience framework

Types of resilience	Resilience capacity to...	Sample indicator
Absorptive resilience	Take steps to cope with known shocks that are likely to re-occur	Percentage of households that can access early warning information about likely shocks
Adaptive resilience	Make adjustments to better cope with known and likely shocks in future	Percentage of households successfully diversifying their sources of revenue
Transformative resilience	Make changes to eliminate risk, vulnerability and inequality	Percentage of people who feel they can make a change in their community

Source: Jeans et al. (2016)

9.2.3 Overlaps Between QoL and Resilience

QoL and resilience are both broad themes that overlap at their margins. For example, our discussion above includes resilience as one element of QoL, whilst some indicators that we use for resilience overlap with indicators of QoL. To explore the relationships between indicators of QoL and resilience, we must make a determination of where one concept ends and the next one begins. Practically, some concepts are easily relatable to both QoL and resilience. For example, having adequate food stocks available at home can be both a means of coping with a shock like a typhoon or a drought (absorptive resilience) or a contributor to the food security of the household more broadly (an important element of QoL).

To deal with this conceptual uncertainty, we follow the distinction proposed by Hagerty et al. between *input*, *throughput* and *outcome* QoL measures in national-level QoL measures (2001). These levels discriminate between exogenously-given factors that contribute to QoL as experienced by people (inputs), individual choices people make that have a bearing on their QoL or that of others (throughputs) and the outcomes of survival, happiness and overall contributions to society that people are able to make (outcomes). Hagerty and co-authors are critical of existing QoL measures for mixing elements of all three levels without regard for the substantial differences between them, although they also argue that measurement at all three levels—when done well—can contribute to a better understanding of QoL outcomes and the environments and behaviours that can contribute

to these outcomes. However, following also Veenhoven (2001), it is these QoL *outcomes* that are of greatest interest. Furthermore, resilience in Oxfam’s work is explicitly *not* an end to itself, but rather part of an approach to achieving sustainable development and defeating poverty (Bahadur et al. 2015) and the concept of resilience as abilities or capacities suggests that resilience is not an outcome but rather part of a process (Béné et al. 2014). We therefore find justification to categorise concepts and indicators as resilience when they relate to the *means* (inputs and throughputs) by which people overcome shocks and stresses to achieve QoL outcomes and those which tie closely to *outcomes* of survival, happiness/life satisfaction and making contributions to society as concepts and indicators for QoL. This distinction guides our selection of indicators for the model building exercise, elaborated on below.

9.2.4 Hypotheses

The hypothesis of this chapter is that expanded resilience capacities should be associated with better QoL outcomes; evidence for this will be significant, positive coefficients for our resilience proxies in the statistical models. Among the covariates included, higher education levels are expected to show a positive relationship with QoL. Education has been shown to be associated with higher scores in a variety of quality of life indicators, including health status and to a lesser extent life satisfaction (Ross and Van Willigen 1997). Furthermore, a number of studies have demonstrated a positive association between

income levels and both the life satisfaction and health status elements of quality of life (OECD 2017). We use the number of household income sources as a proxy for income levels, both because this variable is available in both datasets but also because increasing the diversity of household income sources is a key assumption in many project theories of change, including RESTE. Assisting households to make use of a greater diversity of income sources is widely assumed to contribute to building resilience by reducing dependency on income sources that may be weakened by the negative impacts of climate change (for example, reliance on a single cash-crop or fishing activity) (Ellis 1999). A greater diversity of income sources, from agriculture or other sources, is expected to be associated with better QoL outcomes in the models. Being currently married, which in the case of the RESTE project in Chad may include polygamous marriage, is used as a proxy for socio-economic status given its importance in the local contexts of these projects; a link between being married and better QoL outcomes is also expected. Women and young people, and young women especially, are among the most marginalized and are priority target groups in the RESTE project (Oxfam Novib Impact Measurement and Knowledge 2018). QoL outcomes are expected to be lower for women than for men, and age is expected to be positively associated with better QoL.

9.3 Data Sets

9.3.1 Dataset Overview

Baseline data from two ongoing Oxfam projects with local counterparts provide a rich and novel dataset for exploring these relationships in four distinct geographic and social (socio-spatial) contexts in Bangladesh, Chad, India, and Nepal. Household survey data as well as qualitative data from focus group discussions in Chad were collected as part of the baseline study for the RESTE project funded by the European Union Emergency Trust Fund for Africa (Oxfam Novib Impact Measurement and Knowledge 2018).

Household survey data from Bangladesh, India, and Nepal were collected for the baseline studies of the TROSA project, funded by the Government of Sweden (Oxfam Novib Impact Measurement and Knowledge 2019a, b, c).

9.3.2 TROSA Baselines

The TROSA project aims to achieve positive change in the lives of marginalized and vulnerable communities along the Ganges, the Brahmaputra-Meghna and the Salween river basins in Bangladesh, India, Myanmar, and Nepal (Oxfam Novib Impact Measurement and Knowledge 2019a, b, c). River communities are confronted with a range of challenges that affect the quality of water and the quantity and timing of water availability. The causes are often not known or out of sight or the influence for communities. Yet the experience of living with these water challenges can mean the difference between life and death, between development which is sustainable or not.

In the TROSA project, Oxfam and local partner organizations in the project countries aim to reduce poverty and increase resilience of riverine communities. The project interventions follow a sequential approach starting with supporting communities to understand the water-related context in the areas where they live. It then works to build capacity and the will of communities to engage in local water governance. Active and effective participation in water governance should lead to more secure access to water and control over water resources and timely information about upcoming floods or droughts.

Water access and control comes with power, and power among different people living in riverine communities is unevenly distributed. Especially women and marginalized groups are not able to benefit in the same way from water as men do. Improving opportunities for women and marginalized groups to meaningfully participate in decision-making around water access and control is therefore vital in women's empowerment. Further, women are the primary users of water as

they use it to feed their families as well as work the land (Ray 2007).

The impact of the TROSA project is measured using a quasi-experimental approach involving large-scale quantitative baseline and end line household surveys in the intervention areas of the project countries. Oxfam Country Office teams in Bangladesh, India, and Nepal executed the baseline studies in the targeted areas of these countries between February and May of 2018. Enumerators reached a total of 821 households in Bangladesh, 1049 in India, and 751 in Nepal, split between those in target and comparison villages. Sampling for the survey was designed to collect equal numbers of responses from people living in trans-border river communities targeted by the project and comparison communities selected to: (a) ensure that selected households are living close to trans-boundary rivers, (b) limit spill-over effects between target and comparison households, and (c) ensure that selected households are exposed to the same external shocks.

9.3.3 RESTE Chad Baseline

The RESTE project is active in three regions of west-central Chad: Bahr el Gazal, Kanem, and Lac (Oxfam Novib Impact Measurement and Knowledge 2018). About 20,000 households, or about 128,000 people, live in the intervention area. The project seeks to improve the well-being of targeted populations, through improving the food and nutritional security of poor and very poor households, improving access of youth and women to employment and revenue-generating activities, and supporting greater social cohesion at the community-level. To achieve and sustain these improvements in a context of increasing climate volatility and recurring shocks (related to climate and conflict, among other) Oxfam and local partner organizations implementing the project seek to expand the absorptive, adaptive and transformational resilience capacities of target communities.

Since independence in 1960, Chad has faced challenges in promoting its own socio-economic development, ensuring internal and regional security, and adapting to the impacts of climate change, which placed particular stress on the large number of households dependent on agriculture and herding in communities targeted by the project. Chad ranks 186 out of 189 countries on the UNDP Human Development Index, and people in 88% of sampled households in the intervention area live below the absolute poverty line of less than the equivalent of USD 1.90 per day (UNDP 2018; Oxfam Novib Impact Measurement and Knowledge 2018).

The impact of the RESTE project is being measured using a quasi-experimental, mixed-methods approach comprising large-scale quantitative baseline and end line household surveys as well as rounds of focus group discussions during the project implementation. For this chapter, we consider mainly the quantitative evidence from the baseline study, drawing also on the results of the first two rounds of focus groups conducted during and shortly after the baseline household survey, collected at the end of 2017. Beneficiary villages were sampled randomly for the baseline within the regions and sub-prefectures of the intervention zone, stratified to ensure that the sample collected in each region and sub-prefecture would be proportionate to the population of people eligible to participate in the project living there. Project beneficiaries must be considered “poor” or “very poor” under a locally-developed set of multidimensional poverty thresholds determined through a Household Economy Approach. Villages for the comparison group villages were selected purposefully based on the input of local staff and partners. Selection criteria included villages in the same three regions that were similar in terms of demographics and socio-economic characteristics to beneficiary villages. Interviewers reached 1329 households during data collection, selected at random within sampled villages, and split between both beneficiary and comparison groups (Table 9.3).

Table 9.3 Total sample from available baseline datasets

		Treatment	Comparison	Total
Bangladesh	Men	206	206	821
	Women	202	207	
Chad	Men	123	108	1329
	Women	508	590	
India	Men	287	320	1048
	Women	199	242	
Nepal	Men	236	195	751
	Women	147	173	

Source: Oxfam Novib Impact Measurement and Knowledge (2018, 2019a, b, c)

9.4 Available Data and Snapshot of QoL and Resilience Conditions

A review of variables in both the TROSA and RESTE datasets resulted in a list of indicators that could be used for statistical modeling. Criteria for variable selection included availability in the TROSA and RESTE datasets, comparability of variables across both studies, and the conceptual similarity of these variables to concepts of QoL and resilience concepts. Indicators were preferred that demonstrated the most meaningful statistical variation. Applying these criteria, a shortened list of variables related to QoL and resilience concepts was derived for inclusion in the models. These indicators are proxies of the QoL and resilience concepts described above and do not cover the totality of these concepts. For example, while proxy variables for the QoL outcomes of ‘survival’ and ‘life satisfaction’ can be found in both datasets, there are no available proxies for the ‘contribution to society’ QoL outcome. However, given that they are available in the datasets compiled from these projects, they provide a point of entry for our exploration of associations between indicators of QoL and resilience.

Both datasets contain comparable questions about self-reported health status, used as a proxy for the ‘survival’ QoL dimension (Table 9.4). Self-reported health has been shown to correlate with subsequent mortality risk (McGee et al. 1999). For happiness or life satisfaction, TROSA featured a question about self-reported life satisfaction (“Overall, how satisfied are you

with your life as a whole these days?”). Although absent from the RESTE dataset, the Chad survey did include a question on self-reported self-esteem (“To what extent to you agree with the statement: I consider myself to be a person with high self-esteem”). Although these concepts are different from one another, numerous studies suggest moderate to high correlations between happiness and self-esteem (Diener and Diener 2009; Lyubomirsky et al. 2006).

In the QoL domain of making contributions to society, both the TROSA and RESTE datasets do include a question on whether respondents feel that people like themselves can generally make a change in their community. This is a measure of the extent to which respondents feel that change is possible and that they can be a part of driving it. It is also a mediator of whether respondents feel they can make a meaningful contribution in their community. However, conceptually it lies more closely to resilience, and the transformative resilience capacity, mainly because it measures whether respondents think it is possible for them to make change in their community (means), not a measure of whether they actually have done so (ends).

These indicators demonstrate considerable variation both within and across datasets. Table 9.5 below shows survey responses to the self-reported health question across all four country-contexts, by gender. Results are shown for the target group only, following the approach taken in the publicly-available baseline reports of these studies (Oxfam Novib Impact Measurement and Knowledge 2018, 2019a, b, c). Gender in

Table 9.4 Proxy indicators for QoL outcomes in available datasets

	TROSA	RESTE
Survival	Self-reported overall health status	Self-reported overall health status
Happiness/life-satisfaction	Self-reported life satisfaction	Self-reported self-esteem
Contribution to society	<i>No direct proxy available</i>	<i>No direct proxy available</i>

Source: Oxfam Novib Impact Measurement and Knowledge (2018, 2019a, b, c)

Table 9.5 Responses to the question “All in all, how would you describe your state of health these days? Would you say it is?”

		Very poor (%)	Poor (%)	Fair (%)	Good (%)	Very good (%)
Bangladesh	Men	2.4	9.7	29.1	44.7	14.1
	Women	1.0	2.5	51.5	41.6	3.5
Chad	Men	0.0	11.4	24.4	47.2	17.1
	Women	0.2	4.7	26.2	48.5	20.3
India	Men	1.7	10.5	60.6	25.8	1.4
	Women	0.5	15.1	55.3	23.6	5.5
Nepal	Men	0.4	5.9	77.1	14.4	2.1
	Women	2.0	11.6	67.4	15.7	3.4

Source: Oxfam Novib Impact Measurement and Knowledge (2018, 2019a, b, c)

Note: Data from target group only; original question in the RESTE survey was in French but nearly identical to the English text above. Row totals may not match 100% due to rounding

these tables refers to the gender of the survey respondent.

In both datasets, majorities rate their health status as either “fair” or “good”. Respondents in the RESTE dataset from Chad were the most likely to rate their health status as “very good.” Men tend to report a better health profile in the TROSA data from Bangladesh than women, although other country-specific gender differences between categories are less clear-cut.

A majority of respondents in all the TROSA country samples reported that they are “moderately satisfied” with their lives as a whole these days (Table 9.6). In Bangladesh, women tend to rate their life satisfaction somewhat more highly than men, whereas in India men are somewhat more optimistic than women. Men and women in the Nepal sample report very similar levels of life satisfaction.

People responding to the RESTE baseline survey in Chad were largely positive about their own self-esteem: among both men and women, a majority either agreed or completely agreed with the statement ‘I consider myself to be a person with high self-esteem.’ (Table 9.7).

Turning now to resilience indicators, both datasets offer several indicators of absorptive resilience capacities (Table 9.8). In the TROSA surveys, respondents answered a set of three questions about the ability of their household to cope with a hypothetical heavy flood, both in general and in terms of financial recovery from such a shock. Among the TROSA baseline samples, flooding was the most commonly mentioned water related shock experienced in the past 5 years in Bangladesh and India. However, in Nepal drought was the most common water-related shock. The TROSA survey also asked how big of a problem a hypothetical flood would be in terms of drinking water loss, erosion, income loss, and crop loss. The data show that people responding were overall quite uniform in saying that such impacts from a flood would constitute a serious problem for them, meaning that the results to these questions display little statistical variation. Therefore, we do not include them in our model construction exercise. In the RESTE dataset, a similar general question about the ability of households to cope with extreme climate-related events was asked. Examples of extreme climate-related events that have occurred

Table 9.6 Responses to the question “Overall, how satisfied are you with life as a whole these days?”

		Not at all satisfied (%)	Slightly satisfied (%)	Moderately satisfied (%)	Very satisfied (%)	Extremely satisfied (%)
Bangladesh	Men	6.3	12.6	55.3	20.4	5.3
	Women	0.5	3.5	64.9	26.2	5.0
India	Men	4.2	24.0	60.3	11.2	0.4
	Women	5.5	31.2	60.3	2.5	0.5
Nepal	Men	9.8	20.3	64.0	5.9	9.8
	Women	8.8	23.8	64.0	3.4	8.8

Source: Oxfam Novib Impact Measurement and Knowledge (2019a, b, c)

Note: Data from target group only. Variable not available in the RESTE baseline dataset. Row totals may not match 100% due to rounding

Table 9.7 Responses to the question: “To what extent do you agree or disagree with this statement: I consider myself to be a person with high self-esteem”

		Completely disagree (%)	Disagree (%)	Neither agree nor disagree (%)	Agree (%)	Completely agree (%)
Chad	Men	7.3	17.1	13.8	51.2	10.6
	Women	6.1	11.1	19.3	48.7	14.8

Source: Oxfam Novib Impact Measurement and Knowledge (2018)

Note: Data from target group only. Variable not available in the TROSA baseline datasets. Row totals may not match 100% due to rounding

Table 9.8 Resilience indicators in available datasets

	TROSA	RESTE
Absorptive	Household could cope with heavy flood Household could access financial resources needed to recover from a flood tomorrow	At this time, I feel that my household is capable of coping with the risks of extreme climactic events.
Adaptive	Household could adapt to increased flooding over next 5 years	Percentage of households who can access and use climate information for decision-making
Transformative	Do you feel that people like yourself can generally change things in your community? Do you participate regularly in CBO meetings?	Do you feel that people like yourself can generally change things in your community? Have you personally participated in decision-making at the community level in the past 12 months?

Source: Oxfam Novib Impact Measurement and Knowledge (2019a, b, c)

in the intervention zone in recent years include drought, flooding due to sudden rains, and changing climate patterns that affect agricultural planting and harvesting decisions (Oxfam Novib Impact Measurement and Knowledge 2018, 2019a).

For adaptive resilience capacities, people interviewed were also asked if they thought their household could adapt to increased flooding over the next 5 years. No similar question was asked in the RESTE survey. Other aspects of developing adaptive resilience capacities, such as diversifying the types of crops grown by farming households, or the number of revenue-generating

activities reported by all households, will be measured by the change in these indicators over the course of the project.

For transformational resilience capacities, both surveys included a question about whether people feel that it is possible for people like them to change things in their community. The RESTE project survey featured a number of other indicators tied to transformative resilience capacities, such as access of women and youth to productive resources like land and farming equipment and access to conflict resolution mechanisms within communities. However, the focus here is on the more general question about

whether people feel they can make a change in their community if they wish to as well as the percentage of people indicating that they have participated in decision-making at the community level in the past 12 months. In the TROSA baseline survey, comparable questions were asked about participation in community institutions such as community-based organizations (CBOs).

There is considerable variation in how people answered these questions both within and across datasets. For example, Table 9.9 below shows survey results for questions about absorptive and adaptive resilience capacity in the TROSA dataset.

Answers to this question, a proxy for absorptive resilience capacity, show a considerable geographic split between the Bangladesh and Nepal samples. People responding in Bangladesh are more pessimistic about their households' ability to recover from a flood, while people responding in the India sample are somewhat more optimistic that they would be able to draw on the support they would need to recover. In the Bangladesh sample, men are more pessimistic than women, with 45% of men saying they 'strongly disagree' with this statement, compared to 22% of women.

Answers to this question, which is the proxy for absorptive resilience identified in the RESTE dataset from Chad, suggest that men and women tend to agree that their household is capable of coping with the risks of extreme climate-related events, although for both men and women 'neither agree nor disagree' is the second most-common response (Table 9.10).

Here, results from the TROSA Bangladesh and Nepal samples were more pessimistic than those from the India sample about the ability to adapt if the rate and intensity of flooding was to increase over the next 5 years (Table 9.11). In India, nearly half of the respondents agreed or strongly agreed that they would be able to adapt to such a scenario. Notable gender differences are found only in Bangladesh, where men were more likely to strongly disagree to this statement (42%) than women (16%).

A similar pattern emerges in answers to this question about accessing financial resources to recover fully from a hypothetical flood

(Table 9.12). People responding in the Bangladesh and Nepal samples are much more pessimistic on this topic than in the India sample, with men in Bangladesh the most pessimistic of all.

This question represents the proxy for adaptive resilience available in the RESTE baseline dataset from Chad (Table 9.13). A strong majority of both men and women report that they make use of forecasts about seasonal and climactic change for making agricultural decisions. Note that this question was only asked of the subset of people responding who indicated that they had access to this kind of information, which is only 14% of the target group (Oxfam Novib Impact Measurement and Knowledge 2018).

This question, a proxy for transformative resilience capacity available in both datasets, suggests considerable variation in perceptions of how hard or easy it is to make a change in one's community (Table 9.14). People responding in Bangladesh and Chad are most likely to be negative, though in all samples responses are registered in each of the five answer categories.

Answers to this question, another proxy for transformative resilience capacity in the TROSA dataset, give evidence that participation in meetings of community-based organizations is much more common in the Nepal sample than in the Bangladesh or India samples (Table 9.15). However, in all three samples, men are considerably more likely than women to report regular attendance at these meetings.

A similar pattern appears when examining this question from the RESTE dataset, suggesting that only a minority of people responding have personally participated in decision-making at the community level in the past year, but that men are much more likely to have done so than women (Table 9.16). For the available proxy indicators of transformative resilience capacity in both datasets, women are significantly less likely to be involved in organizations and processes that can help realize change in their communities.

Lastly, a set of co-variables is also included, which are expected to have an influence on QoL outcomes. In the TROSA dataset these include educational attainment (people who have

Table 9.9 Responses to the question “If heavy flooding was to occur in my area tomorrow, my household would be able to draw on support to ensure that we recover from the threats posed by the floods”

		Strongly disagree (%)	Disagree (%)	Neither agree nor disagree (%)	Agree (%)	Strongly agree (%)
Bangladesh	Men	45.2	43.2	10.2	1.5	0.0
	Women	21.8	62.4	15.4	0.5	0.0
India	Men	7.0	44.6	7.7	39.7	1.1
	Women	7.5	41.7	12.1	36.7	2.0
Nepal	Men	33.5	33.1	11.9	19.9	1.7
	Women	34.7	38.8	12.9	12.9	0.7

Source: Oxfam Novib Impact Measurement and Knowledge (2019a, b, c)

Note: Data from target group only. Variable not available in the RESTE baseline dataset. Row totals may not match 100% due to rounding

Table 9.10 Responses to the question “To what extent do you agree or disagree with this statement: At this moment, I consider that my household is capable of coping with the risks of extreme climate-related events”

		Completely disagree (%)	Disagree (%)	Neither agree nor disagree (%)	Agree (%)	Completely agree (%)
Chad	Men	8.9	14.6	23.6	39.0	13.8
	Women	9.9	17.4	24.7	37.9	10.3

Source: Oxfam Novib Impact Measurement and Knowledge (2018)

Note: Data from target group only. Variable not available in the TROSA baseline datasets. Row totals may not match 100% due to rounding

Table 9.11 Responses to the question “If the rate and intensity of flooding was to increase significantly in the next 5 years, my household would have the ability to successfully adapt to the changing threats posed by the floods”

		Strongly disagree (%)	Disagree (%)	Neither agree nor disagree (%)	Agree (%)	Strongly agree (%)
Bangladesh	Men	42.2	41.3	10.2	5.8	0.5
	Women	16.3	54.0	23.8	5.5	0.5
India	Men	8.0	33.1	10.8	46.0	2.1
	Women	3.5	32.7	12.7	48.2	3.0
Nepal	Men	37.7	28.0	13.7	18.2	2.5
	Women	35.4	36.7	15.7	11.6	0.7

Source: Oxfam Novib Impact Measurement and Knowledge (2019a, b, c)

Note: Data from target group only. Variable not available in the RESTE baseline dataset. Row totals may not match 100% due to rounding

Table 9.12 Responses to the question “If heavy flooding was to occur in my area tomorrow, my household would have access to sufficient financial resources to ensure that we fully recover from the threats posed by the floods”

		Strongly disagree (%)	Disagree (%)	Neither agree nor disagree (%)	Agree (%)	Strongly agree (%)
Bangladesh	Men	44.2	40.8	11.2	2.9	2.0
	Women	17.8	52.5	24.3	5.0	0.5
India	Men	5.2	39.7	8.4	45.3	1.4
	Women	5.0	42.2	13.6	37.3	2.0
Nepal	Men	34.3	30.5	14.0	19.2	2.1
	Women	38.1	29.9	15.7	15.7	0.7

Source: Oxfam Novib Impact Measurement and Knowledge (2019a, b, c)

Note: Data from target group only. Variable not available in the RESTE baseline dataset. Row totals may not match 100% due to rounding

Table 9.13 Responses to the question “Do you use seasonal (climatic) forecasts for making agricultural decisions?”

		No (%)	Yes (%)
Chad	Men	31.8	68.2
	Women	25.4	74.6

Source: Oxfam Novib Impact Measurement and Knowledge (2018)

Note: Data from target group only. Variable not available in the TROSA baseline datasets. Row totals may not match 100% due to rounding

Table 9.14 Responses to the question “Do you feel that people like yourself can generally change things in your community if you want to?”

		No not at all (%)	Yes but with great difficulty (%)	Yes but with some difficulty (%)	Yes, fairly easily (%)	Yes, very easily (%)
Bangladesh	Men	35.4	25.7	20.4	15.5	2.9
	Women	37.6	29.2	23.8	9.4	0.0
Chad	Men	22.8	39.0	23.6	13.0	1.6
	Women	36.9	32.2	18.0	11.4	1.6
India	Men	10.1	43.9	27.5	14.6	3.8
	Women	19.1	40.2	27.1	11.1	2.5
Nepal	Men	16.1	60.2	19.9	3.0	0.9
	Women	13.6	60.5	21.1	3.4	1.4

Source: Oxfam Novib Impact Measurement and Knowledge (2018, 2019a, b, c)

Note: Data from target group only, original question in the RESTE survey was in French but nearly identical to the English text above. Row totals may not match 100% due to rounding

Table 9.15 Responses to the question “Do you regularly attend meetings of this group: Community-Based Organizations?”

		No (%)	Yes (%)
Bangladesh	Men	81.6	18.5
	Women	99.0	1.0
India	Men	71.4	28.6
	Women	79.4	20.6
Nepal	Men	39.8	60.2
	Women	59.7	40.1

Source: Oxfam Novib Impact Measurement and Knowledge (2019a, b, c)

Note: Data from target group only. Variable not available in the RESTE baseline dataset. Row totals may not match 100% due to rounding

Table 9.16 Responses to the question “Have you personally participated in decision making at the community levels in the past 12 months?”

		No (%)	Yes (%)
Chad	Men	61.8	38.2
	Women	82.5	17.6

Source: RESTE only

Note: Data from target group only. Variable not available in the TROSA baseline datasets. Row totals may not match 100% due to rounding

completed primary education only, or secondary or higher, with those with no formal education as the reference category), the number of income sources of the household, marital status of

respondent (married as compared to unmarried), gender of respondents (female as compared to male), age of respondent (in years) and the project country (with Nepal as a the reference category).

Similar co-variables are used analysis with the RESTE dataset. Educational attainment is measured categorically (respondents who have completed Koranic education only, basic or primary schooling, or secondary or superior education, with those with no formal education as the reference category), and then the number of household income sources, marital status of household head (married as compared to unmarried), and gender and age measured comparably to in the TROSA dataset. Since the RESTE project data is only from Chad, there are no country variables as in the dataset.

9.5 Methods and Results

9.5.1 Analytical Approach

QoL outcomes are measured using five-point Likert response scales and as such are commonly considered to be ordinal. Ordered logistic regression, first described by McCullagh (1980), is designed to help predict outcomes of this sort. However, use of these models is contingent on ensuring that a number of key assumptions are met, including the assumption of proportional odds (parallel regression), which holds that the statistical relationship between all pairs of outcome groups should be the same. Exploratory testing with our data suggested that most of our models fail to meet this critical assumption.

Therefore, we look instead to linear methods for model construction. Use of linear models with ordinal data is subject to some discussion but the case has been made that this can be acceptable practice, also considering that in many cases, model results differ little whether linear or ordinal methods are used (Pasta 2009). The fundamental assumption inherent in this approach is that response categories in the dependent variable are “evenly-spaced”, meaning that the people answering the question understand each step of the response scale to be an equal distance between the extremes of “very satisfied” and “very unsatisfied”, to cite one commonly-used response scale (Long and Freese 2006). This assumption holds when there are no outliers in the response

categories such as “completely” or “not at all” (De Jonge et al. 2015). In the datasets no outlier response categories are used, therefore, we see no reason to reject this assumption. Moreover, because our primary interest is in the direction and significance of our independent variables, not effect sizes, we proceed with linear Ordinary Least Squares (OLS) regression models.

Models below are presented separately for those estimates with the TROSA and RESTE baseline data. This is to respect the differences in sampling and survey design between the two projects, and also because the available covariates differ somewhat between both datasets. In order to take advantage of the largest sample size available, we use data from both the treatment and comparison groups in both studies for model estimation.

9.5.2 Results

Our first models use self-reported health status as the dependent, or outcome, variable. Each group of models uses the same dependent variable, but we feature one proxy of resilience capacity at a time in each individual model. So, in Table 9.17 below, OLS model 1 includes *Resilience—cope with heavy flood*, model 2, *Resilience—cope financial resources*, etc. Table 9.17 below summarizes results of these models constructed with data from the TROSA baselines.

Some immediate trends emerge from the regression results in Table 9.17 above. The first is that all five resilience concepts appear to have a statistically significant association with the QoL outcome of health status. However, the direction of this relationship diverges depending on the type of resilience capacity. Proxies for absorptive and adaptive capacity, used in models 1–3, demonstrate a negative association with self-reported health status, suggesting that higher resilience capacities are associated with *lower* self-reported health, after holding other factors constant. However, proxies for transformative resilience capacities, in models 4 and 5, illustrate a significant and positive relationship between greater faith that people can change things in their

Table 9.17 Models for QoL outcome ‘self-reported overall health status’

	OLS model				
	1	2	3	4	5
Resilience—Cope with heavy flood	−0.062 (0.015)***				
Resilience—Cope financial resources		−0.040 (0.015) **			
Resilience—Adapt to increased flooding			−0.037 (0.015)**		
Resilience—People can make a change				0.105 (0.016)***	
Resilience—Participate CBO meetings					0.081 (0.034) **
Education—Primary only	0.055 (0.033)*	0.055 (0.33)*	0.057 (0.033)*	0.038 (0.033)	0.052 (0.33)
Education—Secondary or higher	0.146 (0.039)***	0.144 (0.39) ***	0.147 (0.039)***	0.108 (0.038)**	0.138 (0.039) ***
Number income sources	−0.040 (0.023)*	−0.032 (0.023)	−0.034 (0.023)	−0.028 (0.023)	−0.029 (0.023)
Marital status	0.017 (0.049)	0.016 (0.049)	0.016 (0.049)	0.017 (0.048)	0.018 (0.049)
Gender—female	−0.073 (0.029) **	−0.070 (0.029) **	−0.073 (0.029)*	−0.063 (0.028)**	−0.065 (0.029) **
Age (in years)	−0.010 (0.001) ***	−0.010 (0.001) ***	−0.010 (0.001)***	−0.010 (0.001)***	−0.010 (0.001) ***
Country—India	0.090 (0.033)**	0.090 (0.035) **	0.083 (0.034)**	0.039 (0.033)	0.071 (0.034) **
Country—Bangladesh	0.313 (0.044) ***	0.334 (0.043) ***	0.332 (0.044)***	0.371 (0.043)***	0.343 (0.044) ***
Constant	3.69 (0.089)***	3.62 (0.087) ***	3.62 (0.088)***	3.31 (0.084)***	3.49 (0.078) ***
R-squared	0.097	0.093	0.093	0.109	0.092
Observations	2620				

Source: Estimated with data from the TROSA baselines

Note: Robust standard errors are reported in parentheses

*, **, *** indicates significance at the 90%, 95%, and 99% level, respectively

community (model 4) or regular participation in CBO meetings (model 5) and better QoL outcomes.

Otherwise, we also observe a clear trend where women have significantly lower self-reported health status than men when other factors, including resilience capacities, are controlled for. Consistently positive associations between higher

educational attainment and health status, and negative associations between age and health status, are both consistent with theory and the findings of other researchers (see for example, Marmot 2005). The diversity of household income sources and marital status (being currently married) are generally not significant determinants of health status in these models. Significant coefficients

for the India and Bangladesh samples suggest that on average health status is higher in those country-samples than in Nepal, after controlling for other factors.

In all the models above for life satisfaction, resilience capacities all have a positive association with the QoL outcome, even if only significant at the 90% level (Table 9.18). However, as with the models for health status, the significance and strength of the association between transformative resilience capacities and QoL are rather more pronounced than those for absorptive and adaptive resilience, although the coefficients are all relatively small and the explanatory power of the models (the R-squared) quite low. One notable trend in the models in Table 9.18 above are that gender is *not* a significant determinant of life satisfaction after controlling for other factors. This is in contrast to the models for health status, in which women had significantly lower health status as compared to men, after controlling for other variables included in the model.

We turn now to models estimated with the RESTE baseline data. Table 9.19 below shows results for four models with self-reported health status as the outcome variable.

Here we see a different pattern in the relationships between resilience capacities and QoL outcomes, as compared to the TROSA models. The proxy for absorptive capacity, in model 11, suggests a positive and significant association with health status, after controlling for other factors. However, the proxy for adaptive capacity shows no significant association with health status. Among the two proxies for transformative resilience capacities, belief that people can make a difference in their community if they want to has no significant relationship to health status (model 13) although actually having taken part in community decision-making in the past 12 months does have a positive and significant association (model 14). Among other variables, higher educational attainment is consistently associated with better health status. The number of household income sources has no significant relationship with health status in any of the models, nor does marital status of the household head. Gender however is significant across the

board, with women reporting somewhat better average health than men after controlling for other factors in the model.

Table 9.20 above displays results from models with self-reported self-esteem as the outcome variable. Model results suggest a different set of dynamics than seen in other sets of models. Respondents with higher self-esteem tend to have higher absorptive and transformative resilience, and these results suggest that women also have higher average self-esteem than men, once other factors are controlled for. Having higher self-esteem is associated with being more highly educated in models 15 and 16, but not in models 17 and 18 which include proxy indicators of transformative resilience capacities. As in other models, marital status does not correlate with self-esteem. However, unlike in models shown previously, age does not have a significant relationship with the outcome in any of these models.

9.5.3 Limitations

In addition to the discussion above about applying linear methods with ordinal data, this statistical exploration is subject to some limitations. First, data from the TROSA and RESTE projects are from cross-sectional baseline studies and therefore represent only one point in time. This means that the data do not support analysis of trends over time, nor exploration of causal claims through comparison of changes between the treatment and comparison groups in these datasets. Model results have uniformly low R-squared statistics, suggesting that these models can account for only a relatively small proportion of variance in the outcome variables.

Sampling in the TROSA and RESTE projects was designed at the project level. Sampling is intentionally structured based on the criteria for inclusion in the projects themselves. This means that data based on these samples are generalizable only to the populations targeted for inclusion in the project (target group) and populations that resemble them in terms of geography, socio-economic characteristics and demographics

Table 9.18 Models for QoL outcome ‘self-reported life satisfaction’

	OLS model				
	6	7	8	9	10
Resilience—Cope with heavy flood	0.026 (0.015)*				
Resilience—Cope financial resources		0.046 (0.016)**			
Resilience—Adapt to increased flooding			0.029 (0.016)*		
Resilience—People can make a change				0.099 (0.016)***	
Resilience—Participate CBO meetings					0.100 (0.037)**
Education—Primary only	0.077 (0.035)**	0.080 (0.035)**	0.077 (0.035)**	0.056 (0.035)	0.067 (0.035)*
Education—Secondary or higher	0.204 (0.037)***	0.204 (0.037)***	0.202 (0.037)***	0.171 (0.037)***	0.197 (0.038)***
Number income sources	0.032 (0.024)	0.034 (0.024)	0.033 (0.024)	0.023 (0.023)	0.022 (0.023)
Marital status	0.079 (0.053)	0.076 (0.053)	0.078 (0.053)	0.086 (0.053)	0.089 (0.054)*
Gender—female	−0.000 (0.030)	−0.005 (0.030)	−0.000 (0.030)	0.009 (0.030)	0.009 (0.030)
Age	−0.004 (0.001)**	−0.004 (0.001)**	−0.004 (0.001)**	−0.004 (0.001)***	−0.004 (0.001)**
Country—India	0.204 (0.036)***	0.182 (0.037)***	0.199 (0.037)***	0.195 (0.036)***	0.230 (0.036)***
Country—Bangladesh	0.578 (0.046)***	0.583 (0.45)***	0.578 (0.045)***	0.580 (0.045)***	0.588 (0.046)***
Constant	2.45 (0.095)***	2.40 (0.094)***	2.45 (0.095)***	2.32 (0.089)***	2.49 (0.084)***
R-squared	0.097	0.099	0.097	0.110	0.098
Observations	2620				

Source: Estimated with data from the TROSA baselines

Note: Robust standard errors are reported in parentheses

*, **, *** indicates significance at the 90%, 95%, and 99% level, respectively

(comparison groups). Results are not generalizable beyond these specific groups.

Lastly, survey questions on resilience and QoL concepts may have in practice varied slightly between the different studies because of the considerable differences in local contexts across them. Differences in local language-translation, or local interpretation of the questions themselves, may have an influence on the results.

9.6 Discussion

In the previous section we have introduced 18 regression models to test the hypothesis that

people with more expanded resilience capacities should also have better QoL outcomes such as better health status, greater life satisfaction and higher self-esteem. In this section, we summarize findings from these multiple models and propose some conclusions, beginning with a discussion of the results observed across all models for key independent variables.

Absorptive Resilience Capacities Proxies of absorptive resilience capabilities in the TROSA dataset include agreement that a household could cope with a heavy flood and agreement that a household could access the financial resources needed to recover from a flood if one were to

Table 9.19 Models for QoL outcome ‘self-reported overall health status’

	OLS model			
	11	12	13	14
Resilience—Cope with extreme climate events	0.094 (0.022)***			
Resilience—Use climate information for decision-making		-0.047 (0.114)		
Resilience—People can make a change			0.013 (0.023)	
Resilience—Participated in community decision-making				0.233 (0.062)***
Education—Koranic only	0.071 (0.049)	0.176 (0.097)*	0.070 (0.051)	0.056 (0.049)
Education—Basic or primary schooling	0.242 (0.064)***	0.434 (0.165)**	0.222 (0.067)**	0.216 (0.065)**
Education—secondary or superior education	0.331 (0.113)**	0.337 (0.149)**	0.331 (0.116)**	0.307 (0.111)**
Number income sources	0.044 (0.027)	-0.003 (0.080)	0.034 (0.028)	0.019 (0.028)
Marital status	0.036 (0.063)	-0.084 (0.131)	0.049 (0.063)	0.055 (0.062)
Gender—female	0.105 (0.062)*	0.288 (0.129)**	0.105 (0.063)*	0.149 (0.063)**
Age	-0.004 (0.002)**	-0.002 (0.005)	-0.005 (0.002)**	-0.005 (0.002)**
Constant	3.36 (0.160)***	3.69 (0.292)***	3.66 (0.143)***	3.65 (0.136)***
R-squared	0.044	0.068	0.027	0.039
Observations	1327	201	1327	1327

Source: Estimates with data from the RESTE baseline

Note: Robust standard errors are reported in parentheses

*, **, *** indicates significance at the 90%, 95%, and 99% level, respectively

occur in the near future. In the RESTE dataset, the variable measures belief that a household is capable of coping with the risks of extreme climactic events, such as drought or periodic flooding. In the TROSA dataset, both proxy indicators show a significant but *negative* association with health status, after controlling for other factors. This suggests that people who feel better prepared to cope with heavy flooding or recover from a future flood are actually *less* likely to rate their health status highly. However, models estimated for life satisfaction suggest that respondents with better absorptive resilience capacities tend to have a higher health status, consistent with our hypothesis. However, results from exploring similar questions with data from the RESTE baseline point to different conclusions. For example, the proxy for absorptive resilience capacity has a

significant and positive association with both health status and self-esteem, after controlling for other factors in the models. It is not immediately clear what might lead higher absorptive capacity to associate with lower health status in one dataset but higher health status in another, although this may be an interesting topic for future research.

Adaptive Resilience Capacities Available proxies for adaptive resilience capabilities include the level of agreement that households could adapt to increased flooding over the coming 5 years (TROSA) and use of weather information for decisions about agricultural practices (RESTE). Results suggest that respondents with expanded adaptive resilience capacities tend to have lower self-reported health status but higher life

Table 9.20 Models for QoL outcome ‘self-reported self-esteem’

	OLS model			
	15	16	17	18
Resilience—Cope with extreme climate events	0.484 (0.029)***			
Resilience—Use climate information for decision-making		−0.071 (0.129)		
Resilience—People can make a change			0.188 (0.030)***	
Resilience—Participated in community decision-making				0.303 (0.076)***
Education—Koranic only	0.042 (0.057)	0.289 (0.134)**	−0.007 (0.068)	0.040 (0.066)
Education—Basic or primary schooling	0.179 (0.077)**	0.078 (0.230)	0.012 (0.088)	0.089 (0.086)
Education—secondary or superior education	0.170 (0.102)*	0.595 (0.177)**	0.100 (0.126)	0.164 (0.128)
Number income sources	0.070 (0.035)**	0.254 (0.106)**	0.005 (0.038)	0.002 (0.039)
Marital status	0.026 (0.074)	0.018 (0.160)	0.088 (0.080)	0.105 (0.081)
Gender—female	0.135 (0.073)*	0.293 (0.176)*	0.138 (0.082)*	0.189 (0.084)**
Age	−0.001 (0.002)	0.002 (0.005)	−0.003 (0.002)	−0.003 (0.002)
Constant	1.72 (0.190)***	3.00 (0.352)***	3.03 (0.177)***	3.30 (0.171)***
R-squared	0.261	0.076	0.042	0.019
Observations	1327	201	1327	1327

Source: Estimated with data from the RESTE baseline

Note: Robust standard errors are reported in parentheses

*, **, *** indicates significance at the 90%, 95%, and 99% level, respectively

satisfaction (significant at the 90% level) in the TROSA dataset. However, in the RESTE models, the proxy for adaptive resilience capacity has no significant statistical association with health status or self-esteem. This divergence may be driven at least in part by the question in the TROSA baseline being phrased as a hypothetical, whereas the question in the RESTE dataset is about actual practice. There is then no clear pattern between adaptive resilience capacities and QoL outcomes in the models presented.

Transformative Resilience Capacities Results of nearly all models presented suggest that respondents with expanded transformative resilience capacities also report better health, greater life satisfaction and higher self-esteem. The belief

that people can make a change in their communities if they want to, and participation in local decision-making processes, have a positive and significant association with better quality of life outcomes examined in our models. In only one instance (model 13) is a proxy of transformative resilience *not* a significant predictor of a QoL outcome. Otherwise the trend is clear across the other models. This suggests that believing that it is possible to make a change and making an effort to participate in that change either through participating in CBO meetings (TROSA) or community-level decision-making (RESTE), is significantly associated with better QoL outcomes used in our models, even after holding important factors like educational attainment, marital status, gender, and age constant.

Educational Attainment Educational attainment, especially at secondary or higher levels, is positively and significantly associated with QoL outcomes in almost all models. The strong link between educational attainment and health status, and indeed the role of education as an important social determinant of health, is well-documented in the literature (Marmot 2005). Higher educational attainment also demonstrates a positive and significant association with life satisfaction in all models. The exceptions are in models 15–18 which explore the determinants of self-esteem in the RESTE dataset. In these models, higher educational achievement is not consistently associated with higher self-esteem, suggesting that the link between education and self-esteem is not as clear-cut as the relationship between the other QoL outcomes.

Number of Income Sources Contrary to our expectations, in only two of our models is the number of income sources for the respondent's household associated with any of our outcomes, significant at the 95% level (models 15 and 16, from the RESTE dataset with self-esteem as the outcome of interest). Our findings suggest that a more nuanced understanding of the interaction between income diversity and resilience is prudent. This is supported in some literature that suggests that livelihood diversity has complex and at times contradictory interactions with poverty and other concepts related to resilience and QoL. (see for example MercyCorps 2013, evaluating a program focused on building resilience to food insecurity in Somalia, and Ellis 1999). New income sources may simply earn the household less than activities the household has engaged in for longer, especially when a large number of households take up the same new activity at the same time, lowering prices though an increase in supply (Fuller and Lain 2015).

Marital Status Marital status, though hypothesized to have some bearing on QoL outcomes modeled, was not a significant independent variable in any of the models. This means

that no relation between marital status and QoL indicators has been found.

Gender Gender, specifically whether the respondent self-identifies as female, is a significant predictor of QoL outcomes in many models presented. However, gender works quite differently across the models, depending both on the dataset and the QoL outcome in question. For example, in the models for health status using TROSA baseline data, average health status is significantly lower among women than among male respondents, after controlling for other factors. However, in similar models for health status estimated with the RESTE baseline data, being female is associated with somewhat *higher* average health status as compared to male respondents. And, when considering the determinants of self-esteem with the RESTE baseline data, women have somewhat better outcomes than men, net other factors (although we note the significance of the gender variable in models 15–17 is only at the 90% level).

Age Age of respondent generally showed a negative association with QoL outcomes such as health status and life satisfaction in both projects, meaning younger people report higher QoL outcomes. Age was not significant at all in the models for self-esteem estimated with data from the RESTE baseline.

9.6.1 Conclusions

QoL matters for poor people living in poor countries, and for development organizations seeking to strengthen their resilience to climate change and achieve sustainable development. QoL outcomes vary considerably across four diverse socio-spatial contexts in the datasets applied in this research. Furthermore, our models suggest that there is a statistical association between expanded resilience capacities and better QoL outcomes. The clearest of these trends is the positive relationship between indicators of

transformational resilience capacities and better quality of life.

The results of our model further suggest that factors such as educational attainment, and the gender and age of the survey respondent tend to have statistically significant associations with QoL outcomes, although not always in the direction hypothesized. Educational attainment, especially at secondary or higher levels, correlated with better outcomes on most of our QoL measures as expected. However, contrary to our expectations, the number of household income sources is rarely a significant determinant of QoL, after controlling for other factors. Gender is a significant factor in nearly all of our models although the associations between respondent gender and QoL vary depending on the outcome and the dataset. Strong local gender norms and location-specific gender contexts may be driving these divergent results. Lastly, the age of the respondent generally shows a negative association with QoL outcomes health status and life satisfaction. This is in line with expectations for self-reported health-status, which tends to decline with age, though not necessarily for overall life satisfaction.

9.6.2 Relevance of the Findings for Development Practitioners

Our findings indicate that expanded resilience capacities do have an association with indicators like health status, life satisfaction and self-esteem, after controlling for a number of related variables and across widely differing socio-spatial contexts. For development experts, this suggests that efforts to build the resilience capacities of poor people and poor communities have the potential to help improve overall quality of life. Further, results suggest that the associations between transformational resilience capacities—belief that people can make a change in their communities, and their participation in decision-making to help bring this about—and QoL are among the clearest and most consistent in the models presented. This underlines the need to support the agency and voice of poor

communities to influence local government decision-making. Efforts to help build the practical absorptive and adaptive resilience capacities are both necessary and valuable, but more efforts should be put towards building the political capability of people and communities to transform the power structures in their communities and governments.

Our finding that average self-reported health status and life satisfaction tend to decrease with the age of respondents across our datasets suggests that development practitioners should focus both on the challenges facing older adults, while also recognizing and building on the strengths and capacities of youth and young people. In the RESTE project especially, youth are thought to be particularly disadvantaged and thus a focus demographic of the project. Our results suggest that young people also have some important assets of their own that should be better recognized and leveraged for sustainable development progress.

Our models suggest only a weak and inconsistent link between the number of income sources and QoL outcomes. In both the TROSA and RESTE projects, increasing the diversity of revenue-generating activities is seen as a means to expanding resilience capacities and achieving longer-term QoL outcomes. Our results suggest that there is more to this than simply adding new income sources to the mix. Careful attention should also be paid to the adequacy, durability and sustainability of income sources, as well as the implications of income-generating activities for challenging existing social norms around work and gender and age.

Lastly, gender is a central factor in development work and significant factor in most models. However, our results suggest that the relationship between gender and QoL outcomes varies considerably depending on the outcome in question and the socio-spatial context. We find that women score significantly lower on health status in the TROSA project countries, whereas in the RESTE project women score significantly higher on both measures. This underlines the importance for development practitioners of digging into the nuances of how issues affect women and men

differently per specific context when designing and implementing programs. As this data suggests, this includes recognizing that whilst in many contexts women may be the most affected, in some circumstances it is men and boys who are exposed to different factors that can negatively impact their QoL and should thus be specifically targeted. Both are critical pieces of achieving gender justice, and empowering poor people and communities to build resilience to climate change and realize a better quality of life.

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Sustainable Latin American Cities? Evaluation of the Sustainability of the City of Puebla (Mexico) Using Indicators

10

Laura Zulaica, Emilia Lara Galindo, and Ángel David Flores Domínguez

10.1 Introduction

A large number of cities around the world face serious challenges in the management of rapid urbanization: from guaranteeing adequate housing and infrastructure to mitigating the environmental impact of urban expansion and reducing disasters vulnerability (United Nations 2018).

Latin America plus the Caribbean is the second most urbanized region on the planet, 80% of its population living in cities with urbanization processes that reach an unprecedented speed. The absence of urban planning that addresses such growth explains, at least in part, the loss of well-being of its inhabitants (Batres González et al. 2010) and the manifestation of environmental and territorial problems (Zulaica 2019).

In this context, it is interesting to consider the notion of sustainability in the analysis of current urban processes that tend to aggravate problems such as pollution, inadequate distribution of essential services or socio-spatial segregation (Echebarría Miguel and Aguado Moralejo 2003). Development sustainability and its inherent link with the urban environment is an issue that already has at least four decades of systematic propagation and growing prominence, especially given for the future, its challenges imposed by global change and local environmental quality (Cooper and Henríquez 2010).

As a result, these countries have defined various schemes to mitigate the effects of such processes and improve the sustainability of their urbanization. Within this framework, Latin American cities in general, and Mexican cities in particular, face numerous urban and environmental problems that, aggravated by the lack of adequate planning, affect the quality of life of its inhabitants. Achieving the sustainability of Latin American cities is a major challenge to reach the Sustainable Development Goals (SDGs) proposed at the United Nations (UN) Summit in 2015. At that Summit, UN Member States approved the 2030 Agenda for Sustainable Development aimed at reducing poverty, fighting inequality and injustice, and tackling climate change. According to Wood et al. (2018), these goals are the most pressing challenges of our time, so that understanding their interactions can

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help prioritize effective and efficient policy options; hence the importance of measuring goals of progress towards sustainable development (Reyers et al. 2017). In particular, Goal 11 proposes to make cities and human settlements inclusive, safe, resilient and sustainable.

10.1.1 Sustainable Development Goals and Quality of Life

The SDGs in general and Goal 11 in particular involve different dimensions of quality of life in cities. Tonon (2010) argues that the concept of quality of life has come a long way before been reconceptualized, considering well-being not only as dependent on material issues, but also on human values; that is, a notion including objective as well as subjective levels. Velázquez (2001) defines quality of life as a measure of achievement with respect to a level set as optimal, taking into account socio-economic and environmental dimensions dependent on the scale of values prevailing in society and varying according to the expectations of its historic progress. From this perspective, the notion comprises first, the material basis on which life develops; secondly, the natural and built environment in which the human being develops; and ultimately, all the relationships that derive from the activities carried out: work and other kinds of socio-political and cultural relations (Lucero 2008). The concept integrates at least three subjective dimensions: social welfare (Estes 1999), subjective welfare (Diener 1984; Branston 2002) and happiness (Veenhoven 2000). Casas (1996) conceptualizes quality of life as a function of the material environment and the psychosocial environment, proposing to deepen the knowledge of both the material conditions of life and the perceptions, assessments and aspirations of the people who accompany their personal and social well-being.

In this framework, the notion of sustainability assumes objective and subjective experiences of quality of life, and its evaluation acquires increasing recognition as a diagnostic tool to move towards the ecological, social, economic and political goals of sustainable development.

Among the main applications of sustainability assessment, Dizdaroglu (2015) highlights: (1) its contribution to strategic planning and decision-making for governments, international organizations and non-governmental organizations; (2) the information provided to analyze, evaluate and monitor impacts; (3) the ease of communicating the state of the environment and other specific topics; and 4) the ability to raise awareness about the problems of sustainable development.

10.1.2 Sustainability Assessment

There is a wide variety of tools to assess sustainability; among them indicators and indices that play a key role in diagnosing improvement towards sustainable development. Although it is an internationally accepted and disseminated concept, the most critical lines of thought indicate that it is loaded with a strong versatility and ambiguity (Reboratti 2000; Gallopin 2003), which discourages the analysis of specific situations and the design of intervention policies. To overcome these difficulties, several authors have made an effort to synthesize the characteristics that any sustainable development must contain, considering different dimensions that can be summarized as the following: ecological, economic, socio-cultural, and political (Guimarães 2003; Mori and Christodoulou 2012; Braulio-Gonzalo et al. 2015).

The efforts of national and international organizations to develop models of indicators and indices to judge and measure the dimensions of sustainable development received great stimulus following the adoption of Agenda 21 at the Earth Summit in 1992 (United Nations 1992). Chapter 40 of the Agenda specifically calls on international countries and governmental and non-governmental organizations to adopt sustainability indicators applicable to different areas and territorial scales (Kwatra et al. 2016).

At present, different countries have their own methodologies for measuring the current situation of cities from a multidimensional perspective, assuming diverse conceptions contained in the concept of sustainability. These include the

Prosperous Cities Initiative (ONU-Habitat 2016a), the Emerging and Sustainable Cities Initiative (BID 2012, 2014) and in Mexico specifically, the Sustainable Cities Index (Banco Nacional de México 2018).

10.1.3 Scopes of Existing Background

The above-mentioned background is of comparative importance among cities belonging to the same country and in the Latin American context, however they provide partial information to define action proposals aimed at reversing critical situations in cities whose territorial “contrasts” are significant. These contrasts are more intensely expressed in peri-urban areas derived from the process of city expansion. In addition, the global indicators obtained for cities, while responding to other more general objectives, tend to “blur” the particular conditions of these complex areas (Zulaica and Tomadoni 2015).

The results obtained by different proposals at the city level condition the analysis of the differences comprised in the territory, showing a “vacuum” of knowledge on which it is considered a priority to advance to define SDGs to the inner city.

In this context, the selection of indicators on an intra-urban scale and their integration into a synthetic index allow in a first phase to identify the most significant territorial differences and the most critical sectors on which to define lines of action and respond to the associated problems that affect the quality of life of the population.

10.1.4 Objectives and Scopes

Based on background studies and the review of the initiatives mentioned above, this chapter proposes to assess the urban and environmental sustainability of the City of Puebla (Mexico), on the intra-urban scale, in order to identify the territorial contrasts which are displayed in the quality of life of their inhabitants.

In this case, the dimensions considered are grounded on the Inter-American Development

Bank (IDB) model, which in 2011 launched the Emerging and Sustainable Cities Initiative (ESCI). This Initiative responds to the current reality of the intermediate cities of Latin America and the Caribbean which demand intervention strategies to reverse problems arising from the urbanization process. While the concept of a sustainable city is addressed from different perspectives (Williams 2010), ESCI defines a sustainable city as a city that offers its citizens good quality of life, minimizes its impact on the natural environment, and has a local government with sufficient fiscal and administrative capacity to carry out its urban functions with citizen participation.

On this basis, the BID (2012, 2014) argues that, in order to achieve sustainability in a city, at least three dimensions need to be analyzed: (1) environmental and climate change sustainability, (2) urban sustainability, and (3) governance and fiscal sustainability. To measure progress and setbacks of cities towards these objectives, it makes use of sustainability indicators. Based on the available and achievable information to be processed, starting from previous conceptualizations, the sustainability of the City of Puebla will be evaluated preliminarily considering indicators corresponding to the urban and environmental dimensions of the model.

In this first analysis on the sustainability of the City of Puebla, the political dimension was not considered, that is, the one related to fiscal and governmental aspects. The exclusion of this important dimension is due to the fact that there is no disaggregated base information available to deepen the sustainability assessment from this perspective. However, we consider that the two dimensions addressed constitute the reflection of political actions on the urban and environmental situation of the city.

10.2 The City of Puebla

The City of Puebla belongs to the fourth main metropolitan area of the National Metropolitan System (CONAPO 2010), and in 2010 it

concentrated 2,220,143 inhabitants, at 224 km² (INEGI 2010), although in 1970 it reached only to 532,000 inhabitants on an area of 23 km². Hernandez et al. (2009) emphasize that, to a large extent, this expansion is due to different processes such as economic concentration, agricultural crisis, population growth, migration, and more recently to real estate speculation.

In this research, based on a preceding study by the authors (Lara Galindo et al. 2018), the City of Puebla is defined by the integration of nine municipalities (basic political-administrative units) belonging to the federation entity of Puebla and Tlaxcala (Fig. 10.1). This delimitation

exceeds political-administrative limits due to a particular complexity derived from the discontinuous and dispersed growth presented by the Mexican city today (ONU-Habitat 2016b). This urban complex concentrates the 32% of the population of the states of Puebla and Tlaxcala together.

The state public administration has highlighted the national and international significance of the city as a center of industrial development and attraction for business and foreign direct investment, as well as having a significant number of higher education institutions (Gobierno de Puebla 2011). However, this development is accompanied by an accelerated urban expansion,

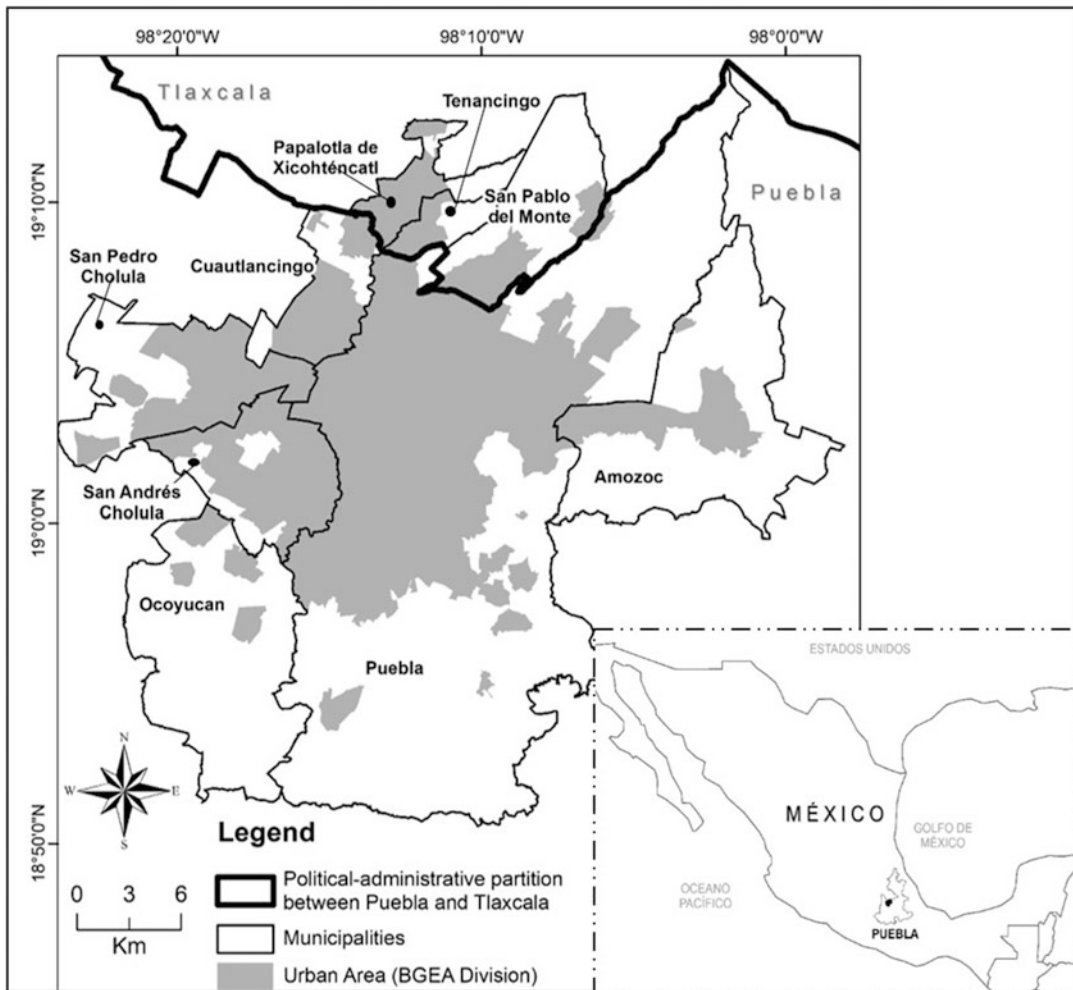


Fig. 10.1 Location of the City of Puebla, Puebla State, Mexico (Source: Own elaboration on the basis of the National Geostatistical Framework, INEGI 2010)

characteristic of cities where urban planning operations are limited (Valverde 2005).

The main economic sector is the tertiary sector, which mostly corresponds to trade (INEGI 2014). Though the existence of the primary sector is almost zero, much of the urban expansion has occurred in areas that were previously agricultural. In addition, the city has deficiencies in access to basic infrastructure and services such as drinking water, electricity, drainage, education, health, and shows population sectors in moderate and extreme poverty conditions (CONEVAL 2010).

10.3 Methodological Procedure

To achieve the expected objective, background examinations of the construction of indices and indicators applied to the study area were reviewed (ONU-Habitat 2016a, b; Banco Nacional de México 2018). Without ignoring the importance of the political dimension of sustainability, the applied methodology integrates some of the dimensions contained in the concept and redefined by the BID (2012, 2014). In this chapter, the emphasis is on urban and environmental dimensions. A synthetic index was built, the Sustainability Index (SI), which originates from the integration of the Urban Dimension of Urban Sustainability, composed of 15 indicators grouped into 6 topics, and the Environmental Dimension, defined by 4 indicators also belonging to 2 topics selected on the basis of the information available and achievable to be processed, which can be viewed in Table 10.1.

SI assesses objective aspects of urban and environmental sustainability based on quantitative indicators. The methodology used has its background in previous work carried out in Mar del Plata, Argentina (Tomadoni et al. 2014; Zulaica and Tomadoni 2015).

The unit of analysis used in this research is the Basic Geostatistical Area (BGEA¹), as shown in

Fig. 10.1. For the purposes of this study, data from the System for the Census Information Consultation (SCINCE) of the General Census of Population and Housing of 2010, prepared by the National Institute of Statistics and Geography (INEGI) of Mexico, was used. It should be mentioned that, each BGEA contains socioeconomic information and housing features.

Without ignoring the benefits of applying participatory and integrated models, this study assumes a technical approach as a starting point for advance in the research. From this approach, indicators are indispensable tools in the collection of information, planning, decision-making, implementation and evaluation of sustainable development policies (Singh et al. 2009; Moreno-Pires and Fidélis 2012).

10.3.1 Selecting Indicators

The assessment of sustainability presents difficulties in identifying and selecting the set of indicators that allow it to be measured (Fernández-Sánchez and Rodríguez-López 2010).

In this case, the selection of indicators that respond to the environmental dimension of sustainability consists of the following topics: water and sanitation and drainage. In the case of the urban dimension, it is integrated by the following topics: territorial order/housing conditions; urban inequity and health; mobility/physical accessibility; and employment.

The names of the comprised categories and their integrated indicators were adjusted according to the information available and likely to be distributed into BGEAs.

10.3.2 Indicators Standardization

In order to be able to compare the indicators used, it is necessary to define a common structure since

¹ An urban BGEA is a geographical area occupied by a set of blocks delimited by streets and whose land use is mainly housing, industrial, services, commercial. They are only

assigned to the interior of urban towns, i.e. those that have a population greater than or equal to 2500 inhabitants (INEGI 2010).

Table 10.1 Dimensions, topics, indicators and weight values (WV) considered

Topics		Indicators	WV
Environmental sustainability	Water	Inhabited private houses that have water in the area of housing (%)	0.15
		Occupants in private homes with access to water in the area of housing (%)	
	Sanitation and drainage	Inhabited private houses that have toilet or sanitary (%)	0.15
		Inhabited private houses that have drainage (%)	
Urban sustainability	Territorial planning—housing conditions	Inhabited private houses with earthen floor (%)	0.1
		Inhabited private houses that have electric light (%)	
		Inhabited private houses with more than 2.5 occupants per bedroom (%)	
		Inhabited private houses that have a refrigerator (%)	
	Urban inequity—health	Urban marginalization rate ^a	0.2
		Population entitled to health services (%)	
	Mobility—physical accessibility	Inhabited private houses that have a car or van (%)	0.1
	Employment	Occupied population ^b (%)	0.1
		Open unemployment rate (OUR)	
		Potential dependency index (PDI)	
	Connectivity	Inhabited private houses that own a computer (%)	0.1
		Inhabited private houses that own a cell phone (%)	
		Inhabited private houses that own internet (%)	
	Education	Population ages 6 to 11 who attend school (%)	0.1
		Illiterate population 15 years old and older (%)	
		Population age 25 and older with at least one passing degree in higher education (%)	

References: ^aObtained from CONAPO (2010); ^bThe Occupied Population Is Understood as Working-Age People Working on the Date the Survey Was Conducted

each indicator bears different classification systems and distinctive nomenclatures (Braulio-Gonzalo et al. 2015). This requires a standardization procedure.

Once the values for the different selected indicators were obtained, they were standardized so as to be transformed into dimensional units that allow making comparisons. In this case, the Omega Score technique was utilized (Buzai 2003; Buzai and Baxendale 2006).

This procedure transforms the indicators data into a measurement range between 0 (worst situation) and 1 (best situation), values corresponding to the minimum and maximum data, respectively.

The formulas used for standardization are presented below according to their positive or negative meaning:

- Indicators whose increase implies a relative worst situation:

$$SIV = (H - p)/(H - l) * WV$$

- Indicators whose increase implies a relative best situation:

$$SIV = (1 - (H - p)/(H - l)) * WV$$

where *SV*: standardized indicator value; *p*: original piece of information to be standardized; *H*: highest value of indicator; *l*: lowest value of indicator; and *WV*: weighted value of indicator.

Since some BGEAs display missing data, they were estimated by *Pearson* correlation between pairs of highly correlated indicators ($r^2 > 0.7$). Following previous studies, weights were established assuming a relatively equitable distribution among the sustainability issues considered, to achieve a total score of 1. The list of topics, indicators, and weight values is summarized in Table 10.1.

10.3.3 Construction of the Sustainability Index (SI) and Comparative Analysis of Spatial Distribution

The SI involves the summation of the results obtained by the topics that make up the dimensions in each of the spatial units. The development of indexes allows to simplify the information by facilitating the understanding and interpretation of the findings (King 2016).

Once the standardized values of both topics and SI were calculated, they were grouped into five intervals formed by Jenks' natural breaks method, using ArcGIS (10.2 version). The Jenks method minimizes variance within each interval and allows for better spatial differentiation. To facilitate the interpretation of the values, it was agreed that each interval would correspond to a category of SI: Very High, High, Medium, Low and Very Low. The results were quantitatively analyzed, and cartograms were used to analyze their spatial patterns.

10.4 Assessing Sustainability Through Indicators: Applications to the City of Puebla

As it was anticipated in relation to the assessment of the state of Mexican cities through indicators and indices, there are two key backgrounds developed under two distinct initiatives: the Urban Prosperity Index (ONU-Habitat 2016a) and the Sustainable Cities Index (Banco Nacional de México 2018). Mexican cities have also participated in the BDI's Emerging and Sustainable Cities Initiative (BID 2012, 2014), although the City of Puebla is not among them, even though it positions fourth in national ranking.

10.4.1 Prosperous Cities Initiative

According to the conceptualizations provided by the UN-Habitat Program, a prosperous city is one

that develops a good performance in the following six dimensions in a balanced style (ONU-Habitat 2016a): (1) being productive so that it contributes to economic growth, generates income, provides decent jobs and equal opportunities; (2) with sufficient and efficient infrastructure to provide adequate physical supports for mobility, productivity, interconnectivity and basic services to the population; (3) with a good quality of life that provides all citizens with adequate housing and decent basic services, facilitating equal access to social services, public goods and good environmental conditions; (4) being equitable and inclusive to ensure fair distribution and redistribution of the benefits of a prosperous city and to reduce the incidence of poverty and precarious settlements; (5) environmentally sustainable to protect the urban environment while ensuring growth through the sustainable use of natural resources; and (6) with a good governance that enables citizen participation, manages resources transparently, strengthens institutional capacities and makes regulated management more efficient.

This concept of prosperity can be assimilated to that of sustainability to the extent that its objectives cover the different dimensions contained in the concept, and the foreseen targets respond to the SDGs, especially Goal 11, as mentioned in the documents themselves.

In short, the methodology for building a Prosperous Cities Index involves measuring a set of indicators that integrate the six dimensions towards prosperity, which are associated to sustainability objectives: (1) productivity; (2) development infrastructure; (3) quality of life; (4) equity and social inclusion; (5) environmental sustainability; and (6) governance and urban legislation.

The proposed evaluation, following the fundamentals of the initiative's methodology, will identify opportunities and potential areas of intervention for cities to steer a pathway of prosperity (ONU-Habitat 2016a), a concept that is synthesized as a state of socio-economic satisfaction attached to the realization of other non-material conditions, which together provide comprehensive security to societies and

individuals, in the short, medium and long term (ONU 2012). With that horizon, the City Prosperity Index (CPI) created in 2012, at the initiative of the United Nations, is used to measure the current and future progress of cities.

This methodology, framed in the Initiative, is now applied in more than 300 cities around the world, and seeks to solve the inefficient, unsustainable and dysfunctional ways with which many cities of the last century were planned, guiding transformative changes in them through a practical framework for the formulation, implementation and follow-up of an Action Plan that integrates public policies and actions to increase their levels of prosperity (ONU-Habitat 2016a, b).

As stated in the documents, it is a holistic and integrated approach, essential for the promotion of the collective well-being and satisfaction of all. In this line, through a specific methodological and conceptual framework, the initiative provides governments with a tool (the CPI) that, through reliable information, will allow to design public impact interventions in the six dimensions it contains. Each of the dimensions includes sub-dimensions, and within them are incorporated specific measurable and comparable indicators.

According to ONU-Habitat (2016a, b), the CPI measurement in Mexico's 152 territorial demarcations (municipalities) shows an X-ray of the socio-spatial situation of its cities and urban agglomerations, offering support elements to analyze the processes that determine and condition urban development. In addition, the document highlights that the index provides a first approach to the evaluation of the public policies that the Government of Mexico has implemented in its various fields.

The results obtained for the total territorial demarcations involved indicate an average CPI value of 54.3, defining the factors of the State of Prosperity from a qualitative perspective as moderately weak. Whenever the analysis is carried out by dimensions, Infrastructure and Equity and Social Inclusion, they are the ones that present the best results, being 62.6 and 70.7 respectively. The Quality of Life dimension then has a slightly lower value (62.0), while Productivity and

Environmental Sustainability reach even lower values (57.3 and 46.7 respectively). For its part, Governance and Urban Legislation obtained the lowest valuation (37.9). In turn, the document highlights the existence of differentiations obtained within the dimensions in the values that make up the sub-dimensions, achieving poor values in the Communications Infrastructure, Economic Growth, Urbanization Governance and Energy.

By analyzing the CPI values corresponding to the Municipality of Puebla (Table 10.2) and comparing it with the overall results, it is observed that on the global prosperity scale it reaches a value just above that obtained for the whole of Mexico (55.5). This result shows that the factors affecting prosperity are moderately weak, so it is necessary to strengthen policies from a comprehensive perspective; in this regard, it is stated that it is necessary for Puebla to prioritize policies for the dimensions of environmental sustainability and governance and urban legislation and to consolidate infrastructure and quality of life policies.

Likewise, the CPI analyses results obtained at the level of two different territorial units: Municipality of Puebla and Urban Agglomeration (Fig. 10.2). In the case of urban agglomeration, the outcomes show more unfavorable conditions in the overall context (54.8), Infrastructure affecting with a fundamental impact on this result. However, the dimensions corresponding to Productivity, Inclusion and Social Equity and Environmental Sustainability show better conditions.

10.4.2 Sustainable Cities Index

The 17 Sustainable Development Goals adopted by the UN in 2015 include 169 targets and 231 indicators that make up the national and local government agenda for 2030.

In Mexico, the Sustainable Cities Index (SCI) was built from the alliance between a group of researchers from Banco Nacional de México, the Mario Molina Center (CMM), the Mexican Institute Competitiveness (IMCO) and the National Public Policy Laboratory (LNPP) of the Centre for Economic Research and Teaching (CIDE), responsible for coordinating the realization of

Table 10.2 CPI obtained for the set of territorial demarcations of Mexico and for the Municipality of Puebla

Dimensions and sub-dimensions	CPI Mexico	CPI municipality of Puebla
Productivity	57.3	58.4
Economic growth	36.2	37.5
Economic burden	60.6	57.7
Economic agglomeration	63.3	69.7
Employment	69.0	68.7
Infrastructure	62.6	68.4
Housing infrastructure	77.6	86.8
Social infrastructure	62.8	74.7
Communications infrastructure	35.1	36.2
Urban mobility	65.4	59.9
Urban form	72.4	84.1
Quality of life	62.0	66.8
Health	63.6	61.9
Education	81.6	88.9
Security and protection	57.2	69.0
Public space	45.5	47.5
Equity and social inclusion	70.7	61.3
Economic equity	47.3	43.3
Social inclusion	78.3	50.2
Gender inclusion	86.7	90.2
Environmental sustainability	46.7	57.9
Air quality	51.7	82.0
Waste disposal	73.4	91.7
Energy	15.1	0.00
Governance and urban legislation	37.9	30.7
Participation and accountability	48.8	43.9
Institutional capacity and municipal finance	49.1	48.2
Urbanization governance	15.6	0.00

Source: Own elaboration based on the ONU-Habitat (2016a, b)

the initiative. This initiative has been developed since 2013 and the Bank, based on the completed outcomes, invests resources in proposals with sustainability goals. Centered on this initiative, a sustainability diagnosis of the municipal and metropolitan level of the country is obtained.²

According to the report, Mexico's metropolitan areas represent the areas of greatest concentration of population and economic activity. In 2017, about 57% of the country's population lived in one of the 59 metropolitan areas delimited by the National Population Council (CONAPO); in 2015, metropolitan areas

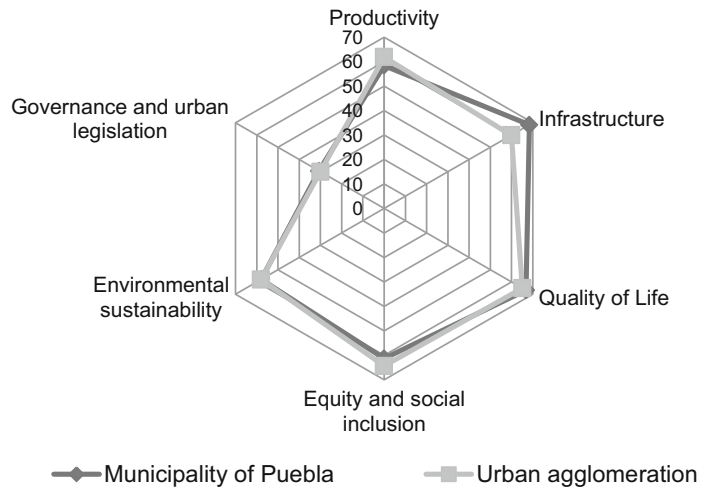
contributed approximately 76.4% of the national Gross Domestic Product (GDP). However, the document highlights that, at the same time, there are situations and processes that generate imbalances and problems involving situations of inequality, vulnerability and environmental impacts in metropolitan areas.

The objective of this Document is to contribute to the monitoring of the SDGs by building an updated index that measures the progress of Mexico's metropolitan areas towards meeting these SDGs, based on available indicators. The report includes 56 of the 59 metropolitan areas defined by CONAPO.³

² It should be noted that the study carried out does not constitute an official UN report, although it was prepared on the basis of the set of Objectives, Goals and Indicators (Banco Nacional de México 2018).

³ Acayucan, Tianguistenco and Teziutlán were not considered, as they lack the necessary information.

Fig. 10.2 CPI
Municipality of Puebla and
urban agglomeration
(Source: Own elaboration
based on the ONU-Habitat
2016a, b)



Methodologically, the index has a scale of 0–100 points, ranging from the worst to the best situation, respectively. It consists of 16 sub-indices associated with 16 of the 17 SDGs.⁴ A total of 107 social, economic and environmental indicators were measured, and the results of the metropolitan areas in each of these indicators were compared with a proposed optimal value.

According to the analysis carried out in this document, it is underlined that, on average, metropolitan areas show greater advances in SDGs 17 (alliances to achieve the objectives), 3 (health and well-being) and 1 (end of poverty); while less favorable averages of progress are linked to SDGs 9 (industry, innovation and infrastructure), 12 (responsible production and consumption), 15 (life of terrestrial ecosystems) and 10 (reduction of inequalities).

The results obtained for the Puebla-Tlaxcala metropolitan area are exposed in Fig. 10.3. The corresponding analysis makes it possible to consider that the index obtained for Puebla-Tlaxcala (49.7) is just above the average of the metropolitan areas evaluated (49.5), concentrating higher values especially in SDGs 11 (sustainable cities

and communities), 15 (life of terrestrial ecosystems) and 4 (quality education), while lower-than-average more significant values are observed for SDGs 1 (end of poverty), 6 (clean water and sanitation), 13 (climate action) and 16 (peace, justice and sound institutions).

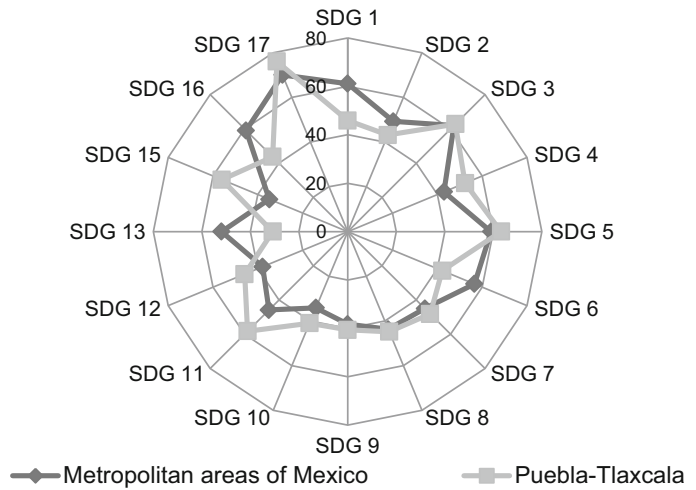
Based on the attained results, the methodology comprises the analysis of the progress made in SDG compliance targets in the average metropolitan areas studied. Grounded on the data of the indicators evaluated, a 12.5% of forecasted sustainability goals were found very far from achieving, focusing on SDGs 13 and 16. Far-off goals belong to the SDGs 1, 6, 8, 10 and 12, while goals achieved and in good progress were presented in SDGs 11 and 17. The targets present regular evolution for the remaining SDGs.

10.4.3 Emerging and Sustainable Cities Initiative

In response to the current reality of the intermediate cities of Latin America and the Caribbean, the Inter-American Development Bank (IDB) created the Emerging and Sustainable Cities Initiative (ESCI) in 2010. The aforementioned Initiative (ESCI) defines a sustainable city as one that offers a high quality of life to its inhabitants, minimizes impacts to the natural environment and has a local

⁴Objective 14 on Marine Life was not included in the study due to lack of information at this geographical level and because it did not allow comparability among the metropolitan areas of the country (Banco Nacional de México 2018).

Fig. 10.3 SCI by SDGs of the average metropolitan areas of Mexico and Puebla-Tlaxcala (Source: Own elaboration based on Banco Nacional de México 2018)



government with fiscal and administrative capacity to maintain its economic growth and to carry out urban functions, with citizen participation. From a multisectoral perspective, the Initiative supports cities in identifying priority interventions in three dimensions of sustainability: environmental, urban development, and fiscal and governance (BID 2016). According to official documents, the environmental dimension includes issues such as air and water quality, mitigation of greenhouse gas (GHG) emissions, adaptation to climate change, reduction of vulnerability to natural threats and the coverage of public services. The dimension of urban development considers the physical, economic and social aspects while the fiscal dimension and governance addresses the characteristics of good governability, including transparency, public participation and modern public management.

Between 2010 and 2011, ESCI developed a methodology of rapid application and diagnosis that made it easier for cities to formulate action plans, by identifying strategic interventions that contributed to the achievement of their sustainability goals in the short, medium and long terms (BID 2016). The diagnostic methodology of today’s cities comprises a battery of 127 indicators, distributed in 30 topics related to the three dimensions of this Initiative.

In 2017 there were 77 cities integrated into the Program both regularly and additionally (subsidized by other agencies), with the country of Mexico including 10 cities: La Paz, Xalapa, Campeche, Hermosillo, Lázaro Cárdenas, Tapachula, Chetumal, Coatzacoalcos, Salina Cruz and Toluca.

Puebla was not included in the cities considered above, however, some of the proposed indicators are applicable to the sustainability assessment.

10.5 Sustainability Index in the City of Puebla: Territorial Contrasts on the Intra-Urban Scale

The Sustainability Index (SI) values obtained for the City of Puebla ranged from 0.3 to 1.0. As indicated in the methodology, five intervals defined by natural breaks were considered, which were interpreted as sustainability categories. Each category groups a certain number of BGEAs shown in Table 10.3.⁵

Sustainability categories High and Very High concentrate 50% of the BGEAs of the City of

⁵ It should be noted that 1.2% of BGEAs (8) could not be classified because of the lack of information regarding some of the indicators was considered.

Table 10.3 Sustainability categories defined for the City of Puebla and number of BGEAs included

Sustainability		BGEAs	
Categoría	SI interval	Number	Percentage
Very low	0.3–0.5	67	9.8
Low	0.5–0.6	116	17.0
Medium	0.6–0.7	150	22.0
High	0.7–0.8	230	33.8
Very high	0.8–1.0	110	16.2
No data		8	1.2
Total		681	100

Source: Own elaboration

Puebla. At the other end, the Very Low and Low sustainability categories collect nearly 27% of BGEAs, i.e. 183 BGEAs would declare deficiencies in some of the indicators that make up the urban and environmental dimensions, posing a challenge to the city's planning policies.

Although the CPI and SCI values obtained for the City of Puebla are higher than the average of all the areas assessed, the contrasts are evident on the intraurban scale. Figure 10.4 shows the distribution of BGEAs according to the defined ranges. In general, it can be noted that the central area includes mostly BGEAs belonging to the High and Very High sustainability categories. In contrast, the areas that make up the periphery and peri-urban⁶ areas are characterized by the predominance of Low and Very Low sustainability BGEAs.

The SI distribution pattern in the City of Puebla is consistent with the theoretical models of concentric circles (Janoschka 2002; Borsdorf 2003), which state that as the city grows it tends to express urban conditions of heterogeneous development: the most favorable situations are manifested in the central area and the most unfavorable in peripheral areas of more recent urbanization, just as it was conceived by the Chicago School. In the analysis of sustainability, the spatial distribution pattern of the City of Puebla displays a prevalence of this center-peripheral model.

Generally speaking, while the periphery mostly assembles BGEAs with less favorable

sustainability conditions, there are areas where the issues affecting sustainability are especially critical. The lowest category ($0.3 < SI < 0.5$) assimilates, mainly in the southwest, BGEAs corresponding to municipalities such as Ocoyucan, San Pedro Cholula and San Andrés Cholula. This is the Atoyac River watercourse area, considered one of the most polluted areas in the State, due to its high content of substances and metals such as lead, cadmium, chromium, manganese, among others (Méndez García et al. 2000) from urban and industrial discharges, as well as by the dragging of agrochemical compounds in their passage through growing areas. Furthermore, in recent years, these areas have been characterized by an intense real estate development (Bernal 2010) on land that was previously used for agriculture.

Real estate development has rarely incorporated sustainability prospects. In this regard, Duhau (2013) argues that the contemporary city is predominantly built and transformed by private/public agents (real estate or state agencies) who produce housing without land-use planning and without having account for the presence of an adequate infrastructure.

The Low and Very Low categories of SI are concentrated in irregular settlements of the north and south of the city, in colonies such as “Coyopotrero” and “Barranca Honda”, located to the north, and “San Ramón”, to the south, as well as in localities with indigenous population—San Miguel Canoa and La Resurrección, bordering the State of Tlaxcala.

The precarious conditions linked to the irregularity in land tenure have been pointed out by

⁶The peri-urban area of the City of Puebla has been defined and characterized by Lara Galindo et al. (2019).

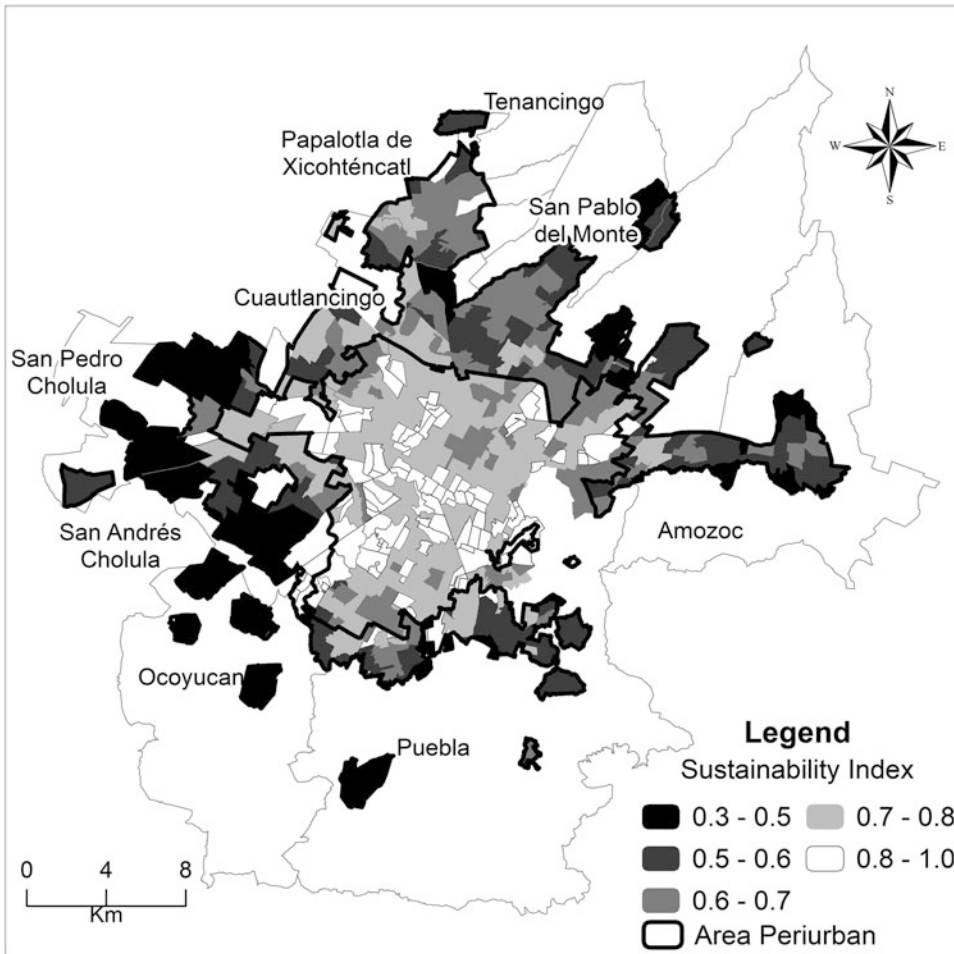


Fig. 10.4 Spatial distribution of the Sustainability Index (Source: Own elaboration based on the database of the INEGI 2010)

Bazant (2008), who highlights in this area the absence of the State at its different levels of government, linked to the provision of public services such as drinking water, electricity, drainage, public infrastructure.

High sustainability ($0.7 < SI < 0.8$) is mainly concentrated in BGEAs in the central area, as well as in some sectors of the southeastern periphery, where the City of Puebla has recently expanded at the expense of the creation of exclusive housing and commercial complexes aimed at the population with high purchasing power. However, health risks arising from the Atoyac River affect

the environmental sustainability associated with the supply of drinking water and inefficient operation of the drainage service (Rosas 2017).

10.5.1 Environmental Dimension

The environmental dimension of sustainability is integrated in this case by indicators corresponding to the water and sanitation and drainage issues. Water resource management and wastewater sanitation are central to the economic, social, cultural and symbolic development

Table 10.4 Categorization of environmental sustainability standardized values

Category	Access to safe drinking water			Sanitation and drainage		
	Range	BGEAs Number	%	Range	BGEAs Number	%
Very low	0.0–0.2	53	7.8	0.3–0.6	11	1.6
Low	0.2–0.5	42	6.2	0.6–0.7	23	3.4
Medium	0.5–0.7	55	8.1	0.7–0.8	48	7.0
High	0.7–0.9	108	15.9	0.8–0.9	117	17.2
Very high	0.9–1.0	423	62.1	0.9–1.0	482	70.8
Total		681	100.0		681	100.0

Source: Own elaboration

of communities. In this sense, the Law on Water for the State of Puebla (2014) warns that “*Water is a good of the vulnerable and finite public domain, it is an essential natural resource for life, and it is the foundation of the health and well-being of every population*”. The values obtained for the issues that make up the environmental dimension of sustainability are presented in Table 10.4.

Data as a whole show that the very high category of sustainability in relation to access to water concentrates 62.1% and 70.8% for sanitation and drainage. This relatively favorable situation obtained for most BGEAs, coincides with the values of the sub-dimensions housing infrastructure and waste management (including effluents) corresponding to Puebla, and express better conditions in the Mexican context. The value relative to housing infrastructure exceeds by 9.2 points the rate obtained for the Municipality of Puebla, and the one related to waste management by 18.3. When referring to access to water, the objective is to know the social welfare conditions of the population, considering that water is a basic necessity for human life (ONU-Habitat 2016b). Moreover, according to the same source, wastewater treatment reduces the environmental impact of human activities, as well as threats to human health.

Nevertheless, while environmental sustainability conditions show relatively favorable characteristics in the City of Puebla, BGEAs with critical values persist. In this sense, the Low and Very Low categories of sustainability for access to water are reached in 14.0% of BGEAs and 5.0% for the issue of

sanitation and drainage. Figure 10.5 shows the spatial distribution of the corresponding results.

Both topics exhibit High and Very High categories of sustainability in the central area of the city, and Low and Very Low categories in peripheral and peri-urban areas.

In the case of Water, the Low range categories are exhibited to the west and southwest of the city. These are areas of urban expansion belonging to the municipalities of Ocoyucan, San Pedro Cholula and San Andrés Cholula. Similarly, as it was already evident with SI, there is a center-periphery behavior characterized by contrasts in the peri-urban area. The average categories are mainly located in popular colonies such as San Pedro Zacachimalpa and San Andrés Azumiatla.

On the other hand, Sanitation and Drainage concentrates Low and Very Low categories towards the periphery of the city and peri-urban areas, specifically in irregular settlements such as San Ramón to the south, popular colonies such as San Andrés Azumiatla and San Pedro Zacachimalpa, and in localities with indigenous populations such as San Isidro Buensuceso in the north of the city. In addition, these low values are located in some areas belonging to the municipality of San Pedro Cholula.

While access to drinking water and drainage is poor in irregular settlements in the City of Puebla, it is also shown in areas where the city is expanding and the real estate explosion is going on. In this regard, López and Montalvo (2015) remark that the process of urbanization and metropolization has brought with it an accelerated and growing demand for services, in particular for urban services such as drinking water, drainage

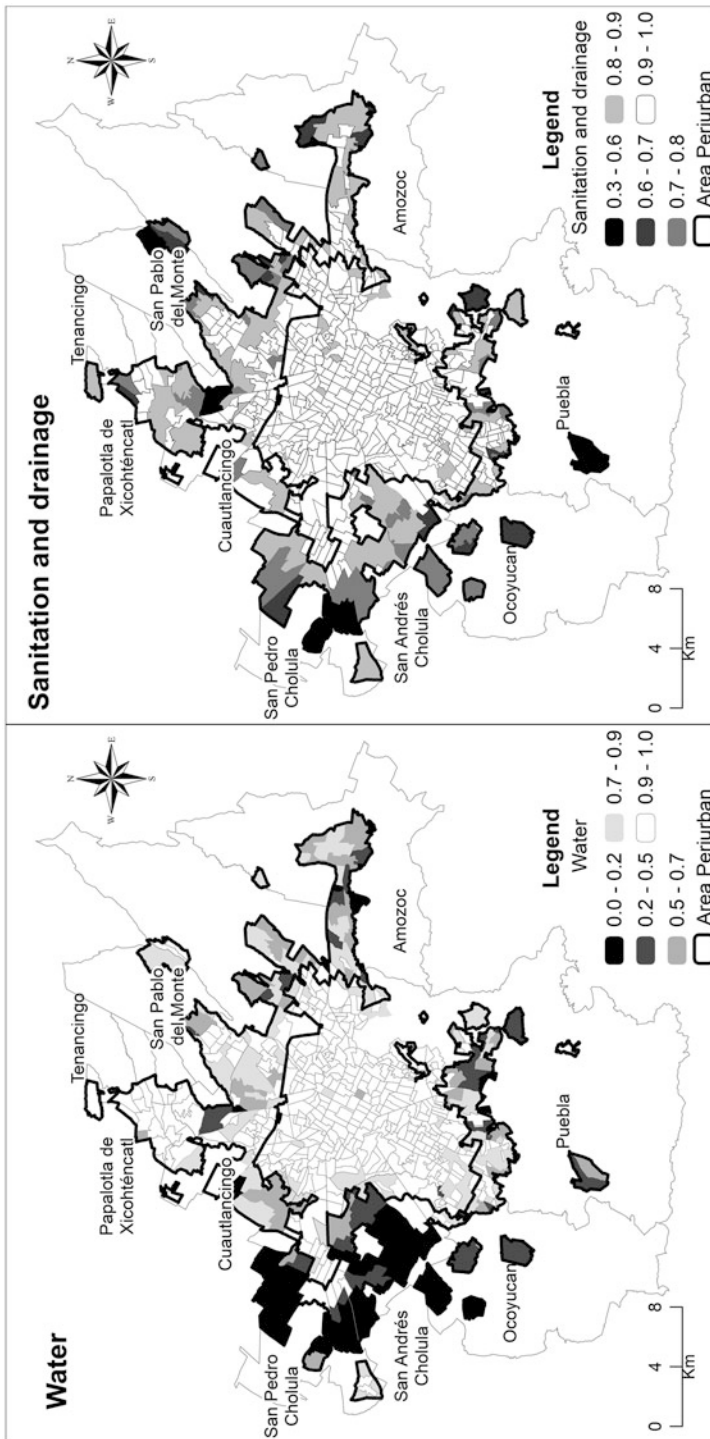


Fig. 10.5 Spatial distribution of the issues that make up environmental sustainability (Source: Own elaboration based on INEGI 2010 database)

and sanitation, which has led to heavy pressures, water shortage, irregular coverage, poor quality and the generation of large volumes of wastewater that cause high levels of environmental pollution and health problems, associated with inadequate management and administration in large cities.

Beyond the results obtained from the availability of disaggregated data, environmental sustainability for water and sanitation and drainage should not be restricted only to its accessibility. This is demonstrated by the results obtained from the SCI for SDG 6, i.e. when incorporating indicators relating to integrated resource management, sustainability reaches values 14.25 points below the average of the studied areas.

According to the report by the Banco Nacional de México (2018), an efficient and sustainable management to provide water supply with the following three characteristics is a priority: supply at the point of consumption, availability at the time wanted, and drinking quality, reducing losses and the environmental impacts of its use.

In the case of the Puebla-Tlaxcala metropolitan area, although the indicator on access to water shows favorable conditions, surface water quality, resource availability and the presence of micro-measurement outlets exhibit adverse conditions, which would explain why SDG 6 index displays below-average values.

10.5.2 Urban Dimension

The issues that make up urban sustainability include different dimensions and subdimensions of the CPI and different SDGs. The results obtained and processed in Table 10.5 allow to highlight that adequate urban sustainability in terms of territorial planning and housing conditions reaches 68.2% of BGEAs, following the issue of urban inequity with 50.4%. In contrast, the issues Mobility—Physical Accessibility and Connectivity, generally present low categories in 51, 4% and 41.6% of BGEAs, respectively. The spatial distribution of sustainability categories for the topics integrated into this dimension are presented in Fig. 10.6.

Generally speaking, favorable conditions of urban sustainability are exhibited in central areas, whereas in peripheral and peri-urban areas unfavorable ones are found. However, this pattern is not common to all topics. In this sense, employment together with mobility—physical accessibility manifest a heterogeneous distribution.

10.5.2.1 Territorial Planning: Housing Conditions

The Low and Very Low categories are mainly exhibited in irregular settlements such as San Ramón and in localities with indigenous populations including San Isidro Buensuceno and Resurrección. These categories also characterize areas of urban expansion of the municipality of Ocoyucan. It should be noted that peri-urban areas show contrasts reaching sectors with low and high values close to each other.

The indicators included in this topic correspond to the subdimension “housing structure” within the dimension “development structure”. The values of this sub-dimension in Puebla reflect a more favorable situation compared to global Mexico. However, it is necessary to establish guidelines for urban planning that include housing programs to ensure access to adequate housing, without risks and with zero or minimal environmental impact. In the same way, it is necessary to create incentives and projects to improve housing and its habitat out of infrastructure and equipment, encouraging the supply of employment in its environment (ONU-Habitat 2016b), especially in peri-urban areas.

10.5.2.2 Urban Inequity and Health

Matching the previous topic, this topic exhibits a center-peripheral pattern characterized by the heterogeneity of the values obtained in peri-urban areas. The Low and Very Low categories are mostly concentrated in expansion areas to the west of the city, in popular colonies to the north and south such as San Pedro Zacachimalpa, San Andrés Azumiatla, San Baltazar Tetela, in areas with housing units such as San Pedro Zacachimalpa, San Andrés Azumiatla, San Baltazar Tetela, in areas with housing units such as San Pedro Zacachimalpa, San Andrés

Table 10.5 Categorization of standardized values of urban sustainability

Topics	Categories				
	Very low	Low	Medium	High	Very high
Territorial planning—Housing conditions					
Range	0.0–0.5	0.5–0.7	0.7–0.8	0.8–0.9	0.9–1.0
BGEAs	12	62	142	225	240
%	1.8%	9.1%	20.9%	33%	35.2%
Urban inequity—health					
Range	0.0–0.3	0.3–0.5	0.5–0.6	0.6–0.7	0.7–1.0
BGEAs	56	128	154	174	169
%	8.2%	18.8%	22.6%	25.6%	24.8%
Mobility—Physical accessibility					
Range	0.0–0.3	0.3–0.4	0.4–0.5	0.5–0.7	0.7–1.0
BGEAs ^a	98	252	174	92	58
%	14.4%	37%	25.6%	13.5%	8.5%
Employment					
Range	0.4–0.6	0.6–0.7	0.7–0.8	0.8–0.9	0.9–1.0
BGEAs	26	135	261	190	69
%	3.8%	19.8%	38.3%	27.9%	10.2%
Connectivity					
Range	0.0–0.2	0.2–0.4	0.4–0.5	0.5–0.7	0.7–1.0
BGEAs	83	200	211	123	64
%	12.2%	29.4%	31%	18%	9.4%
Education					
Range	0.2–0.5	0.5–0.6	0.6–0.7	0.7–0.8	0.8–1.0
BGEAs	23	165	189	188	116
%	3.4%	24.2%	27.8%	27.6%	17%

Source: Own elaboration

^a1.0% of BGEAs (7) could not be classified because of the lack of information regarding some of the indicators considered

Azumiatla, San Baltazar Tetela, in areas with housing units such as Agua Santa, San Bartolo and Loma Bella and in localities with indigenous population, the latter being that of San Isidro Buensuceso in the municipality of San Pablo del Monte and La Resurrección in the capital of Poblana.

Within the framework of the CPI, this topic is mainly included in the Quality of Life dimension and specifically in the “health” subdimension, and with “economic equity” within the “equity and social inclusion” dimension. Generally speaking, the situation in Puebla reflects more unfavorable conditions than the total municipalities considered: 1.7 points below average relative to the “health” subdimension and 4.0 of the “economic equity” subdimension.

Based on the results obtained for the CPI, it is important to include and analyze in the topic urban and health the spatial distribution of indicators linked to child population, since critical situations are detected there (e.g. infant mortality rate or life expectancy at birth). These indicators are directly related to urban marginalization processes.

In this regard, as expressed in ONU-Habitat (2016b), it is considered a priority to strengthen health infrastructure, especially focused on child population, to ensure adequate sanitation for children, concentrating projects on settlements, neighborhoods and colonies with the greatest impact on child mortality and morbidity.

With regard to equity, it becomes necessary in the field of public policies to guide urban development strategies to reduce economic inequality,

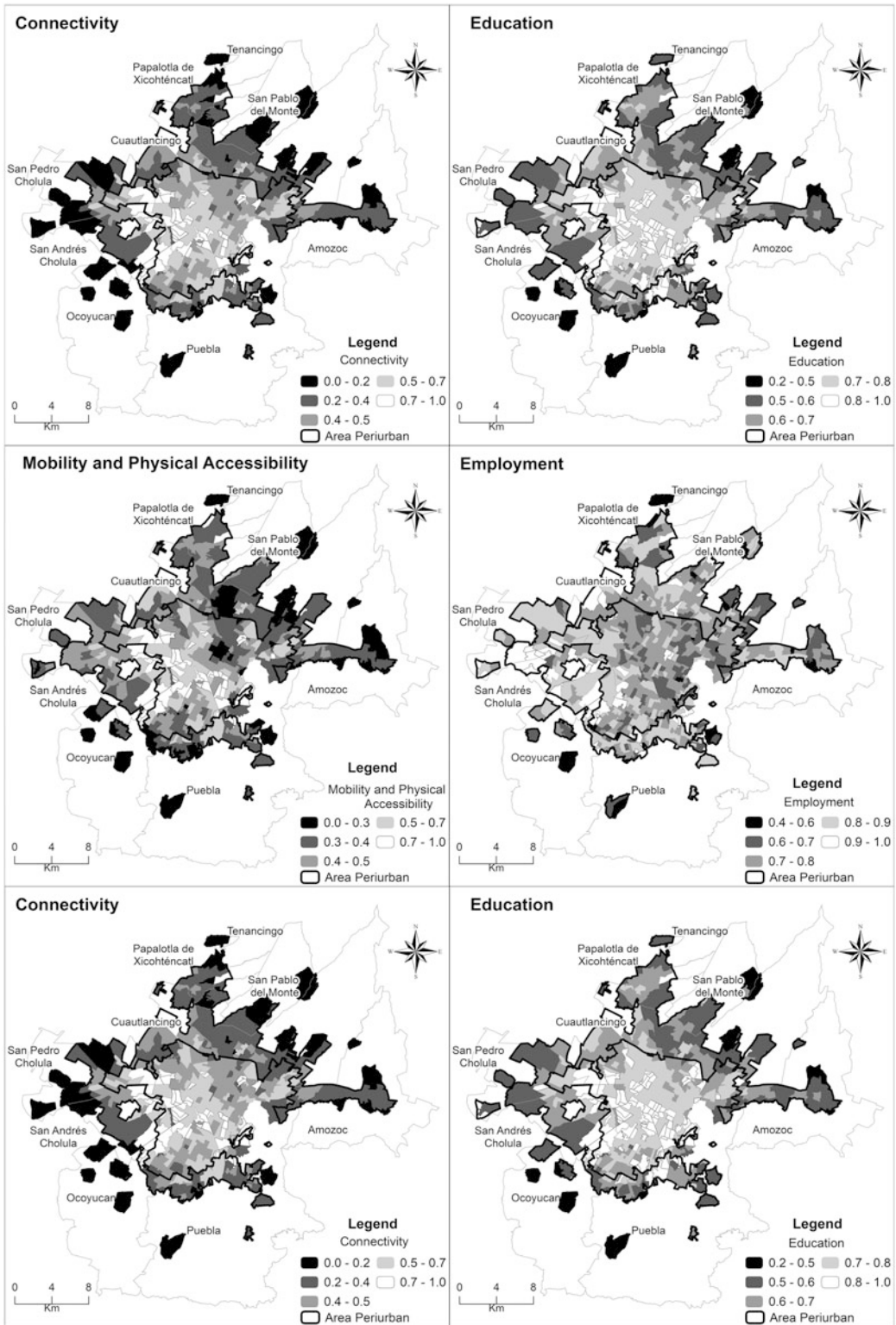


Fig. 10.6 Spatial distribution of the issues that make up urban sustainability (Source: Own elaboration based on the database of INEGI 2010)

poverty and precariousness in urban settlements, focusing on projects, actions and investments in areas where income inequality is most concentrated, such as peri-urban ones. However, this is not a simple task given that, generally, financial capital, frequently favored by public authorities, affects these inequalities. It is known that urbanization has played a crucial role in the absorption of capital surpluses on increasing geographical scales (Harvey 2012). In this context, private over collective interests are promoted, therefore generating situations of inequality that affect urban sustainability and are also very difficult to reverse.

10.5.2.3 Mobility and Physical Accessibility

Spatial distribution does not have a defined pattern in this dimension. High values are expressed in outlying areas such as the Atlixcayotl Reserve area, Lomas de Angelópolis and La Vista Country Club, to the west and southwest of the city. Towards the central area the historic center, university city and the colony San Manuel can be mentioned, while the Volkswagen industrial area can be found to the north. It should be noted that the most important road axes of the city are located in these areas, connecting with other States and with the Mexican capital, as it is the case of the Mexico-Puebla motorway.

In the CPI, the sub-dimension “urban mobility” is integrated into the “development infrastructure” dimension, although with different indicators regarding the topics considered in the analysis and strongly linked to public transport. It is also linked to the “urban form”, which is another of the sub-dimensions within the “development infrastructure” that incorporates road density indicators to promote connections, facilitate intermodality and improve the functionality of the city.

Sustainability objectives in this area embrace optimizing transfers, reducing their costs (economic and environmental) and boosting the productivity of the city. This form of mobility that tends to sustainability should be focused on public transport as an urban planning strategy. The actions to be promoted in this topic are considered

central to strengthen the city, especially the expanding or peri-urban areas.

10.5.2.4 Employment

The City of Puebla exhibits an unemployment rate of 4.1%, reflecting a concentration of High and Very High categories in the southwest, west and north areas of the city. This influences the development of new power plants, shopping malls and industrial areas. In this regard, it should be noted that in 2010, the occupied population was mainly located in the tertiary sector (around 60%), creating commercial and services activity (INEGI 2010). The Low and Medium categories are located in central and peripheral areas to the north and east of the city.

In view of the CPI, this issue is associated with the “employment” subdimension within productivity. In the CPI analysis, below-average values are verified in Puebla (0.3 points) for all municipalities. This topic also integrates indicators of the subdimension “economic burden”, showing values below the set of Mexican municipalities (2.9 points).

In this context, ONU-Habitat (2016b) highlights the importance of promoting formal and productive employment that raises the rate of working population, taking into account local productive inclinations and specific needs of the city and its neighborhoods. In turn, it considers it important to generate conditions of formal and well-paid productive employment for the elderly population, taking into account their particular characteristics.

10.5.2.5 Connectivity

The use of information technologies is central to people’s communication, even as a means of security. Like the other topics, connectivity exhibits a central-periphery distribution pattern without neglecting the heterogeneity that characterizes peri-urban areas. The lower values are mainly concentrated in irregular settlements such as San Ramón to the south and Coyopotrero to the north, as well as localities with indigenous populations such as the Resurrección, San Isidro Buensuceso and San Miguel Canoa, and expanding areas in the municipalities of

Ocoyucan, San Pedro Cholula, San Andrés Cholula and some areas belonging to the municipality of Cuautlancingo. It should be noted that some of these areas do not have the necessary facilities for the provision of electricity services, which prevents connectivity.

This topic integrates indicators of “communications infrastructure” sub-dimension into the CPI. In this case, the best conditions with respect to the context of the Mexico’s municipalities analyzed are verified in Puebla (1.1 points above average). However, differences persist in the City of Puebla that allow to reassert the importance of promoting and supporting the expansion of information and communication technologies with emphasis on spaces educational institutions.

10.5.2.6 Education

The High and Very High categories are located in the central area of the city and to the west, matching the areas where the most important universities of the state and the country are located, such as the Benemérita Universidad Autónoma de Puebla (BUAP), the Universidad Popular del Estado de Puebla (UPAEP), the Universidad de las Américas Puebla (UDLAP), the Universidad Iberoamericana Puebla, among other institutions. In this sense, it is important to mention that the State of Puebla is in a national second place after Mexico City in the ranking with the highest number of institutions and educational establishments of higher level (CONACyT 2017). As with the rest of the topics, the Low and Very Low categories are located in localities with indigenous populations such as Resurrección, San Miguel Canoa and San Isidro Buensuceso, irregular settlements such as Coyopotrero to the north and San Ramón to the south, as well as in areas of expansion and urban growth in the municipality of Ocoyucan.

This topic is included in the “quality of life” dimension of the CPI. In this case, more favorable circumstances than in the whole of Mexico’s municipalities are verified in Puebla for the subdimension “education” (7.3 points above average). The local objective in this case should focus on linking local productive inclinations and

capacities with educational improvement programs.

10.5.2.7 Urban Sustainability and SCI

SDGs are cross-cutting to the topics included in the analysis carried out on an intra-urban scale for the City of Puebla. While the indicators considered are mainly included in SDG 4 (quality education), SDG 8 (decent work and economic growth) and SDG 10 (inequalities reduction), they are particularly framed in SDG 11 (sustainable cities and communities). In this sense, most of the problems that characterize the subjects worked on converge on SDG 11.

Taking into account the latter objective, the values of the SCI obtained for the metropolitan areas of Mexico (Banco Nacional de México 2018) indicate an average of 45.76 points on a scale of 0 to 100, presenting Puebla-Tlaxcala a better condition (49.42 points).

Among the problems that stand out in the national context, it is mentioned that there is inefficient management of urban land to contain urban expansion. According to this source, in the metropolitan areas analyzed, the change in land use due to urban growth consumes on average 15.77% of the environmentally valuable soil, and the annual growth rate of the urban area stands at 0.33, while it should be less than -0.02 . It is also highlighted that the current trend of urban expansion has a direct impact on mobility; nearly half (46.78%) of the population of low socio-spatial strata does not have access to public transport near their home and, on average, 13.84% of people living in cities lack basic housing services.

These problems are seen in the City of Puebla, and especially in peri-urban areas, as evidenced by the analysis of the spatial distribution of the topics. Although in general terms the situation of the City of Puebla according to the indicators contemplated is more favorable, significant contrasts remain within it.

It incorporates green areas in the SCI that were not examined on an intra-urban scale, as well as air quality indicators, aspects on which it is important to move forward. However, the complexity of evaluating this SDG is partly due to the

diversity of issues involved, which requires the use of very different sources of information.

10.6 Final Remarks

Accelerated urbanization and increasing environmental impacts have encouraged the evolution of a sustainable development paradigm that ensures the satisfaction of human needs (Andrade and Bermúdez 2010). Progress towards sustainability requires urban policies to connect objectives of protection and social and economic development in a balanced manner. However, this is very difficult to be politically achieved in urban contexts of low economic growth, unemployment, inequality and poverty. Thus the importance of assessing sustainability objectives.

Mori and Christodoulou (2012) mention that the central objective of sustainability assessment is to provide decision-makers with an assessment of global and local systems that express the integration between nature and society in the short and long term, in order to define actions to achieve a sustainable society. In addition, the authors emphasize that sustainability assessment provides the basic framework of criteria to consider: integrity of ecological systems; intra- and intergenerational equity; economic efficiency and maintenance; democratic governance, caution and adaptation; among others.

In this context, the development of indicators becomes a key task of local governments to generate proposals aimed at achieving the sustainability of cities (Michael et al. 2014). Nevertheless, it is important to intensify the analysis of its implementation in real contexts of unequal power (Harvey 2012). In this regard, the evolution and expansion of the city, and consequently of private enterprise, has revealed deep traces that are increasingly difficult to erase and that show how the insertion of capitalism in urban space defines dynamics of capital accumulation that has continued their trajectory until present (Rolnik 2018).

Locally, indicators are mainly used in the decision-making process to generate intervention proposals at the local level reversing issues

affecting sustainability. This is based on the IDB's ESCI proposal, which model has been applied to the City of Puebla and compared to other initiatives in Mexico.

In order to measure progress towards the environmental and urban sustainability of cities (including the peri-urban territory), it is a priority to generate useful indicators that reflect social concerns in a synthetic way and serve for decision-making. Beyond the above-mentioned, the relevance of the political power and its determination to intervene, or not, in urban processes, should not be ignored.

As mentioned in background studies, the indicators used in the construction of the indices were adjusted, based on the information available and attainable to process on the scale of analysis used. Each of these aspects or topics determines different categories of SI and allows us to deduce how much a space unit (BGEA) approaches or moves away from the concept of sustainability within the universe under consideration.

The proposed indices provide a useful measure to identify sustainability problem areas that can be recovered through policy actions in order to generate progress towards sustainable development goals.

The study contributes to deepen the analysis of topics and dimensions involved in the concept of sustainability, emphasizing internal differentiations, based on representative data of the territories addressed. However, the need to continue the analysis is highlighted, by deepening the political-economic causes of inequalities in order to reverse the current trends.

It is expected that the contributions made in the framework of this work will contribute to the diagnosis of sustainability, identifying areas in need of specific improvements. In this sense, it is worth mentioning that the most favorable SI and those that express poor conditions are presented in the peri-urban area of the city. The territorial contrasts in the colonies belonging to the municipality of San Pablo del Monte, Ocoyucan, San Pedro Cholula, San Andrés Cholula and Puebla stand out. In turn, indicators linked to education, employment and connectivity have a greater impact on the distribution of

SI. The cartograms generated provide useful diagnostic bases for developing intervention proposals that positively affect the quality of life of the inhabitants and direct the urbanization process.

Beyond the methodological strategies used, it is difficult to represent the complexity inherent in the issues involved in the concept of sustainability. With regard to limitations, it is important to mention that sometimes the availability of information poses difficulties in expanding research, especially in the analysis of causal relationships. In addition, we face the challenge of consolidating theoretical and conceptual frameworks by deepening their transferability, and the possibility of drawing comparisons. The opening of these new questions inspires further strengthening of research, which results will enable progress towards sustainability, from their inclusion on the political agenda. Thus far, advancing in the political dimension of sustainability is considered central to fully understand the factors that affect spatial differentiations and their consequences. In addition, the deepening of the research showing how the population can become political subjects by challenging capitalist discourses (Álvarez de Andrés et al. 2019) opens a different vision to the analysis of the sustainability of cities and to the construction of measuring indicators.

The need to dig into the analysis of spatial differentiations of the different dimensions of sustainability in Latin American cities is a challenge to build more sustainable places for present and future generations in line with the SDGs under the 2030 Agenda.

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Quality of Life, Sustainability and Transport: The Case of Melbourne, Australia

11

Robin Goodman, Annette Kroen, and Melanie Davern

11.1 Introduction

The opportunity to fully participate in the social, economic and civic life of a community is a basic ingredient for good quality of life. This participation depends on the ability to be able to move about—to conveniently get to the jobs, services and community places where interactions occur. However, in many large cities across the globe access and mobility is becoming increasingly difficult. The vast majority of cities and towns are now structured around the use of the car, either having been built after its invention or having grown and expanded outward with the extra ability to travel that it brought. In large and expanding metropolises like Melbourne, Australia, with a population of over 5 million and a geographical footprint over 10,000 km², traffic congestion has become a major public issue causing commuters to spend unreasonable amounts of time in their cars and ruining the amenity of many suburban areas. Clearly, dependence on private vehicle transport is unsustainable—environmentally, economically and socially. It is not possible for large, low-density, metropolitan areas to function efficiently and responsibly with each person

travelling in their own individual vehicle clogging up road and occupying valuable land for parking spaces. The provision of good quality public transport is therefore, a necessary ingredient in more sustainable and equitable city development and good quality urban life in all cities and large towns.

In many cities around the world transport infrastructure and services are unevenly distributed, with higher public transport supply in the more densely settled areas of the inner and perhaps middle parts of cities. Rural, regional and outer suburban areas frequently offer lower levels of service relying instead on private vehicle use. This lack of alternatives can impede residents' mobility and access to employment and vital services such as education, health and child care if they do not have access to a car, or it can lead to a disproportionate amount of their income being spent on travel (Currie et al. 2009). Global trends which have led to changes in patterns of employment and wealth have exacerbated spatial inequalities within large cities influencing the Subjective Well-being of residents (Davern et al. 2017a). Lower income residents, who may be forced to live at a distance from city or regional town centres, are left vulnerable to increasing fuel and automobile prices (Dodson and Sipe 2008) creating 'transport disadvantage', limiting their ability to travel when and where they need (Denmark 1998).

This chapter addresses these interlinked issues of sustainability, quality of life and accessibility

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and focusses on the vital role that transport provision plays in it. It utilises evidence from Melbourne to analyse the impact of poor transport provision and diminished mobility options on the quality of life residents in outer suburbs with considerable social and economic impacts. The largest concentration of jobs, particularly those in the higher paying tertiary employment sector, is in the central city, creating a huge commuting workforce travelling in and out each day (Xia et al. 2016). Whilst Australians enjoy a very high standard of living generally there remain serious social and economic disparities, with the inner areas now out of reach for many middle, and lower income residents, due to high land and house prices.

11.2 Subjective Well-Being, Mobility, Quality of Life and Sustainability

Transport plays an important role for achieving a more sustainable development, partly because of its current negative influence on environmental sustainability, particularly through greenhouse gas emissions, and partly because of its enabling role for social and economic sustainability through mobility, e.g. for access to education, women's employment and empowerment, disabled and elderly people's independence (Manaugh et al. 2015; Armstrong et al. 2015; Barfod et al. 2018). In the seventeen Sustainable Development Goals of the United Nations transport is not mentioned specifically, but it is referred to in sub-goals. The most relevant for our topic is target 11.2 under Sustainable Cities and Communities (United Nations 2019, n.p.):

By 2030, provide access to safe, affordable, accessible and sustainable transport systems for all, improving road safety, notably by expanding public transport, with special attention to the needs of those in vulnerable situations, women, children, persons with disabilities and older persons.

The crucial role of transport and mobility in sustainable development has been recognized from the 1992 United Nation's Earth Summit to

the 2016 global sustainable transport outlook report "Mobilizing Sustainable Transport for Development", which was launched at the first Global Sustainable Transport Conference. The transport sector will play an important role in the achievement of the Paris Agreement, given the fact that close to a quarter of energy-related global greenhouse gas emissions come from transport (United Nations 2016).

We adopt the definition of sustainable urban mobility planning, that it is:

an approach to urban planning that prioritises people rather than any particular mode of transport. It seeks to bring origins and destinations closer together, in order to reduce or avoid the need for travel. When travel is essential, the aim is to provide more environmentally friendly modes of transport. Finally, such planning seeks to improve the energy efficiency of transport modes and vehicle technology. (Armstrong et al. 2015, p. 14).

In some respects, we concentrate here on the social aspects of transport and the influence on quality of life. However, environmental aspects also play a role with a focus on public and active transport as forms of sustainable transport, due to the sustainability issues of motorised travel, such as air and noise pollution, contribution to a sedentary lifestyle and traffic incidents (Armstrong et al. 2015; Badland et al. 2017; OECD 2014). While the focus is not on economic aspects, these nevertheless play a role, as transport issues, such as congestion, do not only increase greenhouse gas emissions, but also decrease productivity. The chapter also concentrates on personal transport rather than freight transport. While we acknowledge that new disruptive technologies and organisational development will play a role in the future of transport, such as autonomous vehicles, the sharing economy, and the internet of things (Barfod et al. 2018; Fagnant and Kockelman 2015). We will not look into their impact but will rather analyse the impact of current urban form and transport organisation on the life of residents in outer suburbs in Melbourne.

There is a significant challenge in promoting sustainability in the context of a mostly auto-oriented and car-dependent urban form with low

density and high centrality of Australian cities (Forster 2004; Armstrong et al. 2015). While there is theoretical political support for increasing public transport, cycling and walking, many politicians on the federal as well as state level are engrossed with roads and private motorised transport and there is a political reluctance—as in other Western countries—to reduce subsidies to motorised private transport.

11.2.1 Urban Form Conducive to Sustainable Transport

If the low density, high centrality urban form of Australian cities is not conducive to sustainable transport—as in public transport, walking and cycling—which urban form is? There are a large number of studies that have examined the impact of urban form on travel behaviour. Many other socio-demographic factors, such as income levels, family arrangements and personal preferences (Holz-Rau and Scheiner 2019; van de Coevering et al. 2016), and urban form elements have been found to have a positive influence on walking, cycling and the use of public transport.

The main urban form elements that have been found to have a positive influence are local destinations, mixed land uses, dwelling density and street connectivity (Boulangé et al. 2017; Wang et al. 2016; Marshall and Garrick 2010; Saelens and Handy 2008; Beenackers et al. 2012; Frank et al. 2010). Additionally, for walking and cycling, providing relevant infrastructure, such as foot or cycling paths has also been found having a positive influence (Wang et al. 2016; Hooper et al. 2015; Pucher and Buehler 2012; Gunn et al. 2014). This provision is related to the perceived and actual safety of these transport modes and also to traffic calming (Mertens et al. 2017; Pasha et al. 2016; Hoogendoorn et al. 2004). For cycling, addressing safety concerns in the design of road intersections also influences the uptake of cycling (Marshall and Garrick 2010; Boulangé et al. 2017; Pasha et al. 2016). Green and open space and an “aesthetic” environment

also have a positive influence on walking and cycling, even though the influence is not as strong as for other urban form elements (Wang et al. 2016; Hooper et al. 2015). The integration and transfer between public transport and walking and cycling is important in the sense that the proximity of public transport stops can increase the likelihood of walking for transport: an easy transfer is one of the key requirements for a high quality public transport network (Nielsen et al. 2005; Mulley et al. 2017).

11.2.2 The Relationship Between Quality of Life and Transport

Public policy has multiple interests in transport mobility and accessibility. These include increasing economic participation and efficiency; reducing the externalised costs of congestion and private vehicle dependence; maintaining normative standards of social equity and rights; and improving personal health and well-being. Similarly, improving quality of life or Subjective Well-being is an important objective for policy makers and urban planners. Some even suggest that the ultimate goal of government should be to improve the well-being of the community, rather than the more conventionally used economic indicators, such as economic growth (Delbosch 2012; Mokhtarian 2019; Diener 2006). In the context of sustainability, quality of life is linked and influenced by environmental, economic and social aspects, but also leads to positive outcomes, especially related to social, but also to economic aspects, such as physical health, personal relationships, work engagement and productivity (Diener et al. 2017).

11.2.3 Definitions

The terms of quality of life and Subjective Well-being are often used interchangeably but represent different conceptual backgrounds. Quality of life represents a broader understanding of more objective dimensions of life and is often used in

more health-related quality of life research (Camfield and Skevington 2008). In comparison, Subjective Well-being derives from positive psychology and happiness research and represents an individual's subjective self-evaluation of their life and comprises largely affective (hedonic) and cognitive components including the concept of eudamonia, or sense of purpose (OECD 2013). Subjective Well-being describes an individual's subjective experience of their life (Davern and Chen 2010) and largely represents affective or emotional experiences, tapping into pleasant core effects of contentment, happiness and satisfaction (Davern et al. 2007) which remain stable under the control of a homeostatic (balanced) system (Cummins 1995, 2013).

Some of the major benefits of using Subjective Well-being in research contexts is the simplicity of assessment in fewer than ten questions and the non-confrontational form that these questions have while providing a public health screening assessment of well-being. There are many different approaches to measuring well-being (Mokhtarian 2019). In Australia, large scale Subjective Well-being population assessments have been collected since 2001 (Cummins et al. 2003) using the Personal Well-being Index (PWI) from Australian Unity Well-being Index to assess Subjective Well-being in more than 35 national surveys (Khor et al. 2019). The PWI asks people to rate their satisfaction on the overarching and more abstract question of overall life satisfaction before providing specific satisfaction ratings on seven domains of standard of living, health, achievements in life, personal relationships, community connections, safety and future security. Cross-sectional and longitudinal national survey results provide exceptional normative data for the interpretation of Subjective Well-being results in Australia. Furthermore, there is great interest in using these data for policy and planning with Subjective Well-being consistently being one of the most frequently accessed indicators of well-being in a state-based community indicator system (Community Indicators Victoria) in Australia that was in operation between 2007 and 2017 (Davern et al. 2017c). However, despite

availability of normative data to interpret Subjective Well-being results in Australia, it is rarely used as a public policy outcome measure in research and is particularly relevant to investigations of transport.

Urban form and the characteristics of the places where we live obviously impact on our well-being. Historically, quality of life studies focused on objective indicators, such as employment data, or the incidence of mortality and morbidity. However, over time the "subjective" dimension of quality has been acknowledged, meaning that people can perceive their own Subjective Well-being differently, depending on their social and cultural context, but also on other personal aspects (Marans 2015).

Subjective Well-being is assumed to be increased through engagement in everyday activities (Deci and Ryan 2008; Schwanen and Wang 2014). The transport options a person has can influence their Subjective Well-being by providing opportunities for mobility and with this access to social and other interactions that are necessary for life's necessities and well-being (Ettema et al. 2010; Kolodinsky et al. 2013; Ma et al. 2018). If access to transport is low important interactions might not take place, potentially leading in turn to lower Subjective Well-being (Dolan et al. 2008; Awaworyi Churchill and Smyth 2019). This relationship between mobility and Subjective Well-being is the focus of the remainder of the chapter.

11.2.4 Mobility and Social Participation

If public policy aims to enable social as well as economic participation it needs to enable mobility. A wide range of research has demonstrated that limited mobility can result in decreased Subjective Well-being as well as social exclusion (Ma et al. 2018; Lucas 2012; Stanley et al. 2011; Delbosc and Currie 2011). For instance, research has documented that poor transport options are linked to reduced participation in higher education and training, reduced access to

health services, higher rates of unemployment, lower involvement in social activities and less engagement with social networks, often resulting in isolation (Awaworyi Churchill and Smyth 2019; Mackett and Thoreau 2015; Lucas et al. 2016; van den Berg et al. 2016). Preston and Rajé (2007, p. 153) go as far as claiming that “social exclusion is not due to a lack of social opportunities but a lack of access to those opportunities” and Lucas et al. (2018, p. 622) state that “that the physical location of where people live within the city is more influential on their trip-making patterns than social determinants such as household income, age, gender, and/or employment status”.

Mobility and accessibility are often used interchangeably, and mobility is strongly related to accessibility. The two closely overlap, although mobility is not always necessary for accessibility or vice-versa. While mobility is the possibility to move (around), accessibility is the possibility—as well as ease—of going to specific destinations, which refers to their proximity as well as the quality of their connection through transport modes (Altenburg et al. 2009). When looking at social participation both aspects are important and are naturally intertwined. The built environment and the quality of transport networks matter as constraints or enablers of choices in this regard (Ewing and Cervero 2010; van den Berg et al. 2016; Wood et al. 2008).

While car travel offers mobility and with this a higher chance of social participation, car dependence and “forced car ownership” needs to be taken into account. “Forced car ownership” refers to the need of owning a car in areas of high car dependence (Delbosc and Currie 2011). This need for owning a car may not be problematic for most households, but for households with a low income this can mean spending a large amount of income on (car) mobility, in order to be able to participate in the work force and social life (Currie et al. 2009). For households that cannot afford to own a car it can lead to social exclusion in these areas (Delbosc and Currie 2011).

This shows that poor mobility options can be caused by spatial factors (e.g. large distances, lack of land-use mix, low densities); socio-economic factors (e.g. low incomes, poor health, lack of information, age); as well as—and partly related to spatial factors—a lack of transport options (Lucas et al. 2018; Pyrialakou et al. 2016). In other words, limited mobility and its effects are strongest where spatial and socio-economic barriers overlap. It is also important to consider differences in the influence of transport on well-being in different country and cultural contexts including regional and rural areas compared to major urban centres. For example, in rural Ireland, a lack of public transport was the most commonly cited limitation for rural living but life satisfaction was higher in rural areas with low densities and dispersed settlements (Brereton et al. 2011). The proximity of transportation services, and consequently of transport options is unevenly distributed in space and different areas have different accessibility levels (Jones and Lucas 2012). In Australian cities, but also in many other cities around the world, there is a higher supply of public transport in the more densely settled areas of the inner and perhaps middle areas, while rural, regional and outer suburban areas frequently have lower levels of public transport. Furthermore, employment, services and amenities, such as education, health and child care are often more thinly spread in those areas. As Armstrong et al. (2015, p. 21) summarise: “Fringe developments are characterised by low housing and low employment density, limited (if any) mixed-use development and poor access to public transport. Together, this increases distances between where people live and where they need to travel for work, shopping, socialising and recreating”.

This combination of a lack of alternatives and socio-economic factors can lead to “transport disadvantage”, with people not able to travel when and where they need without difficulty (Denmark 1998). People experiencing transport disadvantage thus might find it difficult to access essential services, travel to work and engage in social activities and are more likely to be socially

excluded or socio-economically disadvantaged (Currie and Delbosc 2010; Pyrialakou et al. 2016). Lower income residents, who may be forced to live at a distance from city or regional town centres and thus to own a car, are left vulnerable to increasing fuel and automobile prices (Dodson and Sipe 2008). Awaworyi Churchill and Smyth (2019, p. 42) have found that “the negative effect of living in transport poverty on Subjective Well-being is comparable to, or stronger than, the effects of educational status, income, being (un)employed or suffering a major illness”. A further evidence review completed by Titheridge et al. (2014) found that the most disadvantaged members of the community are more adversely affected by transport disadvantage and consequent social exclusion. This is particularly concerning given that the most disadvantaged members of society already report lower Subjective Well-being (Cummins 2013) and are most likely to rely on public transport for mobility.

The literature on the impact of transport disadvantage on well-being has evolved in the last 15–20 years. First studies in the early 2000s focused on older people where increased mobility was shown to have a small but important impact on quality of life (Banister and Bowling 2004; Spinney et al. 2009; van den Berg et al. 2016). This focus has then been broadened to research on proximity to transport (Eibich et al. 2016), Activity Based Models (Nahmias-Biran and Shifftan 2016) further demographic groups including age differences (Eibich et al. 2016; Ravulaparthi et al. 2013), different types of transport modes (Adam et al. 2018; Lovretic et al. 2013; Singleton 2019a, b) and has also shown links between transport disadvantage and well-being (Currie and Delbosc 2010; Xia et al. 2016) and to different urban areas. This has been demonstrated in Melbourne (Fig. 11.1), where residents in urban fringe areas, in comparison to inner and rural areas, were the most affected by fuel price increases and the most likely to participate in activities less as a response (Delbosc and Currie 2011).

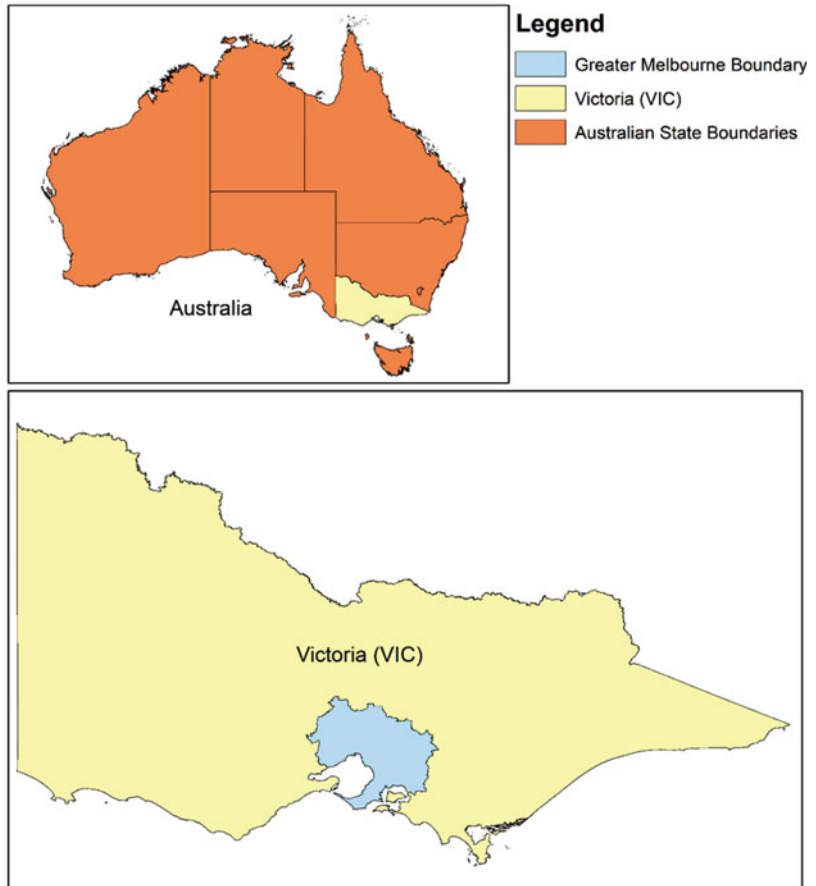
Recent research has also investigated the impact of the neighbourhood (urban form and

social capital) on exacerbating or decreasing transport disadvantage and also well-being (Ma et al. 2018). This research established that a walkable neighbourhood “helps to reduce transport disadvantage and increase social inclusion” (Ma et al. 2018, p. 43). Transport poverty has also become more prevalent in recent research which is defined according to both transport accessibility and affordability (Mattioli et al. 2017) and has been associated with reduced life satisfaction and higher levels of psychological distress in longitudinal research (Awaworyi Churchill and Smyth 2019).

Mobility has been found to influence feelings of loneliness and social interaction. For example, Weijs-Perrée et al. (2015) in a study of relationships between personal characteristics, neighbourhood characteristics, travel behaviour, social interactions, social satisfaction and loneliness have found that people who own a car feel less lonely; people who walk more often have a higher social satisfaction and people who cycle more often have more social interactions. Similarly, van den Berg et al. (2016) in a study on ageing and loneliness have found that the use of different transport modes (bicycle, car and public transport) significantly reduces loneliness, and is a stronger influence than age. They explain this by transport modes providing access to social relationships and thus offering the opportunity to main social networks.

Thus, our assumption is that opportunity for social, economic and community participation is an important influence of Subjective Well-being and that participation depends on accessibility, affordability and mobility. Furthermore, the dependence on private vehicle transport is environmentally, economically and socially unsustainable, and the provision of good quality public transport is essential. Therefore, even though the private vehicle offers a good, and in some areas the only, mobility option for many (e.g. regional areas), we argue that there needs to be other transport options available so that people have the opportunity for social, economic and community participation without relying on a car and contributing to greenhouse gas emissions

Fig. 11.1 The location of Metropolitan Melbourne in south-eastern state of Victoria, Australia. (Source: map produced by the Healthy Liveable Cities Group, Centre for Urban Research, RMIT University)



and other undesired impacts of private vehicle travel. These transport options include public transport, walking and cycling.

11.3 Transport and Land Use Policies in Melbourne

Melbourne, like many other new world cities, is predominantly low-density suburban in nature, radiating outwards from the original Victorian-era inner city core. The city as we know it today was originally established by white settlers in 1835 on the traditional lands of the indigenous people of the Kulin nation, made up of several different language groups, who have never ceded its ownership. The earliest established areas of inner Melbourne were constructed to a medium

density and walking scale, however with the early introduction of rail and tram network beginning in the 1880s, and with trains electrified largely in the 1920s, the city soon began to spread out utilising available space with little constraint. Since formal planning for Melbourne began in the post-World War II era, urban expansion has been directed along growth corridors following radial transport lines out from the centre, with the undeveloped areas in between, known as ‘green wedges’, set aside for non-urban purposes (Buxton et al. 2016).

The major preoccupation for strategic planning in Melbourne is how to accommodate population growth, which continues at a rate of over 2% per annum, (a 2.5% increase in 2017–2018—ABS 2018), and planning for increasing traffic congestion. Most new housing

now being constructed is either low density detached houses on the urban fringe, or small apartments in the inner city.

While all those involved in city planning would acknowledge the need for coordination between transport and land use planning, historically this has occurred separately by differentiated transport and planning authorities and departments with varying degrees of coordination. Transport planning for many years failed to address the need to build new transport infrastructure, with very few new train or tram lines added, with the exception of the opening of a central city rail loop with three underground stations in the early 1980s. A major new suburban rail loop is now being planned, with construction due to start in 2022 (State Government of Victoria 2019), and the existing underground loop is currently being extended. Transport solutions have become hotly contested political issues, with a massively expensive freeway project widely rejected by voters causing a change of government in 2014 (Buxton et al. 2016).

The absence or poor quality of public transport are key reasons why many people use cars to get to work or study. The Australian Bureau of Statistics reports that “in 2012, of adults who travelled by passenger vehicle to work or study, over a half (53%) stated that a lack of public transport services (at all or at the right or convenient time) was one of the main reasons for not taking public transport” (ABS 2013, p. 3). A Parliamentary inquiry in 2012 into liveability in outer suburban Melbourne highlighted inadequate transport infrastructure as the ‘single issue’ on which it received the most submissions (OSISDC 2012, p. 280). The inquiry report found that planning for transport services and infrastructure had not been given sufficient priority in Melbourne’s planning, and in particular that “planning for public transport infrastructure has been a particular blind spot. . . . felt most acutely in Melbourne’s outer suburbs,” (OSISDC 2012, p. 291).

Strategic planning for Australia’s major cities is undertaken by state government which regularly produce metropolitan strategic plans. Since

the 1980s these strategic plans for Melbourne have emphasised the need for urban consolidation, seeking to densify existing suburbs and better utilise existing infrastructure, including for transport. However, many of these plans have been disappointingly ineffective due to poor or incomplete implementation. This has been in part due to the lack of coordination between planning for housing and transport service provision, and in part due to lack of strength assuring effective implementation brought about by neoliberal inspired principles of deregulation (Buxton et al. 2016; Buxton and Goodman 2014; Kroen and Goodman 2012). The metropolitan plans produced in this century have increasingly primarily been concerned with high-level strategic goals lacking detailed descriptions of policy or regulation (Goodman et al. 2013).

The recent metropolitan strategic plans for Melbourne with high significance have been *Melbourne 2030* (DOI 2002), and *Plan Melbourne 2017-2050* (DELWP 2017). *Melbourne 2030* was produced after a lull in planning of more than a decade, and its primary aim was to deal with the forecast growth in population by encouraging urban consolidation and reducing the city’s outward spread. A greater proportion of new housing was to be directed away from outward expansion and into the existing areas, particularly focused around nominated activity centres. The outward incremental spread of the city was also to be halted through the imposition of a legislated Urban Growth Boundary. A major emphasis of this policy was the intention to increase development, including housing, around new or existing activity centres. These centres were identified in a hierarchy of five different categories based largely on size and they were intended to be foci for new commercial, retail and office development, as well as new and higher density housing, and preferably well serviced by public transport. This was not new to metropolitan planning for Melbourne as it had been adopted under a District Centre Policy introduced in 1981. This policy of restricting large retail and office developments to particular places had been difficult to maintain

during the 1980s, however, and the government had eventually abandoned it (Goodman and Moloney 2004).

Melbourne 2030 was initially launched as a draft with many implementation details still under development. Many of the initiatives were in fact indications of intention for further studies and future policy development. The strategy generated both public and academic debate, initially around its process which was felt by some to be insufficiently consultative, then the potential implications of densification, and later around the failure to deliver on what it had promised (Goodman and Moloney 2004; Goodman and Coote 2007; Mees 2003; Birrell et al. 2005; Dodson 2009).

Five years after its release an Expert Panel conducted an audit of progress and reviewed public submissions (Audit Expert Group 2008). Its report found that key policies of *Melbourne 2030* had not been sufficiently implemented. It showed that the proportion of new greenfield development had continued to increase and concluded that ‘on-the-ground’ implementation had fallen short in several key areas, including the redirection of residential growth to established areas, increased development in and around activity centres, and the commitment to public transport investments particularly expanding rail infrastructure (Audit Expert Group 2008). The report attributed this lack of progress on implementation in part to the tendency to focus on further studies and planning rather than on actual built form outcomes and a lack of clarity around responsibilities.

The most recent strategic plan, *Plan Melbourne 2017-2050* (DELWP 2017), continues to emphasise urban consolidation and the need for integrated and coordinated planning but has perhaps a greater emphasis on the location of jobs and the future of employment than did its predecessors. However, like earlier plans, it remains at a fairly high level being aspirational rather than definitive and for action frequently undertakes to develop further policies and processes rather than immediately introduce them. An important step forward in the thinking

however is to recognise the interdependency for quality of life of the location of housing in relation to other essential elements such as shops, services and transport. This is done through the concept of a 20-minute neighbourhood. “The 20-minute neighbourhood is all about ‘living locally’—giving people the ability to meet most of their everyday needs within a 20-minute walk, cycle or local public transport trip of their home” (DELWP 2017, p. 98). It focusses on non-work trips, recognising that in a large metropolis such as Melbourne many higher order jobs are located in the CBD and are very unlikely to disperse, and includes all forms of transport in its definition. However, the link between people and their need for access and mobility is inherent in the concept, and where this might lead to the much long-wished for integrated policy this is to be welcomed.

The transport disparity between inner and outer areas can be partly attributed to the historical legacy of a fixed rail system which has had few major expansions for decades, however the contemporary planning practices for new suburbs in Melbourne is critical now. Although inadequate and delayed transport delivery to greenfield suburbs is by now recognised as a pressing urban planning problem and current policies such as *Plan Melbourne 2017-2050* promise transport choice in outer urban areas, years or even decades pass between the arrival of new residents and non-car transport infrastructure and services. Rail extensions, for example, are extending to growth fronts slowly and in only a few areas and are some decades after the area’s initial development. These are rare and some suburban growth fronts of past decades seem unlikely to ever have a heavy rail connection. Further, for the most part bus services, when they finally arrive, are “infrequent, indirect services that appeal only to a captive transit ridership” (Delbosc et al. 2016, p. 62).

The detailed local area planning for new greenfield suburbs is guided by the Precinct Structure Planning (PSP) process which develops a master planning framework. It has been gradually introduced by the Growth Areas Authority

which was established in 2006 and has now become the Victorian Planning Authority. In mid-2008 all land inside the urban growth boundary that had been previously zoned as farming land was rezoned into an Urban Growth Zone to support new planning processes in the transition of non-urban to urban land. The introduction of this zone placed greater emphasis on the use of PSPs to guide development and the need for integrated planning at an early stage in the process (Mitchell and Eastaugh 2010).

The PSP process is now well established and the PSPs create a structure for urban development and the framework for statutory planning controls. They provide for detailed land use planning and show housing lot yields, the provision and location of employment land, transport networks, open space and natural systems, activity centres and community facilities. The process of PSP planning includes infrastructure provision, such as community facilities, schools, open space, roads, active transport and to a certain (limited) extent public transport.

The provision of infrastructure for public transport, although identified within the PSPs, remains problematic and inadequate because much of the financing and implementation occurs beyond the scope of the planning process. Often financing and implementation only happens once there is sufficient population to make services financially viable. As densities in new suburbs are low and development is not strategically sequenced the timing of service is often long delayed while population slowly increases. The next section now reviews what this means for the mobility, quality of life and Subjective Well-being in Melbourne's growth areas.

11.4 Transport and Subjective Well-Being in Melbourne's Growth Areas

Previous sections have provided a review of both previous research into transport and Subjective Well-being as well as the policy context guiding development across the metropolitan area of

Melbourne, the fastest growing city of OECD nations. This section provides assessment and visualisation of quantitative results to understand spatial patterns between transport, commuting, health and Subjective Well-being within an Australian capital city. Results have been collated from available survey and administrative data sources available in Victoria and are presented in mapped format in the following section. Population level Subjective Well-being assessment requires large scale survey sampling which is expensive and resource intensive explaining why it is rare to have small area estimates available.

11.4.1 Subjective Well-Being Across Melbourne Municipalities

Subjective Well-being was collected in the 2011 VicHealth Indicators Survey which sampled 300 people across Victoria's 79 municipal areas (VicHealth 2012). This is an important dataset available publicly and provides a unique opportunity to explore spatial relationships between Subjective Well-being and other transport related issues. In this example, Subjective Well-being was assessed by the Australian Unity Well-being Index (Cummins et al. 2003) using the Personal Well-being Index (PWI), explained previously. The average of these satisfaction forms the PWI and Fig. 11.2 provides the Subjective Well-being results for 31 municipalities across metropolitan Melbourne. Previous research has identified that population level Subjective Well-being remains consistently around 75 (Cummins 1995, 2013) ranging only 1.3 points from 75.4 to 76.7 between 2011 and 2016 (Davern et al. 2017a) and the Victorian average in 2011 is slightly higher at 77.5.

Subjective Well-being across the Melbourne metropolitan area varies from 73.7 to 80.5. Residents with the lowest levels of Subjective Well-being (<75.0) are located in the outer south-eastern growth area middle suburbs of north-western Melbourne. Areas with the highest Subjective Well-being are located in inner

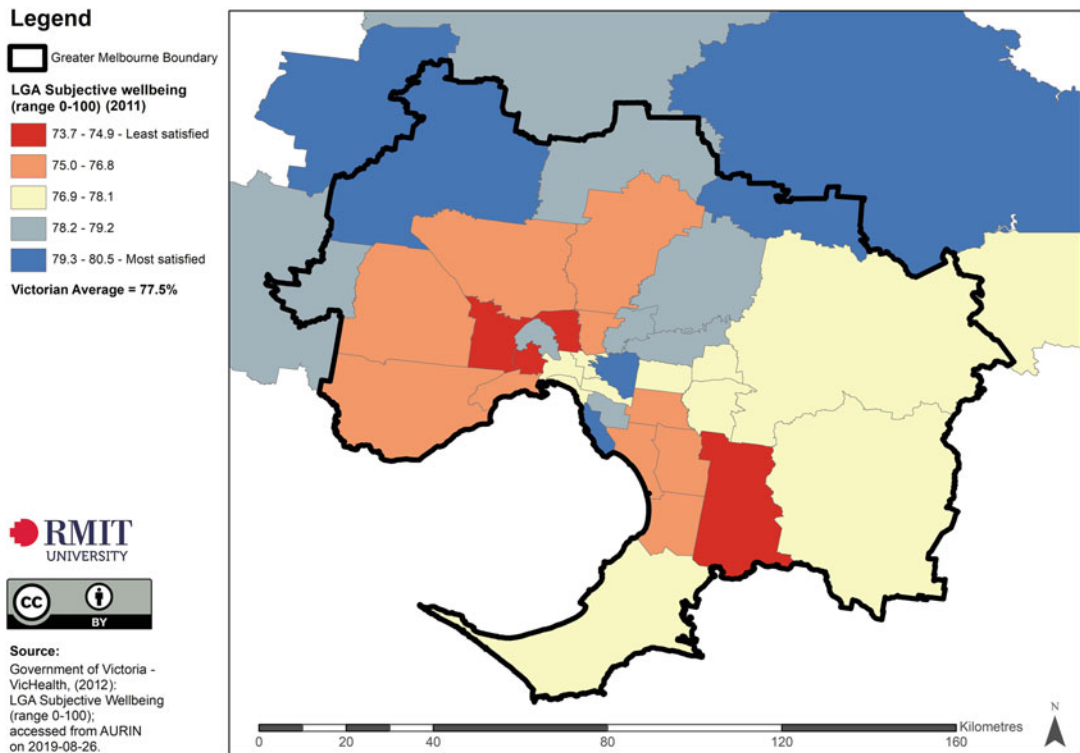


Fig. 11.2 Subjective well-being across the Local Government Areas of Metropolitan Melbourne (Source: VicHealth 2012)

Melbourne along Port Phillip Bay, inner eastern and outer north-eastern areas. The inner eastern areas of Melbourne also coincide with some of the wealthier suburbs of Melbourne.

11.4.2 Socio-Economic Disadvantage

Sociodemographic factors are visible in Fig. 11.3 presenting the Socio-Economic Indexes for Areas or SEIFA Index for Relative Disadvantage (SEIFA—IRSD) developed by the Australian Bureau of Statistics (2011). SEIFA indexes are used to measure socio-economic status and rank areas in Australia on the basis of relative socio-economic advantage or disadvantage. These data are useful for making comparisons between areas experiencing disadvantage with areas that are less disadvantaged. The Indexes include variables including income, education level, occupation and skill levels, housing and dwelling types, and

other more general variables including internet connections, disability, car ownership, families, and marital status among others (Australian Bureau of Statistics 2011). SEIFA—IRSD is presented in Fig. 11.3 providing a visible assessment of disadvantage across metropolitan Melbourne. More recent SEIFA results are available but 2011 data are presented in Fig. 11.3 to align time periods with the Subjective Well-being survey data which was also collected in 2011.

The least disadvantaged municipalities of Melbourne are represented in dark blue in Fig. 11.3 stretching across inner south-eastern, eastern and outer north-eastern areas and coincide with municipalities where residents report high (>75.0) Subjective Well-being. The most socio-economically disadvantaged areas of Melbourne are presented in orange and red in Fig. 11.3 in outer southern, middle western and north-western areas with mid-range disadvantage present in outer western, northern and southern areas.

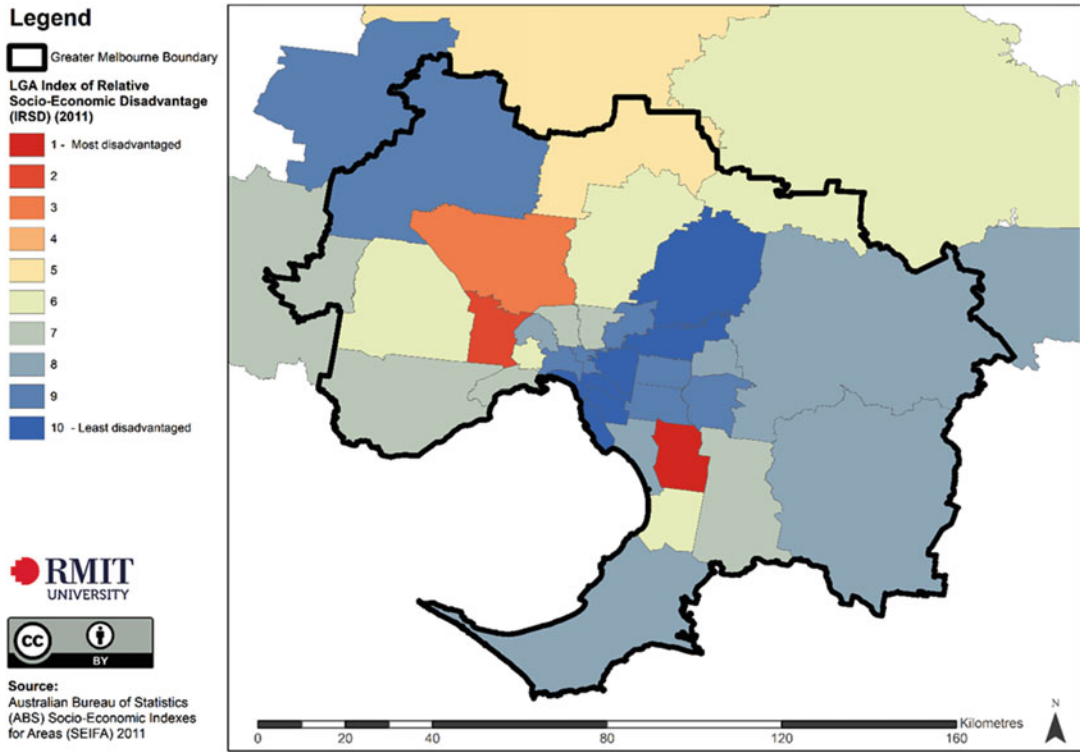


Fig. 11.3 Socio-economic assessment of disadvantage across the Local Government Areas of Metropolitan Melbourne according to SEIFA—IRSD (Source: Australian Bureau of Statistics 2011)

11.4.3 Population Growth across Melbourne

The population of Melbourne is growing rapidly and currently expected to grow to 10 million by 2051 (Victoria 2019) making Melbourne a megacity (United Nations Department of Economic and Social Affairs Population Division 2018) within the next 30 years. This has created unprecedented greenfield development in Melbourne’s outer areas with infrastructure development lagging behind residential development. The rapid population growth across outer Melbourne is presented in Fig. 11.4 which summarises population growth across municipalities of Melbourne between 2006 and 2016.

Fastest population growth is visually represented by dark red with the outer western, northern and south-eastern growth areas dealing with most of Melbourne’s population increase over the past decade. The population of the

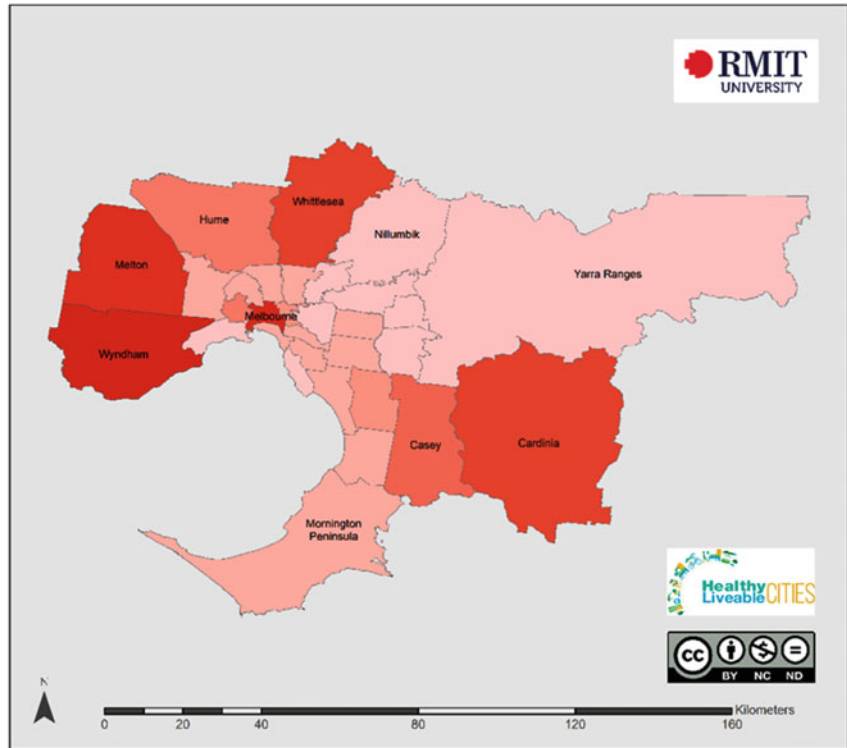
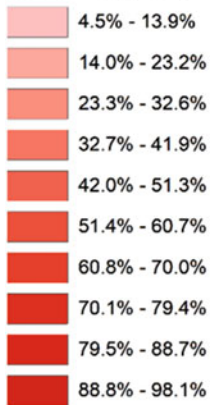
outer western municipality of Wyndham grew by a staggering 98% across the decade, while the outer northern municipality of Whittlesea increased by 62% and the outer south-eastern municipality of Cardinia increased by 69%. Notably, Casey in the outer south-eastern growth area of Melbourne is also one of the municipalities with below average Subjective Well-being (<75.0) in Fig. 11.2.

11.4.4 Access to Frequent Public Transport

Infrastructure needs required to ensure resident Subjective Well-being have not kept pace with the rapid population growth presented in Fig. 11.4. Figure 11.5 provides an assessment of access to frequent public transport services available across Melbourne. It represents the proportion of residences within a suburb that have:

Legend

Percent population growth 2006-2016



Data Source: ABS 2017

Fig. 11.4 Population growth across the Local Government Areas of Metropolitan Melbourne (Source: Davern et al. 2017b)

(i) access to a public transport stop within 400 m and (ii) with a service operating every 30 min between the hours of 7 am and 7 pm (Arundel et al. 2017). This indicator clearly tells a picture of reduced access to frequent public transport across all the rapidly expanding outer growth areas of Melbourne where dark red shaded areas represent suburbs where less than 12.5% of residences have access to frequent public transport. Furthermore, these data presented in Fig. 11.5 were created based on 2016 data and the Subjective Well-being results presented in Fig. 11.2 were collected in 2011 when access to frequent public transport was possibly even lower.

Public transport is only one component of a broader understanding of infrastructure and previous research into the provision of social infrastructure across Melbourne has found an association between lowered Subjective Well-being with reduced access to a mix of social

infrastructure services (Davern et al. 2017a). Outer growth areas of Melbourne are double disadvantaged in terms of access to transport because not only do residents have poor access to frequent public transport services, they also live in environments with poor walkability for transport.

11.4.5 Walkability

Walkability for transport is calculated according to three key factors: land use mix and services of daily living (something to walk to); road connectivity (a way to get there); and housing density (higher population densities are associated with increased populations needed to supply services and different land uses) (Giles-Corti et al. 2014). An extensive research literature has consistently shown that local neighbourhood design is an important influence of physical activity, health

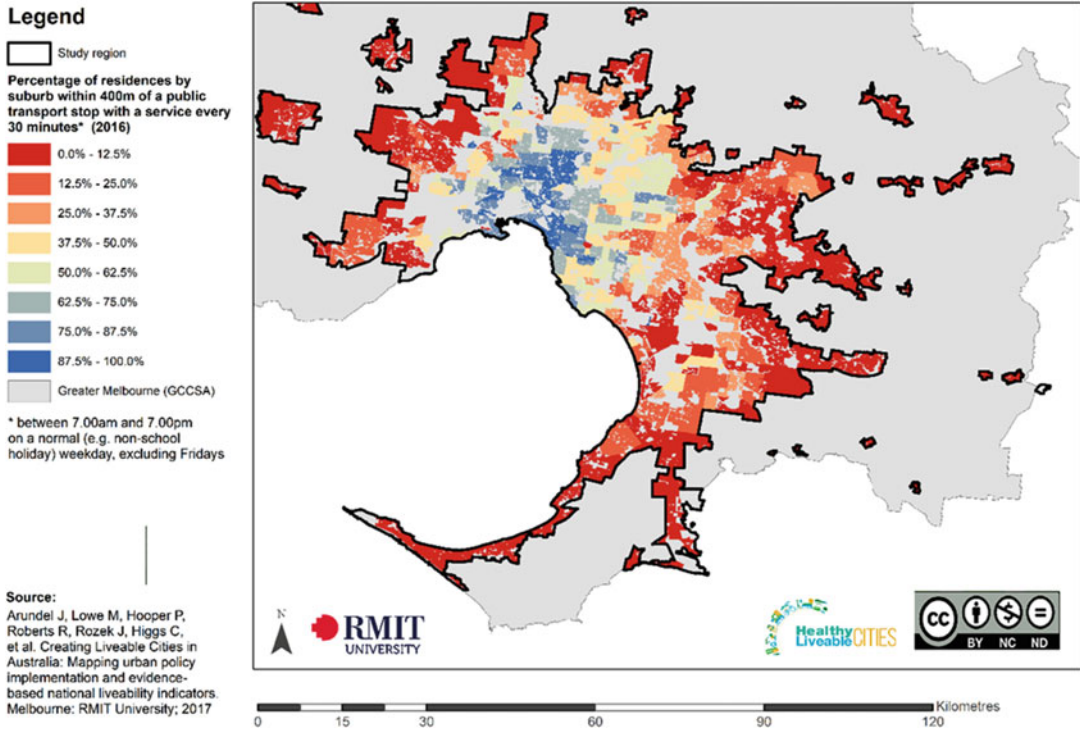


Fig. 11.5 Access to Frequent Public Transport across Metropolitan Melbourne (Source: Derived from Arundel et al. 2017)

outcomes, social connectedness and sustainability (King et al. 2015; Saelens et al. 2003). Walkability for transport for Melbourne suburbs is presented in Fig. 11.6 and reveals reduced levels of walkability in many outer and middle suburbs of Melbourne with high levels of walkability only available in the inner suburbs of Melbourne. This is largely due to low residential density and few destinations (or services) in these outer areas.

These walkability results combined with poor access to frequent public transport are likely to influence a range of life choices including where people work, study, their involvement in the community, their physical and mental health, their personal relationships with friends and family consistent with the findings summarised in literature review presented earlier in this chapter. Furthermore, these aspects of life affected are likely to be captured in the domains of Subjective Well-being included within the Personal Well-being Index (described earlier).

11.4.6 Long Commuting Times

In Melbourne, residents of the more socio-economically disadvantaged (Fig. 11.3) western suburbs are most likely to spend more than 2 h commuting to work. These data are derived from the VicHealth Indicators Survey 2011 (VicHealth 2012) and presented in Fig. 11.7. The dark red areas indicate that 19–26% of the working population is spending more than 2 h/day commuting to work and are most common in the growth area municipalities of outer western and north-western Melbourne. Orange shading is most common across these outer eastern and south-eastern areas of Melbourne and represents 16–19% of working people spending more than 2 h travelling.

Long commuting times have been associated with lower Subjective Well-being in the literature. In areas with poor public transport and walkability, car travel becomes necessary, increasing sedentary and passive transport modes which are associated

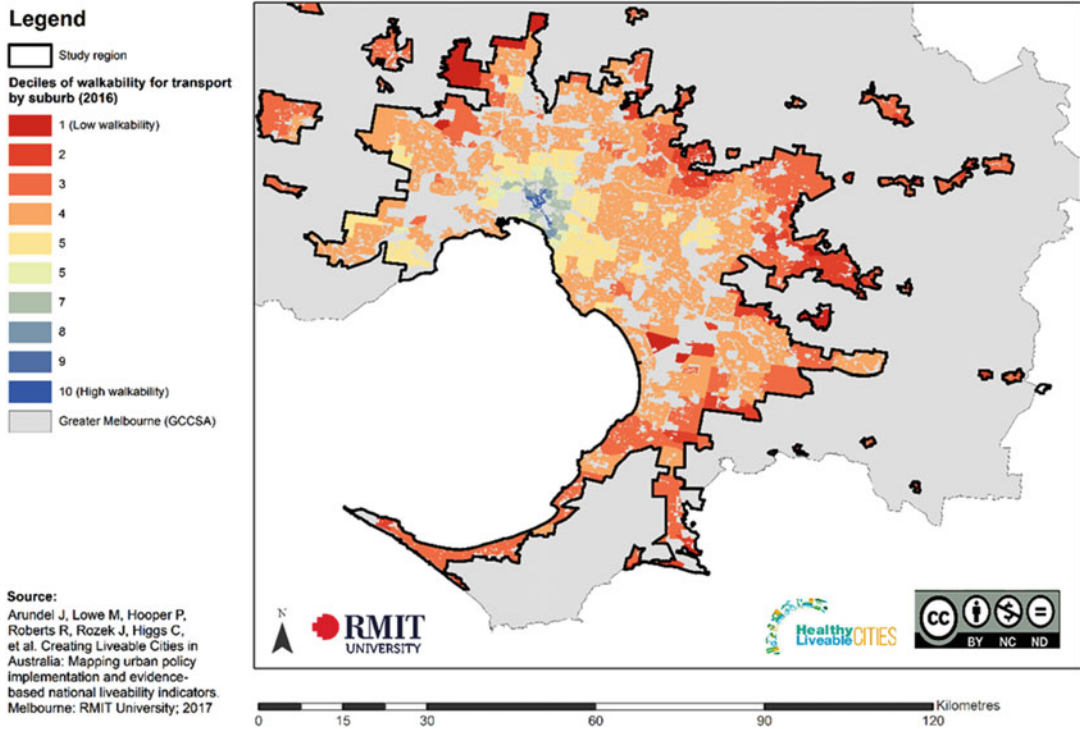


Fig. 11.6 Walkability across Metropolitan Melbourne (Source: Derived from Arundel et al. 2017)

with lower Subjective Well-being compared to those using active transport modes (Adam et al. 2018). These long commuting times are suggested as a social problem and are not always associated with poor health outcomes such as higher Body Mass Index scores (Kroesen 2014) with associations between Subjective Well-being and commuting time argued to be mediated by social relationships. People travelling for this amount of time would be expected to have less time for civic, cultural or personal relationship pursuits which could possibly impact on their Subjective Well-being. Further examination of time spent with friends and family across Melbourne is presented below and concurs with this suggestion.

11.4.7 Lack of Time with Friends and Family

Residents who live in outer areas of metropolitan Melbourne are also most likely to report lacking time to spend with family and friends. The

percentage of people who reported this is derived from the 2011 VicHealth Indicators Survey (VicHealth 2012) with results presented in Fig. 11.8. Municipalities shaded in red and orange represent areas where over 27% of the population reported lacking time to spend with friends or family. Many of these areas are in the outer growth areas and/or municipalities where residents also report lower Subjective Well-being (Fig. 11.2). The reduced time with family and friends in these areas is not surprising and also aligns with long commuting times presented in Fig. 11.7.

Maintaining personal relationships are central to measurement and conceptual understanding of Subjective Well-being and can be an important influence of homeostatic stability (balance) (or instability) of Subjective Well-being (Cummins 2013). However, personal relationships require time to be nurtured and developed over time, providing greater meaning to life and transport availability and commuting times can create time barriers preventing this from

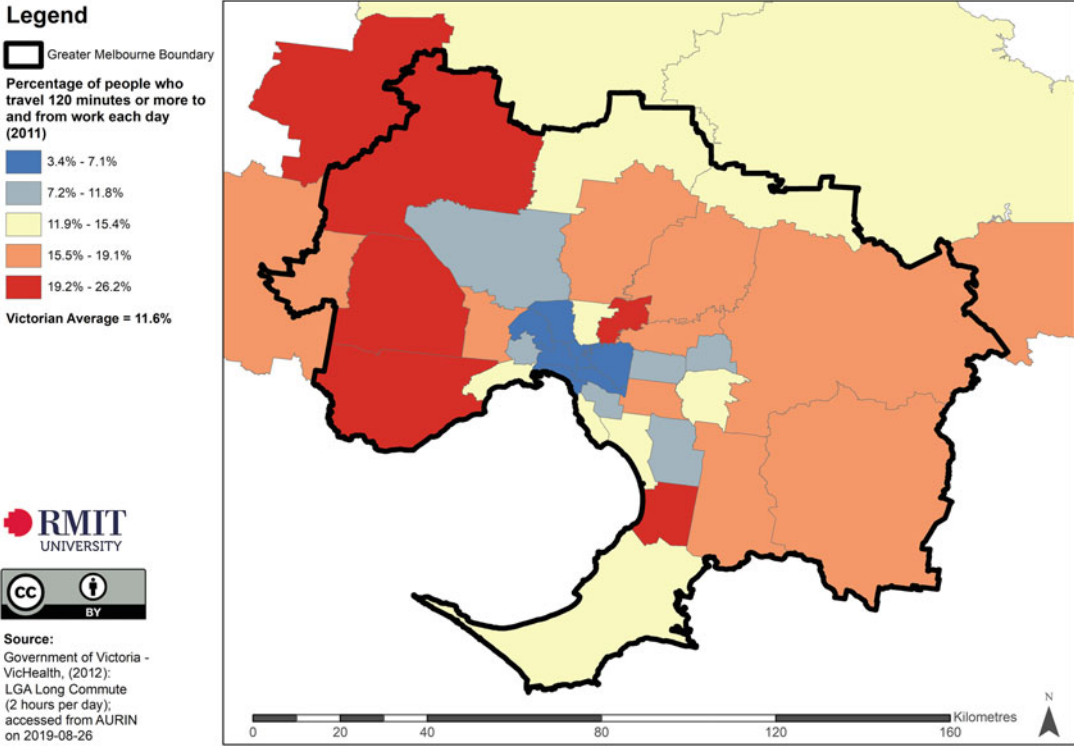


Fig. 11.7 Commuting times greater than 2 h across Metropolitan Melbourne Local Government Areas (Source: VicHealth 2012)

occurring. Although the results presented in this chapter do not provide association level statistical testing, they do provide highly visual representations of patterns linking both active and public transport types and public transport service frequency to patterns observed in population level Subjective Well-being assessment and possible additional social outcomes.

11.5 Conclusions

Households are often attracted to growth areas due to cheaper housing, however as these areas are generally further away from jobs, and—at least in the beginning—shops, hospitals and leisure activities, this means that they often spend a high share of their income (and time) on travelling and are more vulnerable to increasing oil prices because of their car dependency and a paucity of other travel options in these areas.

Ideally, a large extent of the population growth should be absorbed in already established urban areas. This would be more sustainable due to lower use of land for urban development and increased opportunities for active transport because of shorter distances between destinations, which also makes social life and interactions easier. However, as not all population growth can and will be absorbed by established areas, new urban development on the fringes of the city needs to be planned in a way that other transport options than the private vehicle are viable alternatives for residents.

The analysis of metropolitan Melbourne in Australia has shown that the outer urban areas have experienced the fastest population growth, with one local council nearly doubling its population numbers from 2006 to 2016 and the others also growing by more than 50%. It has also, through the example of public transport, shown how infrastructure and services have not kept

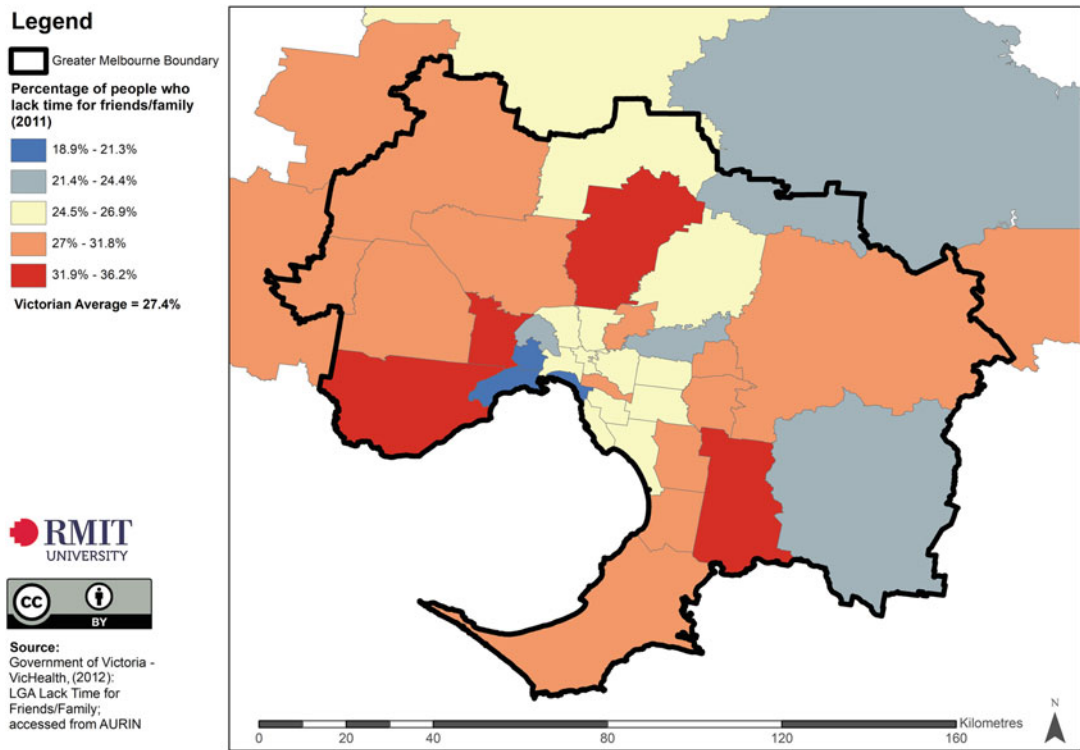


Fig. 11.8 Percentage of people who lack time for family and friends across metropolitan Melbourne Local Government Areas (Source: VicHealth 2012)

pace with the rapid population growth in these areas. Residents in the growth areas have poor access to public transport, with large areas where less than 12.5% of residences have access to frequent public transport within 400 m (well below policy ambitions) (Arundel et al. 2017).

Apart from poor access to public transport services, growth suburbs also usually show poor walkability for transport, which is largely due to low residential density and few destinations in these outer areas. This means that for the people living in the growth areas the use of sustainable transport is less feasible than in other areas of the city.

In addition, because of the centralised job distribution in Melbourne, the share of people spending more than two hours commuting to work are generally higher in the growth areas than in the inner and middle parts of the city. In the growth area municipalities 16-26% of the working population travels for more than

two hours back and forth from work. Long commuting times and (a subsequent high share of) sedentary and passive transport modes have been associated with lower Subjective Well-being in the literature. They are not always associated with poor health outcomes but can have a negative influence on health.

Another element of Subjective Well-being likely to be influenced by long commuting times are personal relationships. The long commute leaves less time for civic, cultural or personal relationship pursuits. Accordingly, in most growth area municipalities (except for one growth council) the share of people reporting lack of time to spend with friends or family is above the Melbourne average with over 27% of the population stating a lack in these areas. This lack of time can lead to lower Subjective Well-being, as maintaining personal relationships is central to feeling well, as these relationships provide greater meaning to life.

The measurement of Subjective Well-being across the Melbourne metropolitan area does not show a clear spatial pattern of residents in growth areas having lower levels of Subjective Well-being. This is also not to be expected, as many other elements than transport and accessibility play into Subjective Well-being, for example through income, age, gender, general health or the family situation. However, it could be seen that residents with the lowest levels of Subjective Well-being are located in a south-eastern growth area council and middle suburbs of north-western Melbourne. In contrast, areas with the highest levels are located in inner Melbourne and the inner eastern and outer north-eastern areas that are also the least socio-economically disadvantaged municipalities of Melbourne.

While the results presented do not provide association level statistical testing, they show patterns that suggest a connection between low levels of active and public transport options and Subjective Well-being. The transport situation in outer suburbs is likely to influence a range of life choices including where people work, study, their involvement in the community, their physical and mental health, their personal relationships with friends and family, and with this their quality of life and Subjective Well-being. This means that better accessibility and more (sustainable) transport options in those growth areas can influence quality of life and Subjective Well-being positively.

Different areas of public policy are likely to influence better transport outcomes. These include infrastructure; pricing; transport and network planning; land use planning; and subsidies. Better transport options can be achieved by improved and expanded public transport, as well as more diverse land-use mix so that important destinations are closer to residents and more easily reached. Network planning and political or institutional capabilities are factors. The following summarises some options on how to achieve a better and earlier provision of public and also active transport in new growth areas.

Higher densities are essential if we want to achieve suburbs that are conducive to other

transport options than the car, in addition to improved health outcomes (Giles-Corti et al. 2014). This does not mean that outer suburbs need high rise buildings, but a standard of two-storey houses and town houses could already increase densities a good deal in Australian suburbs without losing too many of the amenities people are looking for and without increasing prices too strongly. With better building design more dwellings could be built in the same area without being cramped so that destinations are closer to more people and thus more viable for providers of services and also in a walkable or bikeable distance for more people. Better design of open space can also improve the experience of walking and cycling adding to the likelihood of people doing so.

In that context, diversity is another important issue, so that more people can choose their housing according to their needs, be it the intergenerational family with children, parents and grandparents in one house or the single parent with a child to look after.

For making walking and cycling feasible transport options more every day destinations in a walkable and bikeable catchment, such as shops, restaurants, community and health services, and educational facilities need to be planned for and be implemented at an early stage of the development. Interim solutions are a possibility, such as community centres in display homes or developing some parts of planned town centres early. Furthermore, infrastructure and amenities, such as trees for shading along bike and foot paths or bike hoops at certain destinations are more detailed items but have an important influence and need to be integrated into planning as well.

Destinations also include employment. A better balance of jobs and housing on the urban fringe could help to shorten commuting distances and time. Planning for employment precincts—and again thinking about how these could be achieved and supported—are important elements for making public and active transport feasible options for commuting. Naturally, offering high-frequency and reliable rapid public transport to

those employment centres as well as high quality walking and cycling infrastructure are other important elements.

The early delivery of the necessary infrastructure and services, such as public transport and also community hubs, is crucial so that behaviours can be formed when people are moving to their new home. Research has shown that behaviour changes are more likely to occur when major interruptions to routines happen, for example through key life events, such as moving house. Particularly for transport mode choice several studies have come to the conclusion that residential relocation can influence travel behaviour and that characteristics of the new neighbourhood can influence mode choice (Thompson et al. 2011; Krizek 2003; Klöckner and Matthies 2004).

Sequencing of urban growth, in the sense that urban growth is directed to specific areas in a sequence, can help to achieve the population numbers that are “needed” for a viable or at least sensible public transport offer earlier. Rather than having several developments in several locations at the same time and leap-frogging occurring, development would be built in one location at a time, so that the necessary threshold of population for offering public transport as well as other services, such as shops, education community and health services, is reached soon after development has started. As this approach could potentially lead to issues of competition between different developers in different areas, rules about developing out of sequence could be introduced, such as the requirement to compensate the relevant infrastructure agencies, if this variation causes extra costs for these agencies.

Furthermore, trigger points can be used, such as the development of a certain number of lots triggering the implementation of a public transport route. As an interim solution, a small fleet of smaller buses could be deployed, enabling the servicing of smaller roads and temporary routes. Once development is ready to be served by a standard route and bus, this fleet would move to the next suburban frontier area, again as an interim solution. For low density areas, demand responsive services are another possibility to offer at least some public transport. In future, this can

possibly be combined with new technologies, such as autonomous vehicles. However, standard services are overall more desirable, as they provide more reliable and higher frequency public transport, and with this a feasible transport option in comparison to the car.

Other options to improve accessibility with a focus on sustainability include virtual mobility, which reduces the need to travel. However, this also reduces social interaction, which is an important part of Subjective Well-being so its utilisation should be limited.

Critical in achieving these suburbs that have more transport options available is the evaluation of existing suburbs and their problems and especially problems of implementation. In Melbourne, it has been found that while public transport and active transport is planned for, the implementation on the ground and its acceptance is clearly lacking in huge parts. To find out why that is, is one of the first crucial steps to improve policies and the eventual development.

In conclusion, better accessibility and more diverse transport options can be achieved in new suburbs and on the urban fringe and would contribute at least in part to residents’ Subjective Well-being and would also improve sustainability. Greenhouse gas emissions could be decreased, community connections possibly increased with decreased commuting times and more social and economic sustainability enabled. This would be achieved through improved mobility to important destinations such as education, employment, local shops, public open spaces and services through the empowerment of transport-disadvantaged people.

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Territorial Equity Measurement in Buenos Aires Province (Argentina)

12

Alejandra Auer, Claudia Andrea Mikkelsen, and Sofía Ares

12.1 Introduction

Spatial inequality is a concern that reveals the existence of fragments of well-being and deficiencies; thus, quality of life studies become a way of approximating the analysis of these inequalities.

International agencies, such as OUN-Habitat, focus on the importance of quality of life research; at its May 2019 session, their main topic was innovation for better quality of life in cities and communities, stating in its ministerial report:

The urgent need to improve everybody's quality of life and to promote sustainable modes of consumption and production through, among others, but not exclusively, sustainable lifestyles, efficient use of resources, and the transition to a circular economy and other sustainable development strategies. (ONU-Hábitat 2019)

It is interesting to note among the various concerns and actions and in a global context of strong urbanization that the focus is on access to

decent housing, attention to poverty and urban-rural links. Districts with sizeable urban centers are demonstrative of the territorial inequalities that exist in the “urban-rural *continuum*” where most services are concentrated in urban spaces. These disparities hinder territorial equity, which is understood as the “geographical configuration that guarantees all of its inhabitants the same conditions of access to a good quality of life.” Quality of life is a multidimensional concept and can be understood as the quality of the environment in which we live, the quality of action, and a subjective enjoyment of life (Veenhoven 1998). However, only the first category, that is, the objective dimension, is being considered for this study.

Studying the quality of life of the population involves recognizing, at the spatial level, the coexistence and overlapping of populations, companies, states, non-governmental organizations, among other actors, as well as using the territory in diverse, complex ways and not always according to the common good. This chapter proposes to work interrelatedly with the conceptual categories of quality of life and sustainability to observe the existence of territorial equity. In this sense, and in line with the set of objectives set to achieve sustainable development by 2030,¹ it is observed that the 17 established

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¹ <https://www.un.org/sustainabledevelopment/es/2015/09/la-asamblea-general-adopta-la-agenda-2030-para-el-desarrollo-sostenible/>

goals meet the search for better living conditions and sustainable spatial justice environments.

This study aims to analyze territorial equity in the province of Buenos Aires (Argentina) based on the analysis of different indicators of quality of life and sustainability, and measured at the district level. The methodology used was based on the analysis of indicators that integrate the characterizing dimensions of quality of life, such as education, water and health, dwellings, economic activity and employment, communication and connectivity, as well as the environment, through statistical methods and geographic information systems. The latter was used to express the analytical results spatially; that is, they were mapped for a better comprehension of the territory and the multiple dimensions articulated in its construction.

The data sources applied corresponded with the National Census of Population, Homes and Housing (INDEC 2010), digital elevation models and monthly precipitation data (period 1963–2012), as well as reports from the Ombudsman's Office of the Nation (2010) and the Ombudsman of the province of Buenos Aires (2018).

This work is structured into six sections. After the introduction, a debate on quality of life, sustainability and territorial equity is partially revitalized. Thereafter, the methodology used and the universe of analysis are introduced. The final section offers the results and closes the work with some final comments.

12.2 Theoretical Discussions on Conceptual Categories

From a critical understanding of the world and the social realities of Latin America, Arita Watanabe (2011) argues that the guiding model of global economic development finds difficulty with several principles of nations' equity and social justice. Furthermore, under such an anthropocentric model, it increasingly deteriorates the environment. In Latin America, the development of societies is permeated by a model of environmental degrading of the state by not contemplating

effective measures for environmental care and conservation, by not promoting the expected social development, and above all, by not meeting expectations (Arita Watanabe 2011).

Quality of life is an objective that all societies have intended and sought. Veenhoven (1998) explains that the quality of life category covers at least three meanings: (1) Quality of the environment in which we live; (2) Quality of action; and (3) Subjective enjoyment of life.

In the first case, quality of life is mediated by the "place", a category that makes up the conceptual constellation of geographical studies (Haesbaert 2018). The "place" refers to the built environment in which subjects develop their daily life and is where technical objects and social actions contain supportive and also conflicting relationships, which historically, creates space. This space is conditioned by and conditions the quality of life of the subjects. The quality of action, that is, how subjects deal with life, is linked to agency capacity, to the ability to live. The third, as Veenhoven expresses, refers to quality of life in terms of "enjoyment" so the emphasis lies in personal experience. Thus, a good life is a life that one enjoys (1998).

Regarding the multiple dimensions associated with the quality of life, Bailly proposed a critical analysis of the aspects usually considered to characterize it, though not all factors are of the same importance (Bailly 1982 cited by Racine 1984). This author warns that introducing the spatial dimension to quality of life studies provides the possibility of explaining the causes of specific asymmetrical relationships. Disparities in productivity, in employment potential, gaps in the dissemination of information, and innovation are the result of unequal power (Bailly 1982 cited by Racine 1984). Consequently, power relations and their spatial dimension are fundamental to comprehending inequities: "the geography of well-being focuses on the set of relationships that men weave with each other and with their territory to understand the satisfactions that derive from these relationships and from the inequalities that result from them" (Bailly 1982, p. 49 cited by Racine 1984, p. 73).

The study of the objective dimension of quality of life involves adopting indicators that were previously relegated to economic variables. In the case of environmental indicators, they respond to growing demand from society for a healthier environment (Celemín et al. 2015) and thus, create discourse on sustainability that is weaved throughout many contemporary stories.

The concept of sustainability means “to maintain over time” (Lélé 1991, pp. 608–609 cited in Foladori and Tommasino 2005, p. 197). It is a complex, dynamic and multidimensional concept, comprising environmental, economic and social aspects (Gallopín 2001), though some authors incorporate other dimensions, such as the political-institutional (Quiroga Martínez 2001). Following the description of dimensions created by Martínez Castillo and Martínez Chávez (2016), the *environmental* dimension refers to preserving and regenerating the complexity and productivity of ecosystems, natural cycles and biodiversity, while the *economic* dimension refers to the achievement of economically efficient and equitable development. Furthermore, the *social* dimension seeks to achieve equitable access to environmental goods, both intragenerational and intergenerational, among genders as well as among cultures. The *political* dimension implies the direct participation of the population in decision-making, in a decentralized and democratic manner, as well as in the management of sociocultural and environmental possessions. Because it is a multidimensional concept, “it is illogical to talk about “environmental” sustainability or “economic sustainability” (the latter is also defined as “weak sustainability,” *sensu* Galván-Miyoshi et al. 2008), but of the sustainability of socio-ecosystems as a whole (also called “strong sustainability”)” (Galván-Miyoshi et al. 2008, pp. 42–43).

The most widely used definition of sustainable development is the one proposed by the United Nations Commission on Sustainable Development, which declares it as “a development that meets the needs of the present without compromising the ability of future generations to meet their own needs” (WCED 1987, p. 43 cited by Tommasino et al. 2005, pp. 12–13).

Two ethical concerns arise from this definition and may conflict: *intergenerational justice*, given that future generations should be compensated by reductions in the allocation of resources generated by the actions of current generations, or they should limit their actions in the interest of making resources available for future generations; and *intragenerational equity*, which refers to reducing resource disparities among those living today. In addition to these two anthropocentric issues, there is also an eco-centric view of biodiversity, which is related to the intrinsic value of nature (Gallopín 2001). The main criticism of the term “sustainable development” is to omit the main foundations of the production model creating chaos on the planet, as well as the socio-economic aspects and consequences of that model, which have increased the gap between the rich and the poor (Martínez Castillo and Martínez Chávez 2016).

Quality of life as a multidisciplinary and multidimensional category has incorporated sustainability in its reflections in terms of observing spatial inequalities, while also demonstrating territorial inequities.

In relation to justice, Moreno Jiménez (2007) recognizes two perspectives. One of them is based on the notion of equality that “refers to the fact that everyone has identical rights and obligations.” Thus, he proposes that “individuals in similar circumstances should be treated in the same way” (Moreno Jiménez 2007, p. 204). Accordingly, an egalitarian point of view will assimilate all inequality as injustice. The other approach is based on the idea that not all men are identical and as such, this is where Rawls’s theory appears (2003), indicating that inequalities are not necessarily contrary to justice and equity and that the latter is intended to optimize inequalities to limit them.

Moreover, justice is not a value that remains only on a super-structural plane but also has a spatial dimension. Thus, geography can contribute to justice and equity. For Reynaud, socio-spatial justice is “the set of means used by the public authorities to alleviate inequalities among socio-spatial classes” (Reynaud 1981, pp. 91–92 cited by Moreno Jiménez 2007, p. 204).

Moreover, the authors continue by arguing that the pair (equality/inequality) is present as a way to evaluate spatial justice. For Reynaud (Reynaud 1981 cited by Moreno Jimenez 2007), equality has two contents: (a) equality of opportunities, meaning that everyone has the same economic structures and identical levels in the provision of community equipment; (b) equality of access, an item that adds to the sociological side based on personal resources (educational-cultural level, economic situation), while the spatial aspect is linked to geographical accessibility measured in the monetary and temporal costs of movement to access community infrastructure.

According to Harvey, social justice consists of the application "... of principles of justice to conflicts arising from the need for social cooperation while seeking individual improvement" (Harvey 1979, p. 98). His concept of social justice was based on the idea that "a fair distribution can be rightly reached" (Harvey 1979, p. 99). As such, measuring territorial justice requires taking into account the allocation of resources and therefore, the satisfaction of people's basic needs, as well as the determination of "the extent to which the allocation of resources to one territory affects conditions in another" (Harvey 1979, p. 107). Hence, the degrees of difficulty offered by the environment, in conjunction with policies and resources to mitigate them, would be parameters for establishing the degree of spatial justice. It may be indicated that any decision of territorial order that takes into account the principle of maximization, i.e. "that the possibilities for the least advantaged territories are as favorable as possible" (Harvey 1979, p. 113), will be fair.

In the 1990s, Young warned that there were two types of injustice: one of domination (does not allow elections), and the other of oppression (does not allow for the acquirement of powers to create elections). Within oppression, Young recognizes exploitation (related to capitalism), marginalization (of work, of social life), lack of power, cultural imperialism, and violence (towards specific groups) (Young 1996). In this context, Harvey (1991) states that the causalities of injustice and spatial inequalities come from capitalism, identifying the harm to future

generations due to environmental degradation as the sixth form of oppression (cited by Brennetot 2011).

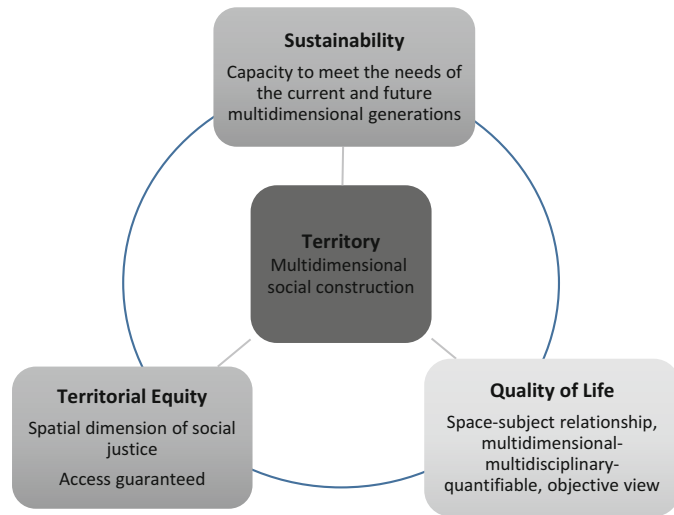
In recent years, Bret has brought to geography the concept of territorial equity, which, given its description, has common points with Reynaud's arguments. Territorial equity is defined as the spatial dimension of social justice and designates a geographical configuration where everyone is guaranteed the same conditions of access to public services, employment and other characteristics of life in society (Bret 2013). From these concepts, it is feasible to understand and analyze situations marked by territorial equity.

The link created among quality of life, territorial equity and sustainability is expressed in Fig. 12.1, from which the research objective proposed in this chapter will be addressed.

12.3 Characterization of the Study Area

Argentina is one of the largest countries in the world, with a population of 40,117,096 inhabitants, of which half are concentrated in the autonomous city of Buenos Aires and the province of Buenos Aires (INDEC 2010). Given its latitudinal expansion, it has a climatic diversity ranging from the cold of the south to the tropical temperatures of the *Chaqueña*, *Tucumano-Oranense* and *Misionera* northern ecoregions. At a regional level, these characteristics have contributed to some productive and socio-economic asymmetries throughout history. The combination of fertile soil and adequate rainfall means that one-third of the national territory bears soil with agricultural potential, which occupies the eighth largest area of acreage of cultivated land (35,750,000 ha), the third-largest area in terms of cultivated land per capita (1.12ha) and the 15 largest on surface under irrigation (Matteucci and Morello 2000). The increase in agriculture in Argentina's most fertile lands and its expansion into new territories has led to marginal areas for livestock or to their intensification through *feedlot* systems, degrading productive strategies because of underlying economic

Fig. 12.1 Relationships among conceptual categories. (Source: the authors' examination of information from cited authors)



rationality. Additionally, more than 9 million ha of the *Pampa* and *Gran Chaco* ecoregions have increased the annual double crop practice with the adoption of a so-called “technological package” that brings together the agrochemical, improved seed and machinery triad.

Environmental consequences of this production model include the loss of natural biodiversity from the overuse or misuse of pesticides, loss of fertility from underuse of fertilizers, and persistent loss of soil, structure and water retention capacity. In addition, unplanned growth and market open policies have created several current environmental problems (Matteucci and Morello 2000).

The Pampean Region, which comprises the city of Buenos Aires and the provinces of Buenos Aires, Santa Fe, Córdoba, Entre Ríos and La Pampa (INDEC 2010) has, in global terms, a higher degree of economic growth and relative development than the rest of the Argentine regions. Its hegemony throughout the formation of the national system, particularly associated with the agro-export model, has helped to forge a positive image compared to the rest of Argentina’s regions. The basis of this dichotomy, Pampean-Extra Pampean, is the greatest relative strength of the Pampean region’s economy, characterized by a diversified structure and with the capacity to place exportable surpluses. On the

contrary, the economies of the other regions are generally more specialized (and vulnerable) and are commonly directed at the domestic market (Velázquez et al. 2015). This region has the best quality of life after the Patagonian Region (according to Velázquez and Gómez 2016). However, the situation is heterogeneous inland, with three distinguishing sectors: (1) Central Area: has the best economic situation and comprises most of the province of Buenos Aires except for the Depressed Pampa and the area of contact with the Metropolitan Region of Buenos Aires (MRBA); (2) Santa Fe and Córdoba: high rates of well-being and transition zones; for example, to the north of Argentina and; (3) Peripheral area of the *Pampeana* Region corresponding to La Pampa and Entre Ríos (Velázquez and Gómez 2016).

In this context, the province of Buenos Aires has a population of 15,625,084 inhabitants (INDEC 2010). It is divided territorially and administratively into 135 districts (Fig. 12.2b), of which 110 were considered for this study, except those corresponding to the MRBA. The climate is humid to sub-humid, with precipitation ranging from 600 mm southwest to 1100 mm in the northeast (Soriano et al. 1992). The ecological areas recognized for this province are defined based on characteristics of relief, soil, drainage patterns, and vegetation, and include the Rolling Pampa, Inland Pampa, Depressed Pampa and

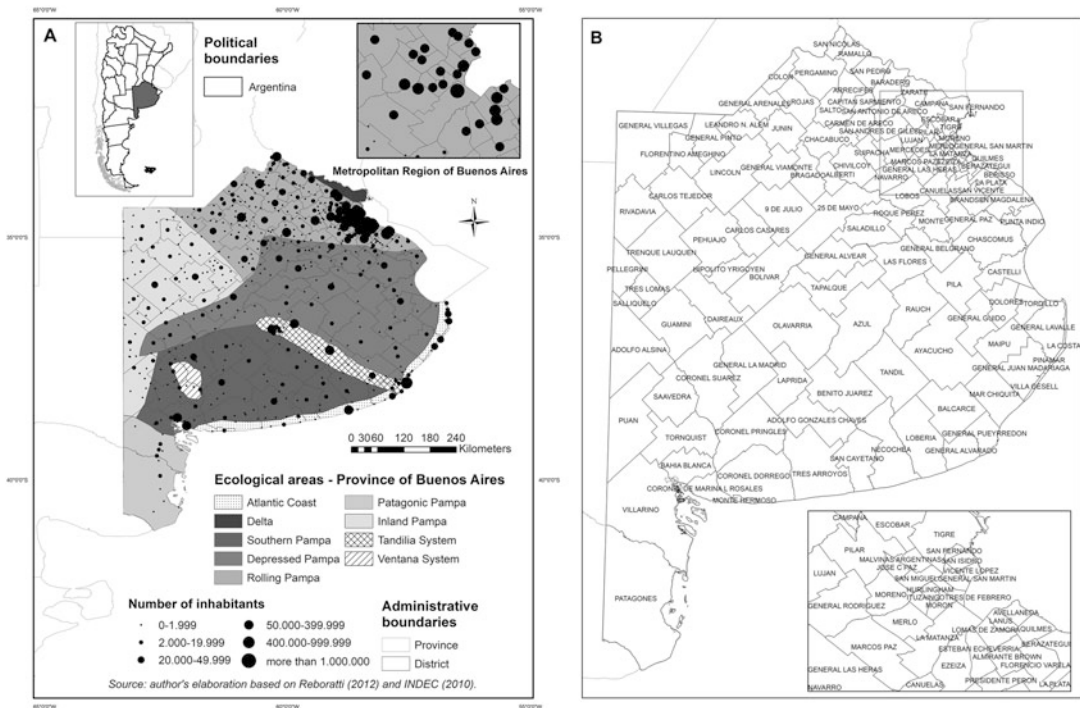


Fig. 12.2 Province of Buenos Aires, ecological areas and localities (a) and districts names (b)

Southern Pampa (Fig. 12.2a). While agriculture and livestock are the dominant activities, the Rolling Pampa landscape is characterized by fields with cultivation, while in the Depressed Pampa, the cattle fields under natural or semi-natural pastures are the elements of the landscape due to soil limitations. Lastly, the Inland Pampa and Southern Pampa present intermediate values of agricultural development (Soriano et al. 1992).

Argentina’s highest technical, scientific, informational, and demographic density is concentrated in this province; however, this is also where the most significant inequalities converge (Velázquez and Gómez 2016). In regards to the historical density of this province, it is interesting to make clear the distinction between the MRBA, which includes the autonomous city of Buenos Aires and the districts of the first, second and third urban ring zones, more often called the interior of Buenos Aires province. The first

corresponds to the administrative-economic center of Argentina, an area of the former European settlement, which has led, together with Córdoba, the process of industrial expansion (Velázquez and Gómez 2016). Furthermore, this section has been the headquarters of national authorities and an exemplifier of Argentina’s urban macrocephaly, a feature it shares with the rest of Latin America’s major capitals. For its part, the interior of the province has played a central role in the production of primary goods. Thus, such matters have greatly influenced the resulting spatial configuration, where many of the localities have contributed to the advancement of the “white and European frontier” over native people (Linares and Velázquez 2012; Velázquez and Gómez 2016) with locations that currently fulfill various functions, although with an unbalanced urban system and a concentrated scheme, as shown in Fig. 12.2.

12.4 Methodology

Methodologically, the study must be characterized as quantitative in nature, where the use of multivariate analysis techniques have allowed the creation of a Quality of Life Index (ICdV), which gathers indicators related to the dimensions of education, communication-connectivity, water and health, dwellings, economic activity and employment, as well as the environment (Table 12.1). That is, a set of variables were used to characterize each of these dimensions, which, in turn, were operationalized through two or more indicators for a better approach.

The units of analysis on which the index was applied correspond to the districts of the province of Buenos Aires, except for the MRBA. For analysis of the first five dimensions, the data source used was the National Census of Population, Homes and Housing of 2010 (INDEC).

In relation to the environment dimension, digital elevation models (DEM) from the Shuttle Radar Topography Mission (SRTM) sensor, with a resolution of 90 m (earthexplorer.usgs.gov), and monthly precipitation data from January of 1963 to December of 2012, with a resolution of 0.5° (ERSL-NOAA²), were used. Furthermore, the DEM was used for slope calculation. Precipitations were grouped annually, and the mean value and standard deviation of each of the data series were calculated. The calculations carried out sought to determine the recurrence of wet and very humid periods in relation to the slope, a central variable to analyze the surface water runoff. From this, very wet years were determined if the average rainfall was ± 2 standard deviations, while wet years were those that only exceeded ± 1 standard deviation. This accounted for the years of each and as a result, the period of recurrence of those was calculated (Mikkelsen et al. 2018a, b).

The Pesticide Pollution Index, which was obtained from the Ombudsman (2010), was also included. For the indicator “waste management,”

the daily generation of urban solid waste (tonnes/day) and the distance from garbage to the nearest urban area (kilometers) were considered, with data from the report of the Ombudsman of the province of Buenos Aires (2018) being used. In cases where full information was not available (29 districts), missing data were obtained by interpolation of the values corresponding to the border counties.

According to the theoretical approach selected, profit variables, i.e. those that in their highest scores, characterize the best situations, were selected. Therefore, the Pesticide Contamination Indicator (originally a cost variable that in its highest scores, denotes the worst situation) was multiplied by -1 . However, the waste management (WM) indicator was calculated as:

$$WM = \frac{1}{\text{Generation waste}} \times \text{distance} \times 100$$

The design of data matrices had, as a starting point, the definition of the spatial units (110 counties of Buenos Aires province), the choice of dimensions and indicators (Table 12.1), and the selection of a multivariate analysis technique (standardized averages method).

For the selection of the indicators, it was taken into account that they were not collinear within the dimensions (Table 12.2); for this purpose, an exploratory analysis was made with Geoda software, which associates traditional statistical analysis with its cartographic visualization. Hence, statistics such as R^2 were extracted. Additionally, the Tolerance Index and the variance inflation factors (VIF) were obtained in a spreadsheet, revealing that the indicators were not collinear, as they stayed below 10.

After verifying that the indicators were not collinear, the data matrix construction process continued.

Taking these variables, the Original Data Matrix (ODM) was designed and then transformed into the Index Data Matrix (IDM) (16×110). Thereafter, the IDM was standardized on zeta scores, forming the Standardized Data Matrix (SDM). The ODM was designed with

² <https://www.esrl.noaa.gov/psd/data/gridded/>

Table 12.1 Dimensions, variables and indicators

Dimension	Variable	Indicator	Source
Education	Achieved highest level of education	% of population aged 20–59 with secondary or full polymodal level % of population aged 26–59 with full university level	INDEC. CNPhyV (2010) (In Argentina, the National Population, Household and Housing Census seeks to maintain a 10-year periodicity recommended by the United Nations. The last census was carried out through personal interviews on October 27, 2010, while the previous one was carried out in 2001. The next census is scheduled for October 28, 2020)
Water and Health	Provision of water within the house	% of the population in households with in-house water % of the population in households with main water supply and with motor pump	INDEC. CNPhyV (2010)
	Health coverage	% of population with social welfare	
Dwelling	Overcrowding	% of the population in uncrowded households (two or fewer people per room) % of the population in houses with more than one household	INDEC. CNPhyV (2010)
	Materials quality	% of the population in houses with quality of materials INMAT-1: resistant and solid materials on floor and roof, with ceiling	
Communication and Connectivity	Computer	% of the population in households with a computer	INDEC. CNPhyV (2010)
	Telephony	% of the population in households with mobile phones % of the population in households with landline phones	
Economic Activity and Employment	Activity situation	Employment rate: % between the occupied population and the population aged 14 and over	INDEC. CNPhyV (2010)
	Retirement contributions	Active workers who have employer retirement contributions or make them on their own in the population aged 14 and over (%)	
Environment	Recurrent wet years	Gradients (%) and repetition of very wet and wet years	Mikkelsen et al. (2018a, b)
	Pesticide pollution	Pesticide contamination rate	Ombudsman's Office (2010)
	Waste management	Urban solid waste management	Ombudsman of the province of Buenos Aires (2018)

the 16 indicators selected for the 110 counties that integrate the study area, in addition to the population totals (population aged 20–59, aged 26–59, over 14 years and total). Moreover, percentage calculations were performed structurally; that is, in the direction of the rows. The SDM contains

the standardized values of the zeta scores of the 16 indicators, in addition to the Quality of Life Index, which has a dimension of 17×110 .

Standardization was performed to ensure comparability between indicators by applying the formula of the Z scores.

Table 12.2 Correlation (R^2), index of tolerance and index of inflation values of variance, according to the dimensions

Statistical	R^2	Tolerance index	VIF
Full university level	0.638	0.362	2.759
Full secondary level	0.485	0.515	1.942
Water within the house	0.819	0.181	5.526
Water source	0.740	0.260	3.852
With social welfare	0.668	0.332	3.008
Personal overcrowding	0.774	0.226	4.420
Household overcrowding	0.698	0.302	3.308
Materials quality	0.784	0.216	4.623
Computer possession	0.795	0.205	4.882
Landline possession	0.834	0.166	6.033
Cellphone possession	0.704	0.296	3.379
Retirement contributions	0.309	0.691	1.447
Employment	0.409	0.591	1.691
Recurrence of wet periods	0.269	0.731	1.368
Waste/risk of pesticide contamination	0.358	0.642	1.559
IP	0.332	0.668	1.497

Source: Authors' analysis of relevant research. Data processed with Geoda 1.14.0, August 24, 2019—(Luc Anselin) and an Excel spreadsheet

$$Z_i = \frac{X_i - \bar{X}}{\sigma}$$

where Z_i is the Z score corresponding to each indicator and spatial unit (county), X_i is the value of the indicator in each spatial unit, \bar{X} is the average of the indicator, and σ is the standard deviation.

With standardization by Z scores, values are transformed into positive and negative scores. In the case of the profit indicators, for the positive values, the more they move away from zero, the better the situation.

To obtain the Quality of Life Index, the method of unweighted spatial classification scores was applied. Humacata defines the spatial classification scores as follows: "They are a synthesis of the values acquired by each set of profit and cost variables in each spatial unit, and constitute one of the final results of the standardized average method" (Humacata 2015, p. 129).

$$ICV = \frac{\sum_1^{16} Z_i}{16}$$

where Σ is the sum of the values of each indicator and 16 is the total of indicators.

The results of the quantitative processing were the basis for the design of the thematic mapping in the GIS environment (free software QGIS 2.14 Essen). In this regard, Humacata highlights that:

Geographic Information Systems (GIS) technology becomes a fundamental support tool by allowing quantitative treatment of alphanumeric information and the possibility of building a wide variety of thematic cartography, fundamental for the analysis of spatial distributions and associations. (2015, p. 136)

Thus, within the GIS environment for the 16 standardized indicators and the Quality of Life index, similar class intervals were proposed, with an amplitude of one standard deviation. According to Buzai, "This classification has the advantage of considering the average of the variables ($z = 0$) in the middle of the central category and then reaching the extremes of the distribution in 1.5 as a floor for each end. In all cases, these class intervals can be assimilated into categories that could be called very high, high, medium, low and very low, with an expected occurrence in a normal distribution. . . ." (Buzai 2003, p. 117). It should be clarified that in some data series, it was necessary to add class intervals to account for the wide range of distributions.

Finally, Geoda software was used to calculate Moran indices in its Global and Local (LISA) versions. To check the level of spatial autocorrelation of the Quality of Life Index, we worked with Queen modality (Siabato and Guzmán-Manrique 2019; Lucero 2015). Regarding the Global Moran Index, Lucero indicates that it is “a statistical summary of the degree of SA [spatial autocorrelation] and synthesizes in a coefficient—the slope of the regression line—the degree of association between a given level in the variable of interest in a geographical area with respect to the weighted average of the same variable in adjacent or neighboring areas” (2015, p. 143).

On the other hand, measures such as the “Moran Index (LISA) allow to visually explore the elaborated agglomeration patterns based on the values of a variable presented by the analyzed observation units and the neighboring units” (Lucero 2015, p. 144).

The domain of the Moran Index is $[-1, 1]$, within which -1 indicates negative autocorrelation, 1 positive autocorrelation, and the interval $[-0.35, 0.35]$ expresses random situations in the distribution of the indicators (Siabato and Guzmán-Manrique 2019).

12.5 Results

12.5.1 Education Dimension

It is essential for quality of life and sustainability studies to introduce indicators linked to the *level of education*, since access to education is a right provided for in Article 26 of the Declaration of Human Rights (1948), with the fundamental role of empowering subjects and giving them autonomy. “Education is [...] essential to achieve and protect other human rights and the necessary scaffolding for good health, freedom, security, economic well-being and participation in social and political activities” (UNESCO 2004, p. 14). Formal instruction allows the expansion of cultural capital, the probabilities of entering the labor market, control of the sanitary conditions of

dwellings, and to make use of information and communication technologies (Sabuda 2008).

Based on previous work done by this team (Lucero et al. 2015; Mikkelsen et al. 2018a, b), in the education dimension, two indicators have been systematized and analyzed at the district level and refer to the maximum level of education achieved. These include the percentage of the population, aged 20–59 years, with a full secondary or polymodal level, and the population percentage of those aged 26–59 years with a full university level to cover the different educational levels and that allow the maximum level of education. The first indicator refers to the highest range of obligatory education in the Argentine Republic, established for this level in 2006, with the aim of training young people and adolescents for exercises in citizenship, work, and continuity in the study (National Education Law No. 26.206/06).

On average, in the districts studied, 21% of the population aged 20–59 attained a full secondary or polymodal level, while 6% between 26 and 59 years of age completed the university level. These values can be considered rather low. On the secondary level, the districts of Villarino, Navarro, General Lamadrid, Roque Pérez and Rauch show the lowest percentages (approximately 15%). However, the best conditions were found in Coronel de Marina Rosales (33%), Baradero, La Costa, Villa Gesell (around 27%).

At the full university level, the lowest values were reflected in Presidente Perón and Tordillo (2%), Villarino and Marcos Paz (3%). Several of these districts are close to the MRBA while others, such as Tordillo, are far from localities where university education is given. However, this issue with distance would not explain the numbers for Villarino, as it is so close to Bahía Blanca. The highest values represent districts that are home to important houses of high education, such as La Plata (15%), Tandil (10%) and Bahía Blanca (9%).

In the synthesis of these indicators, which can be examined in Fig. 12.3, Navarro and Villarino show very low values of the education dimension. These low values demonstrate a high territorial dispersion, while the medium values bring

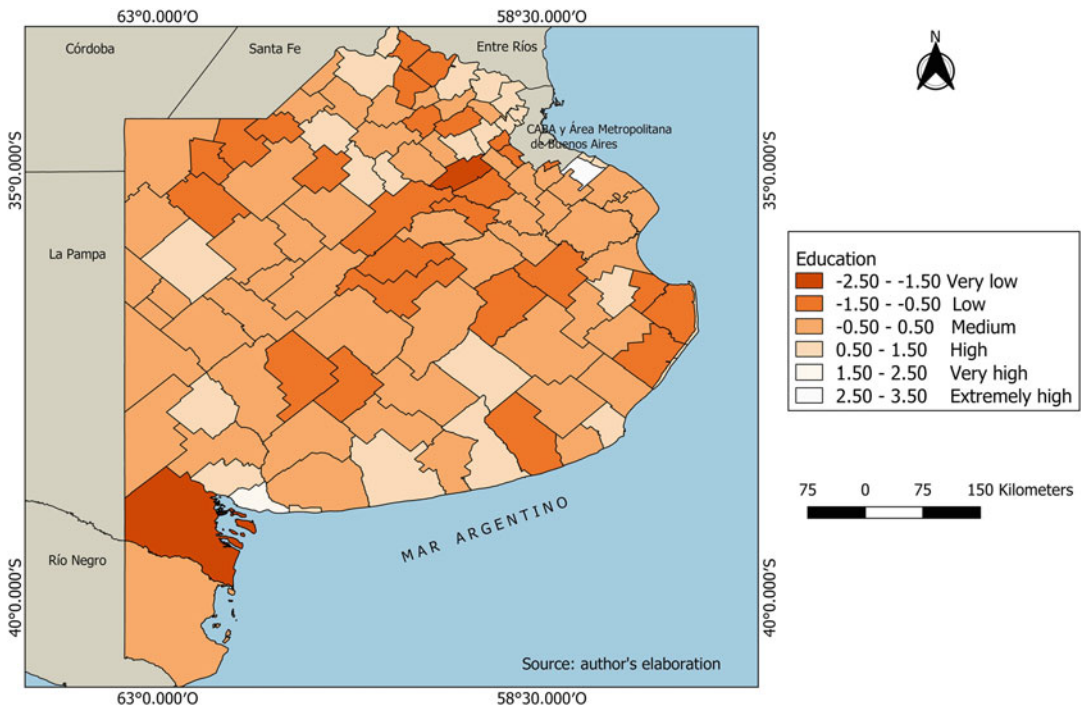


Fig. 12.3 Province of Buenos Aires according to the education dimension

together the most significant number of districts studied. Lastly, the very high values embody La Plata and Coronel de Marina Rosales, which is in line with the behavior of individual variables.

12.5.2 Water and Health Dimension

Health is defined as “the value assigned to life, modified by social opportunities, perceptions, functional states and disability caused by diseases, accidents, treatments or policies” (Patrick and Erickson 1993 cited by Fernández and Pérez 2005, p. 126). Regarding health, it is essential to focus on prevention, and therefore, attention needs to be given to food, hygiene, living conditions, housing and education. Absence of appropriate indicators at different territorial scales need to be mentioned, including indicators related to access to water (water connection within the house and provision through public networks or with a motor pump), as well as the greatest possibilities of access and choice for

medical consultations, quantified through private social welfare coverage.

Concerning access to safe water, in 2010, the United Nations General Assembly recognized the human right to water supply and sanitation. According to the World Health Organization (WHO), “Healthy and easily accessible water is important for public health, whether it is used for drinking, household use, food production or recreational purposes” (WHO³). These points have been incorporated into the Sustainable Development Goals, one of which seeking to achieve universal and equitable access to affordable drinking water (WHO).

Contaminated water and poor sanitation are associated with the transmission of diseases, such as cholera, diarrhea, dysentery, hepatitis A, typhoid and polio. Consequently, a provision or transfer in the territory of facilities and services and that promotes human health through positive

³ www.who.int/es/news-room/fact-sheets/detail/drinking-water

hygiene conditions (personal and housing) is a key aspect in the assessment of quality of life.

According to the analysis of census data, in the province of Buenos Aires, there are vast distances in terms of access to safe water within the house. The districts with the worst situations (Presidente Perón, General Rodríguez and Pilar) are located close to the MRBA, showing their expansion trends and the possible formation of another conurbation ring. The other district in this group, Tordillo, is located near Samborombón Bay. Access to water through a public network or a motor pump also indicates a significant distance, of almost four points, between the worst and best situation categories. Among the lower values is Tordillo, along with General Lavalle and Pila.

Private social welfare coverage is one that provides access to health outside the public management system. According to Maceira,

Argentina has a segmented health system. This implies the absence of a single fund to ensure and offer a homogeneous package of services to the entire population. Thus, the range of the services offered is related to the ability to pay, whether voluntary (pocket payment) or compulsive (wage withholdings), from contributors and their families. (2009, pp. 9–10)

Within the water and health dimension, the indicator of private social welfare coverage is the one that has presented the least difference between the extremes, showing that the district with the worst situation is Villarino, followed by districts close to the MRBA, the coastal Atlantic districts (Villa Gesell, Pinamar, La Costa) and the southern districts (Patagones). The best conditions were observed in districts located in the provincial center; thus, this finding brings up the possibility about the link between public employment and private social welfare coverage (Olavarría, Trenque Lauquen, Yrigoyen, Laprida, Tres Lomas, General Guido and Puán).

The dimension sub-index (Fig. 12.4) expresses very low values in districts near the MRBA (Presidente Perón, General Rodríguez, San Vicente, Cañuelas, Pilar, Escobar), in districts of the Depressed Pampa (Madariaga, Tordillo, Lavalle) and in Villarino (Pampa Patagónica).

The reference to the best situations in the water and health dimension shows again the pre-eminence of districts that do not have large cities, with the exception of General Pueyrredon and Bahía Blanca. A territorially discontinuous pattern that focuses on the provincial North and Midwest is distinguished.

12.5.3 Dwelling Dimension

Dwelling is par excellence in the area of everyday life, and is fundamental for the biological reproduction of society. Houses must protect their inhabitants from inclemency and provide thermal comfort and protection against substances or vectors that pose health risks. A house that does not meet minimum requirements in terms of materials, dimensions and sanitation is associated with higher rates of morbidity and mortality. In this sense, overcrowding (in its two forms, personal and household) contributes to the transmission of diseases, in addition to a relationship with violence, which is also observed. The lack of safe fuel for cooking and heating, as well as poor ventilation, can result in poisoning and the worsening of respiratory diseases (OMS 1990). Moreover, lack of floors, plasters and insulation creates difficulties within the respiratory system.

To evaluate the dwelling dimension, the following variables and indicators were selected, recovering their definitions from INDEC⁴:

- *Personal overcrowding*: Percentage of the population in households without overcrowding; considers that members of a household do not suffer overcrowding if the ratio between persons and rooms is less than or equal to two (two or fewer people per room). This indicator explains what the living conditions in homes would look like, allowing for the ability to enjoy enough space for each member of the household.

⁴ INDEC. (2010). *Definiciones de las bases de datos. Base de usuarios Censo 2010, Redatam+SP*. Argentina: Ministerio de Economía y Producción.

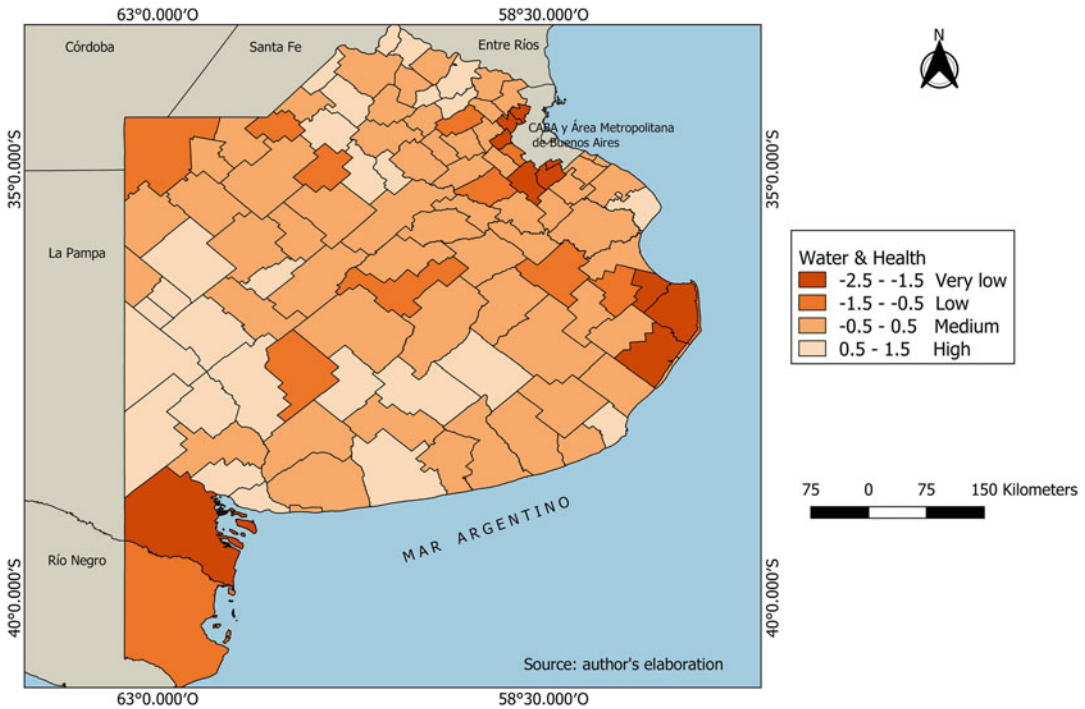


Fig. 12.4 Province of Buenos Aires according to the water and health dimension

- *Household overcrowding*: Percentage of the population in a house of more than one household (Lentini and Palero 1997) and thus, understanding the person or group of people (relatives or not) who live under the same roof and share food expenses.
- *Quality of materials (INMAT)*: This variable refers to the quality of the materials with which the dwellings are built (primary material of floors and ceilings), taking into account the solidity, strength and insulation capacity, as well as its finish. The modality included in the calculation of the Quality of Life Index is Quality I (resistant and solid materials, both on the floor and roof; with the ceiling).

As a result of the analysis of the dimensions and its components, it was found that the overcrowding of persons shows distribution patterns more evident than in other indicators. Here, the high values occupy the Buenos Aires center, from north to south. Average values surround this area, while the best values include

Salliqueló, Puán, Saavedra, Coronel Suárez, General Arenales and Alberti. The low to extremely low rates were mainly located in the northeast, bordering the MRBA, and in the east and southwest, including Villarino and Patagones.

The *overcrowding* indicator of households expresses the dominance of high values, i.e. it is unusual for two households or more to share the same house. In the provincial scenario, average values occupy the inland to the west, north and southwest. The worst situations were located around the MRBA, especially to the north. The values were dispersed to the negative end and the districts with the best conditions were located in the Depressed Pampa (Pila and General Guido).

The *material quality* indicator shows the prominence in dimension (almost one-third of the districts) with high and very high values in the provincial center. The widespread existence of good housing conditions were also displayed in the forty districts with average values, especially in the southeast, north and northwest. In some districts of the southeast bordering the

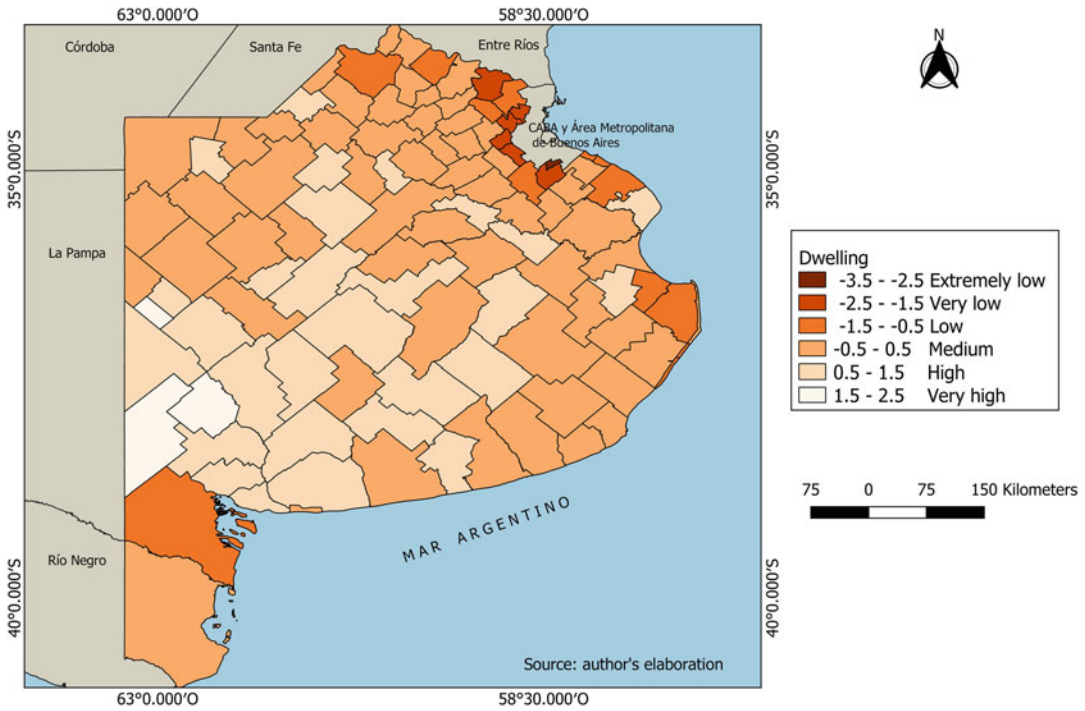


Fig. 12.5 Province of Buenos Aires according to the dwelling dimension

Argentine Sea, as well as in the northeast and in proximities to the MRBA, the worst conditions were distributed.

The *dwelling* dimension sub-index (Fig. 12.5) reinforces the above mentioned findings, displaying the most deficient situations around the MRBA and in the rural northeast. However, the rest of the Buenos Aires territory shares housing conditions between medium and very high.

It should be considered that, in the dwelling analysis, the use of traditional materials (bricks, plasters, ceramic or mosaic floors, among others), considered within the INMAT-1 category, is associated with cultural and socio-economic aspects. Therefore, it is not surprising that good conditions dominate and that in those areas of faster population growth, close to large cities, there are significantly more types of building materials that take center stage. These materials are sometimes linked to the formation of precarious settlements and in these areas, the existence of overcrowded conditions, whether personal or household, is also more common. Finally, it is

appreciated that the worst situations in dwellings correlate with the lowest values in the water and health indicators.

12.5.4 Communication and Connectivity Dimension

The opportunity to have access to communication and connectivity influences the well-being of the population, as it is directly linked to other dimensions, such as education, health and employment, among others. To study connectivity and communication in Buenos Aires province, the variable “computer possession” has been included, a tool that currently allows for interaction, education, banking and even administrative activities. Additionally, indicators for the population in households with landline phones and population in households with mobile phones were evaluated.

In terms of mobile phones, its availability at home was considered if at least one of its

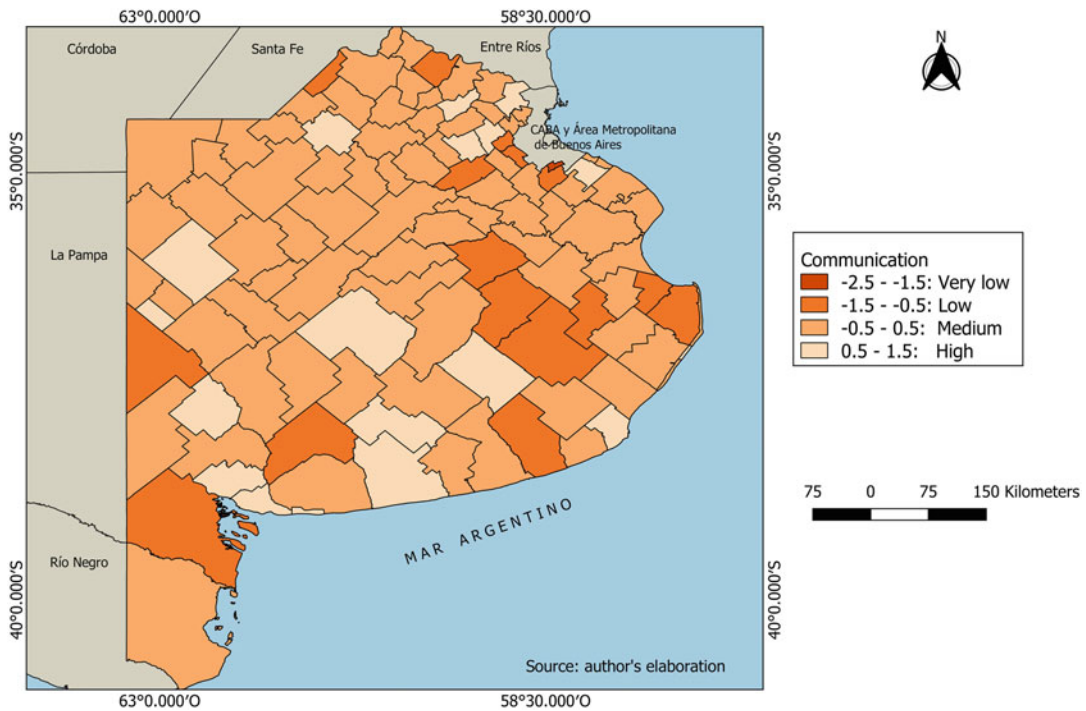


Fig. 12.6 Province of Buenos Aires according to the dimensions of communication and connectivity

members owns a cell phone. As for a landline or line telephone, these were more widespread in urban than in rural areas, although these are increasingly being replaced by cellular telephones, which is a worldwide trend. Mobile phones have become popular in the most diverse contexts and cultures, as well as in countries where a high proportion of the population is still illiterate or has no access to the purchase of a computer, much less access to the Internet, landlines or even the electricity grid (Ramírez Pino 2009).

On average, in the districts studied, 50% of the population had access to computers, 44% had a landline and 92% had a cell phone. Presidente Perón and Villarino had the worst conditions, with the lowest proportions of computer access, placing Coronel Rosales and Bahía Blanca as having the best values. Regarding access to landlines, General Lavalle and Pila showed the lowest percentages; meanwhile, Pinamar and General Pueyrredon were the districts with the highest proportions. As for cell phones, the

percentages were generally high, however the lowest values were located in Presidente Perón and Villa Gesell (87%). Pila, Tordillo or Roque Pérez hovered around 95%.

In the synthesis of the *communication and connectivity* dimension (Fig. 12.6), Presidente Perón gives evidence to being the only district with very low values. Low values were concentrated in the south, coast and eastern center of the province, while the medium values denoted a clear dominance throughout the province and may refer to some equitable access to communication and connectivity. In the rank of high values, districts such as Bahía Blanca, Coronel Rosales and Tandil stood out.

12.5.5 Economic Activity and Employment Dimension

Employment is a central component in achieving a good quality of life; on the one hand, work dignifies the subject and allows him to develop

his abilities while on the other hand, generates an income that allows him to perform other activities or satisfy his material needs, such as good housing, better health coverage, access to education, leisure time and recreation. In turn, the workplace is a source of social relations that also adds to one's quality of life. According to the International Labor Organization, "decent work is essential to the well-being of people. In addition to generating income, it facilitates social and economic progress, and strengthens people, their families and communities." Moreover, it is part of the 17 Sustainable Development Goals, by "promoting sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all." Decent work means the opportunity to access productive employment that generates a fair income, workplace safety and social protection for families, better prospects for personal development and social integration, freedom for individuals to express their ideas, to organize and participate in decisions that affect their lives, as well as equal opportunities and treatment for all, both women and men (International Labor Organization).⁵

In Argentina, informal employment is one of the most critical socio-economic problems, as it currently affects 4 out of 10 workers (Bertranou and Casanova 2014). Among its consequences, it is acknowledged that:

It hinders the recognition of labor rights and is associated with poverty in its various dimensions. In addition, informal workers generally do not have the necessary protection against various social risks, such as accidents at work, unemployment, poverty in old age, among others. (Bertranou and Casanova 2014, p. 17)

Two indicators were considered to assess this dimension: the percentage between the occupied population and the population aged 14 and over, and the active workers who have employer retirement contributions or make them on their own over the population aged 14 and over (%). The latter was considered because in Argentina, all

workers in dependent relation and non-dependent workers are required to participate in the retirement allocation system.

An analysis of this dimension (Fig. 12.7) showed that much of the very low values were observed in the most arid areas of the province, specifically in the district of Villarino, but also in agricultural-farming districts of the Southeast of Buenos Aires, including General Alvarado, Mar Chiquita and General Madariaga. Very low values were located in the Rolling Pampa, in the districts of General Arenales, General Viamonte and 25 de Mayo, even though these are productively important areas due to their agricultural and industrial activity. In the latter region, most of the districts with low values were located, but also several of the districts that registered high values. The rest of the districts of this group were scattered throughout the province, as was the case with the medium values. The districts with very high values were also scattered, with the main ones being Adolfo Alsina, Brandsen, Coronel Suarez and Ayacucho. Therefore, some territorial equity can be observed in this dimension.

12.5.6 Environment Dimension

The *quality of the environmental setting* relates to the living conditions of the world with regard to human beings and has an impact on the quality of life of individuals and societies. Environmental quality is directly linked to all of the external physical, chemical and biological factors of a person, and encompasses environmental factors that could affect health (WHO).⁶

The Argentine Constitution, in its 41st article, states, "All inhabitants enjoy the right to a healthy, balanced environment, fit for human development and for productive activities to meet present needs without compromising those of future generations; and they have a duty to preserve it".

According to the WHO, it was estimated that in 2012, approximately one quarter of the world's total deaths were due to living or working in

⁵ <https://www.ilo.org/global/topics/decent-work/lang%2D%2Des/index.htm>

⁶ https://www.who.int/topics/environmental_health/es/

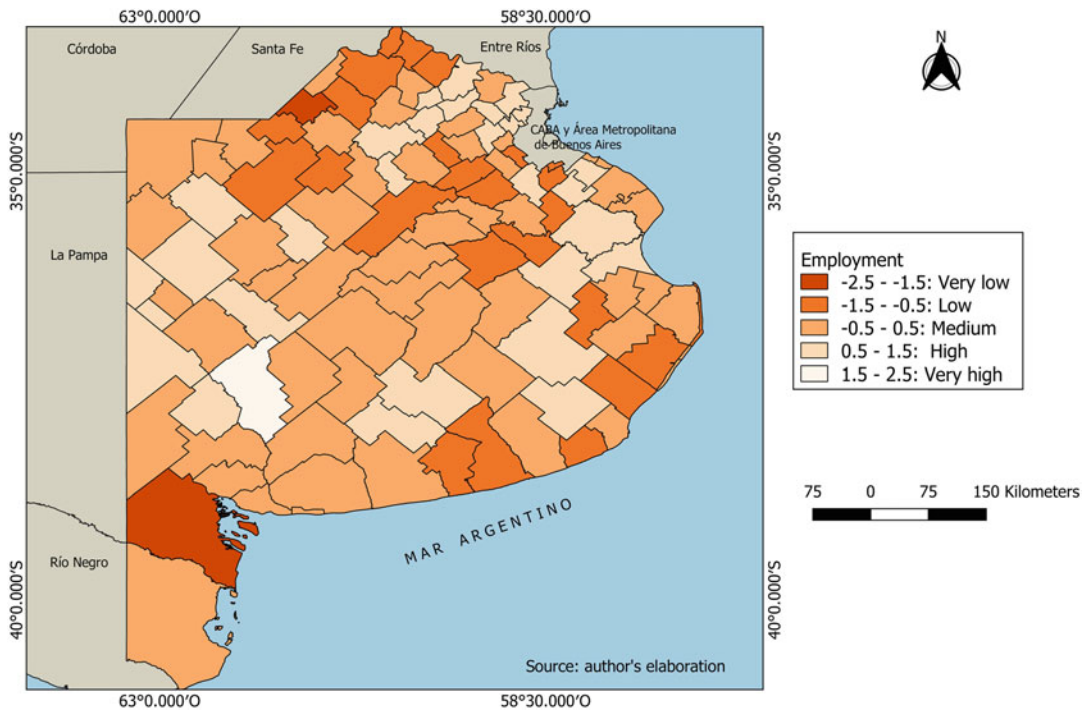


Fig. 12.7 Province of Buenos Aires according to economic activity and employment dimensions

unhealthy environments, with the leading environmental risk factors being air, water and soil pollution, exposure to chemical products, climate change and ultraviolet radiation.⁷ Thus, the economic development model and current lifestyle cause changes in the state of the environment that affect the quality of life of all citizens of a country.

To assess this dimension, the percentage of slopes and recurrence of very wet and wet years, the rate of pesticide contamination, and urban solid waste management were considered.

Analysis of this dimension (Fig. 12.8) revealed that most districts bear medium or low values, the latter being observed mostly in the center and in the Rolling Pampa. The very low values corresponded to the districts of Escobar and Marcos Paz, which are close to the MRBA, the district of San Pedro, which is mainly fruit

growing, and the districts of La Plata and General Pueyrredon. These are primarily the horticultural belts of the province and the country. The high values were observed to the west of the province, east of the Depressed Pampa, and in the Rolling Pampa.

Regarding the indicator of pesticide contamination, a clearer pattern was observed, where the very high values crossed the province from North East to South West, mainly in the Depressed Pampa, where the main productive activity is livestock. This was followed by high values in the Inland and Southern Pampas, where agriculture is important because it improves land-use capacity. The average values were observed in the northern end of the Rolling Pampa, the core area of which is agricultural production, where low values were also observed, as well as in the districts of San Pedro, Marcos Paz, La Plata and General Pueyrredon in the Southern Pampa. Very low levels were seen in the district of Escobar. Low values, which are at high risk of pesticide contamination, are appreciated in these districts

⁷ <https://www.who.int/es/news-room/detail/15-03-2016-an-estimated-12-6-million-deaths-each-year-are-attributed-to-unhealthy-environments>

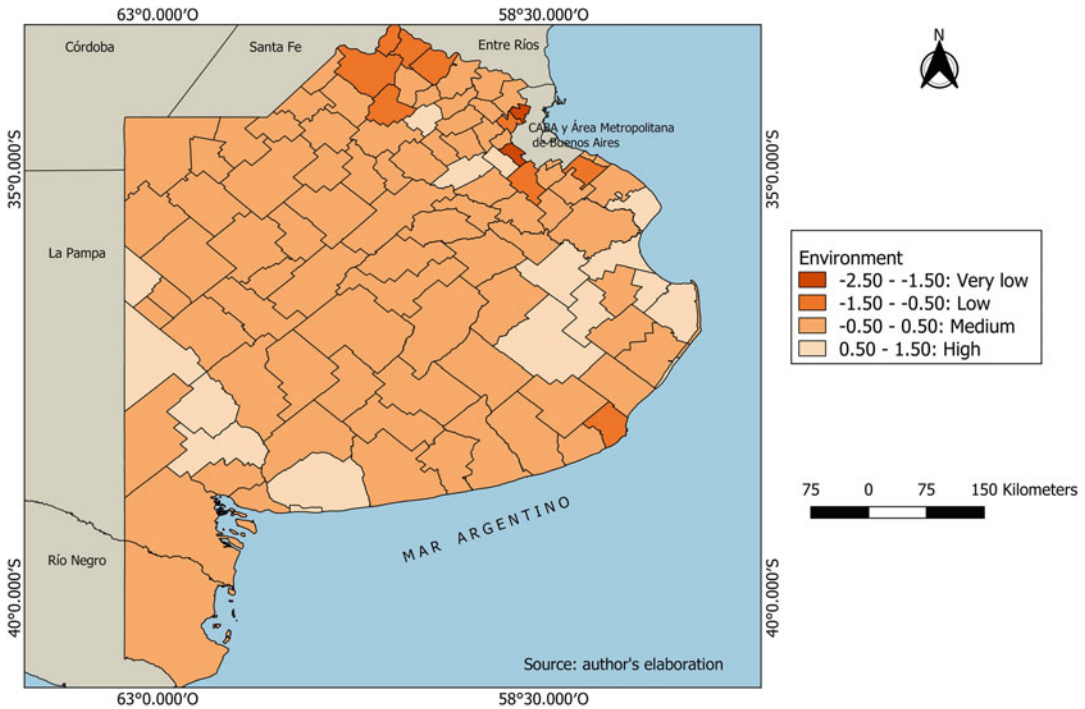


Fig. 12.8 Province of Buenos Aires according to the environmental dimension

because they are the regions whose main activities correspond to the horticultural, fruit and flower production of the province.

As for the indicator related to the threat of flooding, there was more repetition of wet years mainly in the Depressed Pampa and in the southeast of the Rolling Pampa, while cases of lower recidivism were few and observed in the districts of General Pueyrredon, Tornquist and Saavedra.

Regarding the waste management indicator, only three districts obtained high values, including Navarro, Carmen de Areco and Tordillo, with a few other dispersed districts with medium values in the central-west and central-east area of the province. There were low and very low values in most districts, which indicates that they have large dumpsites and/or are close to urban areas. The lowest values in most cases corresponded to districts with large urbanizations, such as La Plata, General Pueyrredon, Bahía Blanca, Escobar and Pilar, the latter two being peripheral to the MRBA. Thus, a significant number of the population is exposed to the different

components of this problem, including odors, leaching, presence of rodents, and risk of disease, among others.

The flood-related indicator affects both urban and rural inhabitants more directly, while the pesticide pollution indicator relates to the rural population and the waste management indicator to the urban one. Nonetheless, in both cases, they affect the entire population. Regarding these last two indicators, there were greater differences between the maximum and minimum values, showing less territorial equity among districts, which can be related to the type of soil and the activities that are carried out there, as well as imbalances in the urban-rural areas. The result of the waste management indicator serves as an example of the spatial inequities arising from the different purchasing powers of the districts, where the higher levels, given the current consumer society, generates more waste, which in turn will impact the less purchasing-power districts, generating or reflecting greater spatial inequities.

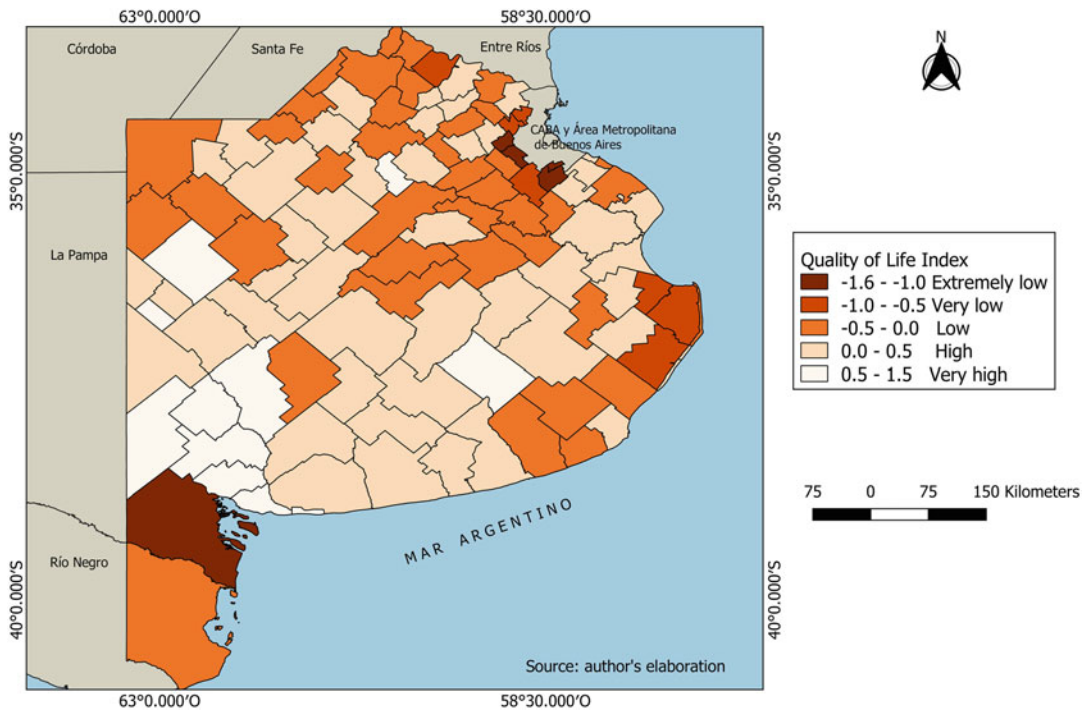


Fig. 12.9 Province of Buenos Aires according to the Quality of Life Index

12.5.7 Synthesis of Dimensions

The districts that have a higher value in the Quality of Life Index (Figs. 12.9 and 12.10) correspond to the southern and central-western area of the province, including the Southern Pampa, Bahía Blanca, C. de M. Rosales, Saavedra and Coronel Suarez (the latter two also belong to the Sierra de la Ventana hills), as well as the Inland Pampa, and the districts of Trenque Lauquen, Salliqueló and Puán. Two Depressed Pampa districts also displayed high values in the index, corresponding to Alberti and Tandil, both of which belonging to the ecological area of the Tandil hills. Most of these districts have better water and sanitation, health and housing conditions, followed by education and communication and connectivity, with lower cases of high values in economic and environmental activity. In fact, while they have the highest values in the index, half of these districts only exhibited better results in two dimensions, the Trenque Lauquen district in only one of them, while the Saavedra

district had five of the six studied dimensions. Several districts had negative values in certain dimensions, showing both deficiencies and inequities. However, when analyzing per district, the standard deviation of dimensions and the Quality of Life Index (Fig. 12.11), a negative slope was observed; that is, the higher the Quality of Life Index, the lower deviation of the dimensions, showing greater equity among them.

Conversely, those with a lower value in the index showed greater differences among their dimensions. These districts correspond to the area surrounding the MRBA (Escobar, General Rodríguez, Pilar, Marcos Paz, San Vicente, Cañuelas and Presidente Perón), with low values being seen in the northern end, including the San Pedro district, the Villarino district in the extreme south, and near Samborombón Bay, the General Lavalle and General Madariaga districts. Eight of the 10 districts with lower levels had deficiencies in water and health, six in dwelling and in communications and connectivity, and to a lesser extent, in education and environment. Only two

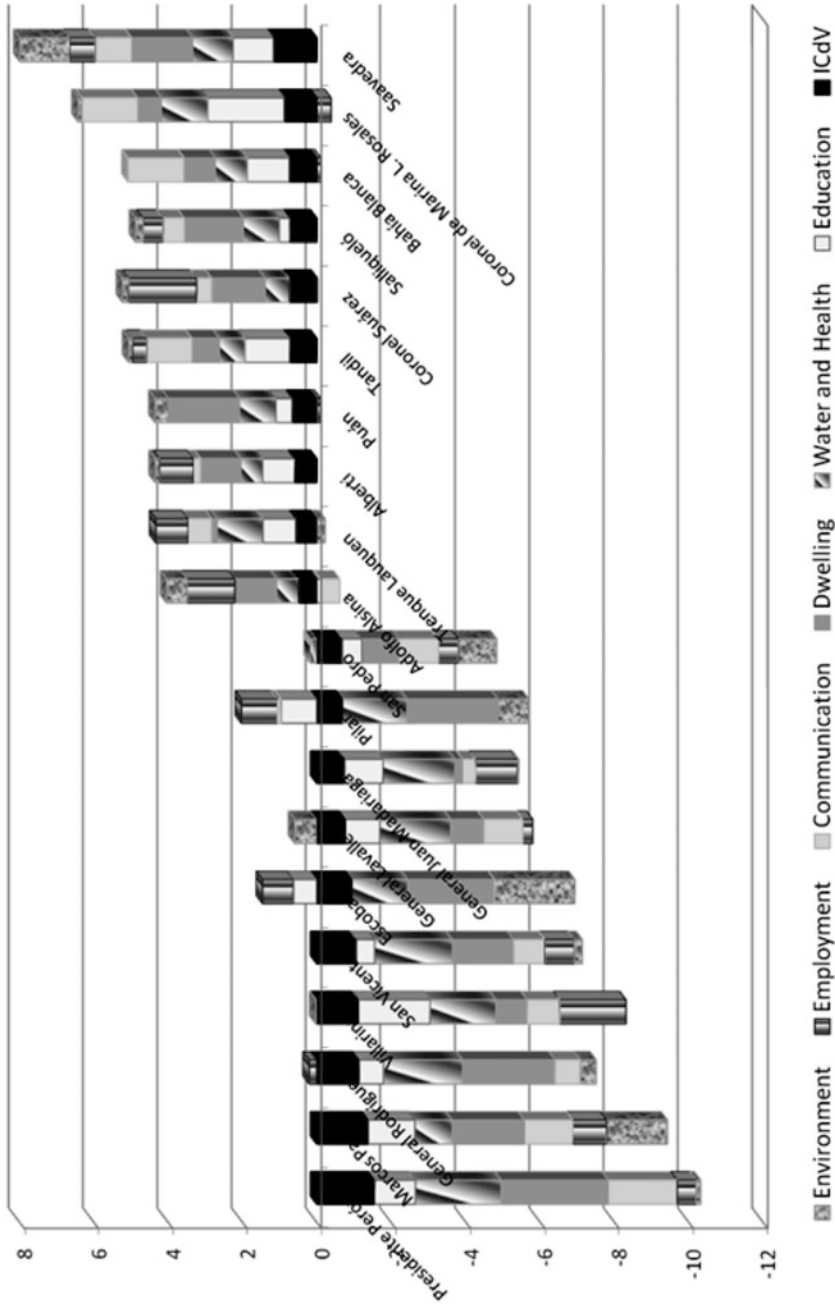


Fig. 12.10 Quality of Life Index: the top 10 and 10 worst districts in the province of Buenos Aires. (Source: authors' examination of the research results)

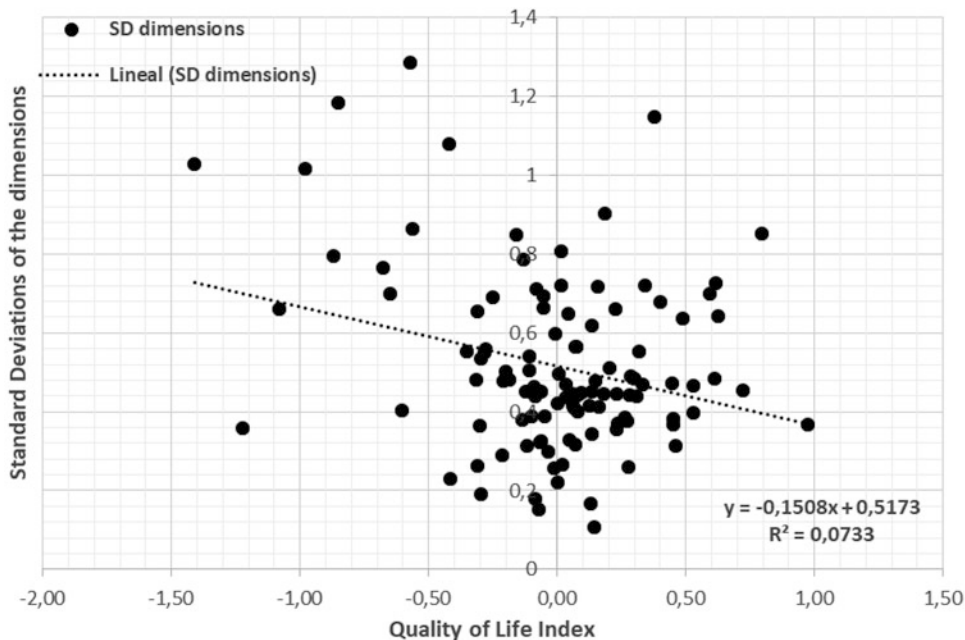


Fig. 12.11 Relationship between the standard deviation of the dimensions and the Quality of Life Index. (Source: authors' elaboration)

of these districts were among the worst performers in the economic activity dimension. However, Villarino, Marcos Paz and Presidente Perón had lower values in four of the six dimensions studied, particularly education and communication and connectivity. This reveals inequality in both access to basic services and opportunities for its people to improve their situation. In two cases, they had very low values in the index despite having very high values in some dimensions, as was the case of Pilar concerning economic activity and General Lavalle in the environment dimension. In fact, these two districts, together with Escobar and President Perón, were among the districts that had the most significant standard deviation in indicator values, showing specific imbalances among various dimensions.

The relationship among the dimensions of sustainability can be detected because the economic activity dimension (e.g. current production model based mainly on agricultural inputs) partly conditions the environment dimension

(e.g. pesticide pollution), which has consequences that impact other dimensions (e.g. population health). It should be considered that some activities can improve the quality of life of certain populations (e.g. urban) to the disadvantage of another sector (e.g. rural); thus, it is important to hold public policies that guarantee the equity of the well-being of all inhabitants.

Other disparities were observed when analyzing the distribution of the population within the districts. Six of the ten districts with the worst Quality of Life Index values found that more than 90% of their population resided in cities with more than 50,000 inhabitants, with one, the district of Presidente Perón, with 100% of its population in cities of that size. In five of these districts, the rest of the population was rural. These six cases corresponded to districts close to the MRBA; it was observed that some spatial inequity derived from the population's movement from the city of Buenos Aires towards the third belt of greater Buenos Aires, which was comprised of these districts. Many of these

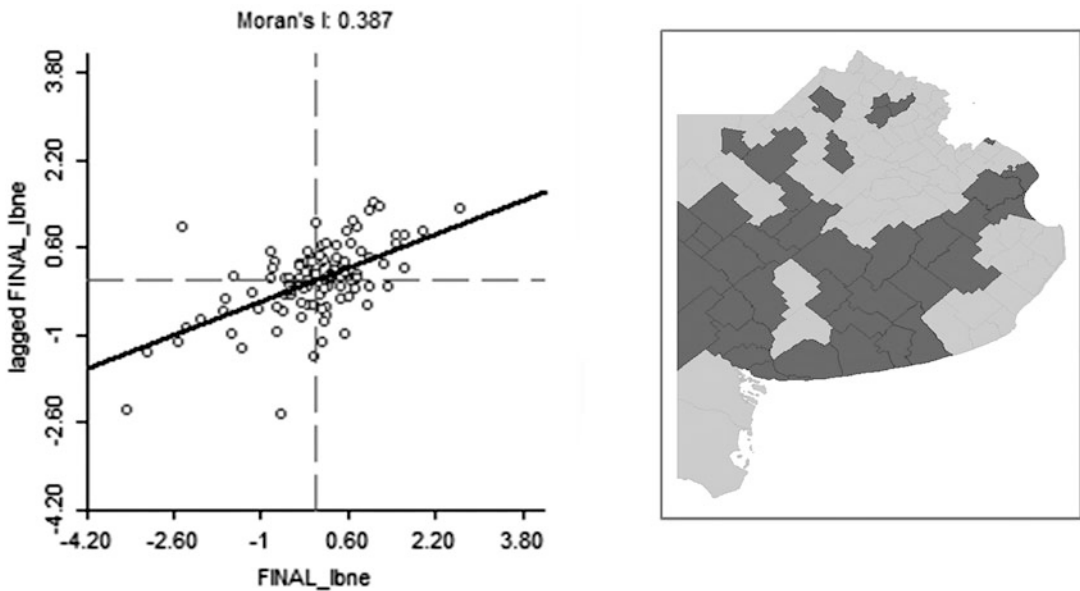


Fig. 12.12 Moran index. (Source: authors' elaboration based on data processed in the GEODA environment)

districts have major deficiencies in the dwelling and water and health dimensions, which reflect certain unfulfilled basic needs.⁸

On the contrary, districts with higher levels of the Quality of Life Index display less difference in the number of inhabitants, and in most cases, in intermediate locations. Thus, it is important to note that even in districts with the best Quality of Life Index totals, low values were observed in the environment dimension and in education. With regard to the environment dimension, it should be considered that in some cases, districts with higher levels of risk for pesticides may be the less floodable areas, which could be cases of compensation, resulting in a low indicator for this dimension.

According to the analysis, the thematic maps of each dimension and of the Quality of Life Index expressed particular patterns of agglomeration, within which it was challenging to recognize the existence of territorial configurations.

The calculation of Moran's index, in its two versions, gives a value of 0.387; that is, just outside the range where situations of random

territorial distribution were identified. Figure 12.12 shows that the point cloud is essentially grouped in Quadrant II (41 counties, 37.2%), where districts with high index values were surrounded by spatial units that share this quality.

These figures determined that there was a spatial autocorrelation of low statistical importance. The analysis continued with a spatial autocorrelation test, which contrasted with the territorial distribution of the data with randomly produced results. The null hypothesis claimed that the territorial configuration of the data was random. Figure 12.13 shows the performance of the p-value and the expected value of $I - E(I)$. The obtained values allowed for this because of the difference between the $E(I)$ and the I of the Moran index, revealing that the territorial configuration was not random. Therefore, the null hypothesis is rejected and accepted as an alternative hypothesis, in which the distribution was not random.

Thus, it is believed that the spatial discontinuity evidenced by the Quality of Life Index deserves to be explained by demographic, social, political, economic and physical-natural variables. All together, they build the territory of Buenos Aires province, providing particular characteristics to the various areas, where history

⁸ https://www.argentina.gob.ar/sites/default/files/doc_diagnostico_ciudades_2030.pdf

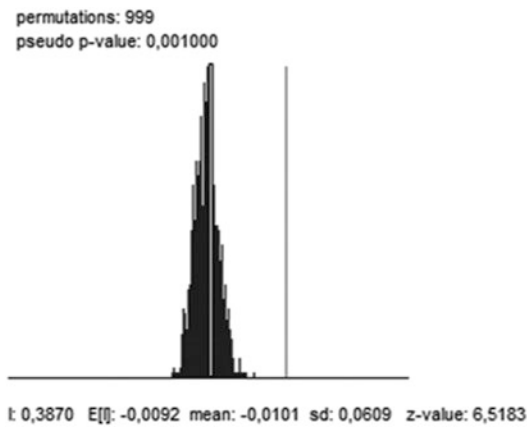


Fig. 12.13 Spatial autocorrelation test. (Source: authors' elaboration based on data processed in the GEODA environment)

is no stranger to current configurations. Addressing the incidence of the aforementioned variables more in-depth is proposed as a future challenge in pursuit of increasing knowledge around social gaps in the province of Buenos Aires.

12.6 Concluding Thoughts

The objective of this chapter has been to analyze territorial equity in the province of Buenos Aires, Argentina, based on the analysis of various dimensions to jointly understand quality of life and sustainability.

When recovering the concept of territorial equity as a spatial dimension of social justice that allows observing a geographical configuration, it is evident that the province of Buenos Aires presents inequalities in terms of access to goods, services, employment and environmental quality. These are issues that challenge achieving quality living for the inhabitants of Buenos Aires.

The 110 administrative units studied denote an unequal spatial configuration, with gaps that reveal whether or not they reach conditions to approach a measure of achievement, such as the quality of life. On average, the districts studied in the province of Buenos Aires rank in the range of the Quality of Life Index's average values,

covering 87 districts. This situation does not justify setting aside the remaining 23 districts, where its inhabitants have dissimilar conditions and that show existing polarization. Thus, in 12 districts, low and very low quality of life were noted, affecting almost 17% of the population as a whole. In opposition, 11.3% of the population enjoys high to very high quality of life situations, according to the parameters considered. The distance of 2.7 points between the extremes of the Quality of Life Index supports the lack of equity present in the province, represented in the extension of intermediate conditions and the extremities discussed above.

For all the attained results, attention must be placed in the ranking of those who occupy the 10 most committed positions, since it is the inhabitants of those districts who are experiencing the worst situations of equity. These 10 districts bring together 16% of the population studied. They highlight the disparities with gaps of more than 10 percentage points in the water and health dimension, in population indicators in *households with a water connection within the house* and with the population in *households with a motor pump water supply*. The following dimensions, dwelling and communication and connectivity, with population indicators in *houses with more than one household*, the population in *households with mobile phones* and the population in *households with landline phones*, continues to be 8–9 percentage points.

As such, definitions of public works and the provision of services should focus heavily on working on access to a safe, quality water supply and sanitation to effectively approach the 2030 sustainability goals and, even more, to comply with the fundamental rights declared by the United Nations General Assembly in 2010. Likewise, to have decent housing where overcrowding ceases to be a problem and that reveals territorial marks of lack, promiscuity, and contagion of diseases, which come from the impossibility of access to decent, accepted jobs. Issues that affect the possibility of communication and connectivity, not only for pleasure or fun but also, as a right of connection and access to certain goods that

modernity provides, is not equally accessed in the districts analyzed.

In this sense, the progress towards the possibility of making the sources of information consulted more complex, including others that are not available so far, and to approach the multifaceted reality of intra-departmental life, projecting forward the continuity of the work undertaken by this chapter.

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Protecting Quality of Life: Protected Needs as a Point of Reference for Perceived Ethical Obligation

13

Rico Defila and Antonietta Di Giulio

13.1 Sustainability Grounds the Ethical Obligation of Warranting Quality of Life

The documents about sustainability issued by the United Nations (UN) since the late 1980s use different terms to capture the overarching goal of sustainable development (such as meeting people's "needs" or "basic needs", achieving a "better life", a "decent life", "quality of life", or "wellbeing" for all, or providing everyone living now and in the future with a "healthy and productive life", Di Giulio 2004). Despite these differences in terminology, what the UN wrote and still are writing about the ultimate goal of sustainability, sums up to the result that according to the UN, sustainability is about making sure that all human beings in present and future generations have the possibility of satisfying their needs and of leading a good life (see, e.g., Di Giulio 2004; Manstetten 1996; Michaelis 2000; Rauschmayer et al. 2011). The 'good life' in this context is not about a life being good in a moral or ethical sense but about a life being good in terms of the quality it holds for individuals.

Sustainability is thus not a descriptive term, but a normative concept. It is meant to inform the national, international and global governance: governance should, on all levels, be aimed at achieving the overarching goal ingrained in the concept. Societal actors from the governmental level down to the level of individuals are invited to commit themselves to this concept, that is, to contribute to the achievement of the goal of sustainability. That is, the concept of sustainability posits a global societal obligation. Accordingly, sustainability found its way into global goals, such as the Sustainable Development Goals (SDGs), into national constitutions, such as the Swiss constitution, into declarations, mission statements, and action plans of governments, economic actors, NGOs and educational institutions. The normativity of sustainability does in part result from its having been agreed upon in negotiations and having been put down in global as well as national commitments. The social negotiations and political commitments are expressions of socio-political intentions and their result thus posits a political obligation. But there is also a normativity that is inscribed in the very concept of sustainability, and this normativity is an ethical obligation that is justified by intra- and intergenerational justice (this justice is, in turn, about warranting the possibility of each and every human being of living a good life).

The concept of sustainability sets thus a particular stage for how to discuss quality of life in

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relation to ethical obligations: The question is not whether quality of life grounds an ethical obligation or whether needs have a special normative force (see, e.g., Brock and Miller 2019). The question rather is, what definition of quality of life and of needs is suitable for the specific ethical obligation that is set up by the concept of sustainability and for the purpose of serving as a basis for global, international, and national governance. The criteria that have to be observed can be summarized as follows (for a more in-depth discussion see Di Giulio and Defila 2019; Di Giulio et al. 2010, 2012): The definition of quality of life and of needs *must be applicable across nations and cultures*. For this purpose, it must be broad enough and context sensitive to cover a diversity of lifestyles, socio-cultural conditions, and future developments. In order to meet the criterion of global applicability, a theory of the ‘good life’ for the context of sustainability must provide universal human needs, otherwise it cannot apply to more than just one socio-cultural context. The definition of these needs in turn must avoid to draw on positional goods (such as specific jobs, educational degrees, or relative income) and satisfiers (such as education, health care, food, or energy), because both positional goods and satisfiers are ephemeral and unstable and differ within and across societies. Furthermore, it must avoid privileging some cultures (and life choices and lifestyles) and excluding others. The definition of quality of life and of needs *must ground policies and assessments*. For this purpose, it must be specific enough to allow for reliable commitments, the development of concrete and coherent policies, and defining systems of indicators that are not arbitrary and easily contestable but sound and convincing. In order to meet the criterion of providing guidance for policy-making, a theory of the ‘good life’ for the context of sustainability must be what Soper calls a “thick” theory in contrast to a “thin” theory:

In general, the less information the ‘thin’ theory provides, the less controversial it will be, but also the more difficult to draw on as a guide to policy formation. (...) For these reasons, the more interesting and policy relevant universalists will want to insist that universality extends beyond this minimum. (Soper 2006, p. 361)

The definition of quality of life and of needs *must respect individual freedom*. For this purpose, it must be confined to what a community and a government can reasonably be asked to warrant without resulting in a paternalistic state and/or a nanny state. The definition of quality of life and of needs *must comply with the visionary nature of the concept of sustainability* and its implication that quality of life and needs cannot be reduced to mere physiological survival. For this purpose, it must be based on a salutogenic approach¹ rather than proceeding from what is missing or problematic, and it must cover more than just physiological aspects. This is far from being the rule: Brock and Miller (2019) show that most need approaches adopt a defensive perspective by focusing on state of affairs that call for remedy and/or by proceeding from what is missing.

In this chapter, we will argue that Protected Needs, a salutogenic definition of the ‘good life’ for the context of sustainability, do ground ethical obligations both for individuals and for communities not only in theory, but also with regard to how people feel. Proceeding from the assumption that the concept of sustainability grounds an ethical obligation of providing the conditions that are crucial for achieving human wellbeing, we will, in Sect. 13.2, present the theory of Protected Needs, a thick theory of the ‘good life’ that we suggest to use as a point of reference to flesh this obligation out. But with a view to actual realities and policies, the question whether an obligation is actually assumed is perhaps more important than whether it can be theoretically assigned. This is the question we will turn to in the Sects. 13.3 and 13.4 of the chapter. In Sect. 13.3, we will argue why it is important to investigate perceived ethical obligation, and in Sect. 13.4, we will show how we investigated perceived ethical obligation in a representative national survey in Switzerland (N = 1059;

¹ Salutogenic approaches are based on “a positive perspective on human life” and aim to investigate the origins of health rather than those of disease and risk (Mittelmark and Bauer 2017).

fielded in 2016), and we will present and discuss the results of this survey. In Sect. 13.5, we will draw some conclusions both with a view to the academic world and the world of policy-making.

13.2 Protected Needs: A theory of the 'Good Life' Suited for the Ethical Obligation in the Context of Sustainability

Against the background presented in Sect. 13.1, we suggest to use the theory of Protected Needs to operationalise quality of life and needs for the context of sustainability (Di Giulio and Defila 2019). Protected Needs are needs that (a) deserve special protection within and across societies because they are crucial to human wellbeing, and are, at the same time, (b) needs for which a special societal protection is possible, because they are needs for which a governmental/community responsibility can reasonably be assigned. With a view to the necessity of meeting the criteria mentioned above, our proposal covers both, nine universal needs (Table 13.1, left column) and for each need a thick description serving as starting point for its cultural and historical adaptation (Table 13.1, right column). The Protected Needs denote what individuals must be allowed to want (Table 13.1, left column) and the possibilities individuals should be provided with (Table 13.1, right column).

We developed the list of Protected Needs by (a) comparing existing lists of needs, lists of capabilities, and lists integrating needs and capabilities (such lists are provided e.g. by Burchardt and Vizard 2011; Costanza et al. 2007; Doyal and Gough 1991; Max-Neef et al. 1991; Nussbaum 2006; Robeyns and van der Veen 2007; Ryan and Deci 2000; Ryff 1989; for more lists see e.g. Alkire 2007, 2010), by (b) consulting cross-cultural empirical evidence about what does or does not contribute to human wellbeing (such evidence and/or reviews are provided e.g. by Abbott et al. 2010; Abma et al. 2016; Aked et al. 2008; Anand et al. 2009, 2011; Baumeister and Leary 1995; Brulé and

Veenhoven 2014; Cummins 1996; Dolan et al. 2008, 2011; Lewinsohn, n.d.; MacPhillamy and Lewinsohn 1976; Ramos et al. 2015; Ryan and Deci 2001; Shin 2015; Veenhoven 2008; White and Dolan 2009), and by (c) comparing lists and empirical evidence in order to identify a set of needs of which we are firmly convinced that the needs in this set can by right be assumed to be universals. As a result of this procedure and compared to other approaches, the list of Protected Needs is distinguished by the following points:

- It includes only needs for which a community and governmental responsibility with a view to provide the possibility of need satisfaction can be posited. Capability approaches and other approaches that try to capture everything that is important with a view to human wellbeing do not allow for this because their goal is to cover everything that humans do and strive for including things such as love and being loved, being healthy, or being creative.
- It is limited to external conditions of human wellbeing (that is, it does not include personality traits, and the like). It thus limits social responsibility on providing the necessary external conditions of wellbeing. Approaches that belong to the field of psychological wellbeing and/or subjective wellbeing do not draw on this distinction, that is, their dimensions of wellbeing cover also (or primarily) personality traits and internal conditions of wellbeing.
- It provides a salutogenic (positive) definition of quality of life. Some other lists, especially those linked to the human rights debate do not aim at defining quality of life but at demarcating the baseline of protection for human life and dignity (they thus focus on potential harm). Such lists do describe unachieved quality of life instead of providing a salutogenic definition of quality of life.
- It includes only needs, that is, it does not include satisfiers, resources, or positional goods. Many of the other existing lists are not designed and developed with a view to this distinction. Accordingly, they include resources and satisfiers such as education,

Table 13.1 The nine Protected Needs

Group 1, focusing upon tangibles, material things (Protected Needs 1–3)	
<i>Need (what individuals must be allowed to want)</i>	<i>Specified description: Individuals should have the possibility ...</i>
(1) To be provided with the material necessities for life	... to feed themselves sufficiently, with variety, and with food that is not detrimental to health ... to live in a suitably protected and equipped accommodation, offering privacy and sufficient space and allowing them to realise their idea of living ... to care for their bodies with dignity and dress suitably
(2) To realize their own conception of daily life	... to shape their daily life according to their own ideas ... to procure and use the material necessities for life from a diverse range of supply, and to have sufficient means to do so ... to move freely in public space
(3) To live in a livable environment	... to live in an environment (built and natural) that is not harmful to health and is aesthetically pleasing ... to develop a sensorial and emotional relationship with nature ... to have access to and be able to move about in diverse natural and cultural landscapes
Group 2, focusing upon the person (Protected Needs 4–6)	
<i>Need (what individuals must be allowed to want)</i>	<i>Specified description: Individuals should have the possibility ...</i>
(4) To develop as a person	... to develop their potential (knowledge, skills, attitudes, feelings, etc.) and thus their individual identity ... to face the challenges of their choice ... to freely access reliable information and thus form their own opinion
(5) To make their own life choices	... to freely decide and act upon the value-orientations they choose to adopt or reject (spirituality, religiosity, ideology, etc.) ... to set their own life goals and pursue them ... to determine how they want to lead their life in terms of intimate relationships, family planning, where to live, etc.
(6) To perform activities valuable to them	... to carry out activities that they consider to be fulfilling (in work and leisure; paid and unpaid) ... to carry out activities that match their personality and in which they can unfold their potential (in work and leisure; paid and unpaid) ... to allocate their time for their different activities according to their own preferences and to have time for idleness
Group 3, focusing upon community (Protected Needs 7–9)	
<i>Need (what individuals must be allowed to want)</i>	<i>Specified description: Individuals should have the possibility ...</i>
(7) To be part of a community	... to maintain social relationships with other people (private, professional, during training, etc.) ... to take part in cultural activities and celebrations and to participate in associations ... to access the cultural and historical heritage of their community
(8) To have a say in the shaping of society	... to co-determine the affairs of the society in which they live ... to take an active stand for concerns and problems (local, national, international) they hold dear ... to voice their opinion, by themselves and with others

(continued)

Table 13.1 (continued)

(9) To be granted protection by society	<p>... to be protected from public and private violence, from infringements on physical and mental integrity, and from natural hazards</p> <p>... to pursue their goals without discrimination and with equal opportunity, to live in legal certainty, and to be treated with dignity and respect</p> <p>... to be supported in the event of physical or mental impairment, unemployment, poverty, and other impairing conditions</p>
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The nine Protected Needs, consisting of universal needs (left column) that are specified by a thick description (right column). The thick description of the needs serves as starting point for its cultural and historical adaptation

Source: first published in Di Giulio and Defila (2019). The original and thus authoritative version of the Protected Needs (both needs and descriptions) is the German version (dating October 15 2016), authored by Rico Defila and Antonietta Di Giulio. The German version has been subjected to a comprehensive cognitive testing in Switzerland. Based on this it has been revised and then translated into French (by M.I.S. Trend). The German version has been translated into English by Antonietta Di Giulio and Rico Defila. Valuable contributions and feedback have been provided by Manisha Anantharaman, Marlyne Sahakian, Czarina Saloma-Akpedonu and Anders Hayden

mobility, income, or health services. Such lists do potentially confound needs in the sense of purposes that cannot be further reduced and cannot be substituted and need claims that are based on what people need in an instrumental sense in order to achieve purposes they want to achieve (so-called elliptical need claims).

- It does not encompass needs that do obviously privilege specific cultures (and lifestyles) and/or life choices, such as a specific religion (or spirituality in general), having children, or taking care of others. In order to achieve this, we did the following: First, we considered as much empirical findings as possible that had been gained by cross-national and cross-cultural comparison and included nothing that had been empirically proven not to be crucial for wellbeing. Second, we established an interdisciplinary group of academics² with which we discussed our findings and suggestions, and we excluded everything that in this discussion revealed to be possibly biased.
- It provides a thick theory of quality of life, while many other lists do not provide much more than only titles of needs.

From a theoretical point of view, Protected Needs are ends in themselves, and they are legitimate needs that cannot on ethical grounds be contested. Individuals and communities (encompassing also national governments and intergovernmental as well as global organisations) have an obligation to provide (social, cultural, economic, environmental, etc.) conditions under which all human beings can—now and in the future—satisfy these needs. We call these needs *Protected Needs* to express this ethical obligation. The notion of Protected Needs does neither imply the claim that each and every human being does in fact experience all these needs nor does it imply that each and every human being must experience all these needs or must seize the possibilities listed in the thick descriptions of these needs, but it does imply that all human beings are entitled to satisfy their individual constructs of wanting that correspond to needs on the list of Protected Needs (Protected Needs are dispositional needs, they are not necessarily occurrent needs). We use “individual constructs of wanting” (Di Giulio et al. 2012) to emphasise both that needs are always subjectively experienced by individuals (see also Soper 2006) and that needs depend, in how they are individually delineated and weighted, on social and cultural contexts and are thus also socially constructed. People have quite different conceptions of how their needs should be satisfied and what a life they value looks like, and they are entitled to live accordingly. That is, they are

²The scholars involved in this group were: Peter Bartelheimer, Mathias Binswanger, Birgit Blätzel-Mink, Rico Defila (project team), Antonietta Di Giulio (project team), Doris Fuchs, Konrad Götz, Ruth Kaufmann-Hayoz (project team), Lisa Lauper (project team), Gerd Michelsen, Martina Schäfer, Gerd Scholl, Michael Stauffacher, Roland Stulz, Stefan Zundel.

entitled to satisfy the needs they develop according to their individual preferences, culture, and physical, emotional, and cognitive features—and thus to have the possibility of living a life they value. This individual freedom is limited, though, by the ethical rule of not compromising others' possibility to satisfy Protected Needs. The ethical obligation for communities thus includes the obligation to prevent individuals from impairing others' possibility to satisfy their Protected Needs.

13.3 Why It Is Important to Ask About the Perceived Ethical Obligation of Warranting Quality of Life

In the previous sections, we showed, first, that the concept of sustainability grounds an ethical obligation of providing the conditions that are crucial for achieving human wellbeing. Second, we presented a thick theory of the 'good life' that can be used as a point of reference to flesh this obligation out. In sum, an ethical obligation can by right be postulated from a theoretical point of view, and it can be assigned both to the individual and to the community. But with a view to actual realities and policies, the question whether an ethical obligation is actually assumed is perhaps more important than whether it can be theoretically assigned.

In order to answer the question whether an ethical obligation is actually assumed, one can either focus on peoples' actions (do they act accordingly?) or on peoples' perceptions (do they think they are obliged?). The former is not adequate. Positing a 'good life' for all as an overarching societal goal on the national, international and global level and grounding a corresponding ethical obligation for individuals and communities does not translate into a significative list of activities that can provide a sound point of reference that in turn can be used to decide whether individuals or communities act responsibly. Therefore, the appropriate approach

to answer the question whether the obligation of providing the conditions that are crucial for achieving human wellbeing is actually assumed is looking at peoples' perceptions and to ask whether people actually perceive such an obligation, that is, whether the ethical obligation that can be inferred theoretically does empirically correspond to actual perceptions.

This approach is supported also by another reasoning: Positing the 'good life' as an overarching societal goal and grounding a corresponding ethical obligation for individuals and communities targets the dominant narrative of policy-making with the aim of changing the priorities of what are the values, goals and criteria of policy-making. According to the framing theory that Klintman and Boström (2004, 2008) apply in analysing actual policy processes, policy-making is informed by "symbolic-interpretative constructs" (Klintman and Boström 2004, p. 615). They distinguish four layers of frames and framing processes that differ in their degree of abstraction. Reflecting about whether the dominant frame should be altered to prioritise other goals belongs to the deepest layer, to layer four. Against this background, the question about the ethical obligation of warranting quality of life for all human beings does target layer four, that is, the layer of the basic narrative about values, goals, and criteria. Unless the goal of warranting quality of life for all people (and the corresponding values and criteria) does resonate in people, quality of life cannot provide a "symbolic-interpretative construct" having the potential of being prioritised in governance. Therefore, the first thing to do is to ask people how they feel about this goal and not to ask people about what they are doing with a view to this goal.

Finally, investigating perceived ethical obligation can serve as a suitable proxy for corresponding actions: The question of how a perceived ethical obligation and subjective norms relate to actual behaviour and behavioural intentions has been and still is discussed in psychology and in other disciplines belonging to the social sciences (e.g., Sparks et al. 1995; Stern

et al. 1999; Shaw and Shiu 2002; Bamberg 2013; Oh and Yoon 2014; Sandve and Øgaard 2014; Shaw et al. 2016). Although there is no agreement on the exact predictive power of perceived ethical obligation, and although there is no agreement on how exactly and under which conditions it translates into action, no-one contests that having a sense of obligation *does* play a role with a view to how people act.

13.4 Whether Protected Needs Provide a Shared Normative Criterion of Ethical Obligation

The notion of ethical obligation the way we are using it here is congruent with the generic, that is not yet theoretically differentiated, concept of responsibility. The question informing our empirical research can thus best be captured by making use of the major components that are usually applied in analysing responsibility in its generic sense (see e.g. Mieth and Neuhäuser 2016, p. 297). The major components are the *agent* (who is responsible?), the *object* (for what is the agent responsible?), the *recipient* (whose condition counts?), and the *normative criterion* (what is the normative point of reference for attributing and assessing responsibility?).

Proceeding from the concept of sustainability which defines warranting quality of life as the object of ethical obligation, the *theory of Protected Needs* posits that individuals and communities (*agents*) are obliged of warranting quality of life for present and for future generations (*recipients*), and that the possibility of satisfying Protected Needs is the decisive normative point of reference (*normative criterion*). We wanted to find out to what extent this mirrors in peoples' perceptions. We also wanted to find out whether the theory of Protected Needs has the potential of providing a broadly shared normative criterion of ethical obligation or whether it is appealing only to a specific group of people within society. We investigated this in a representative national survey in Switzerland (N = 1059; fielded in 2016), that is, in a country with a consensual policy discourse climate (in contrast

to an adversarial policy discourse climate, see for this Klintman and Boström 2004).

13.4.1 Capturing Perceived Ethical Obligation in a Questionnaire

In our questionnaire, we operationalized the perceived ethical obligation by two elements:

1. *Are the nine Protected Needs conceded to others, that is, how important do people think these needs to be with a view to human wellbeing and to what extent are they perceived to be contestable?*

In asking about the general importance of the Protected Needs, we proceeded from suggestions by Burchardt and Vizard (2011) and by Veenhoven (2008): Burchardt and Vizard (2011) emphasize the necessity of considering vulnerable groups in discussing needs that should be broadly recognized as human needs. Veenhoven points the attention to the importance of asking not about justice and equity but about perceived injustice and about inequality that hurts: "It seems more plausible that inequality hurts only when it interferes with the gratification of basic needs, such as our need for food or respect" (Veenhoven 2008, p. 9). Based on this, we decided that our questionnaire should include not only a question about the general importance of the nine Protected Needs for human wellbeing, but encompass also a question about vulnerable groups. The latter should be combined with asking about injustice that cannot be tolerated. Against the background of our research question, vulnerability depends on the right to lead a 'good life' accorded to different groups of people in the public discourse. People that in the Swiss public discourse are sometimes accorded less rights are primarily those that are not Swiss citizens. For this reason, we wanted to use the criterion of citizenship in asking about particularly vulnerable groups.

This translated into two questions: In one question, for each of the nine Protected Needs the respondents were asked whether they think it

to be imperative that people can, with a view to quality of life, satisfy this need or whether they think people can get over of not being able to satisfy this need (Question 7; 7-point scale: 1 = is not imperative, 7 = is imperative, 2–6 not labelled). In a second question, for each of the nine Protected Needs the respondents were asked whether they think it to be blatantly unjust if circumstances (such as lack of money, forbidden by family or religion, non-supportive environment, not being allowed by law) make it impossible for different groups of people to satisfy this need (Question 8). The scale were five different groups of people. These groups of people were presented to the respondents as an increasing scope of persons, thus forcing respondents to decide whether they felt it blatantly unjust for no-one (= 1), only for Swiss citizens (= 2), also for foreigners living in Switzerland (= 3), also for refugees and undocumented migrants living in Switzerland (= 4), or for people living all over the world (= 5).

2. *To what extent do people think that they are, as individuals, obliged to contribute to the possibility of other human beings of satisfying the nine Protected Needs, and to what extent do they think that the Swiss society is obliged to contribute to this possibility?*

In asking about the recipients of individual and community obligation with regard to ensuring satisfaction of the Protected Needs, we proceeded from suggestions by Robeyns and van der Veen (2007): Robeyns and van der Veen infer from the concept of sustainability that four dimensions of recipients have to be considered with regard to ensuring quality of life, the present generations at home, the present generations elsewhere, the future generations at home, and the future generations elsewhere (Robeyns and van der Veen 2007, p. 17). We adopted this suggestion, and in order to exclude that future generations are reduced to the currently living children, we operationalized future generations by “people living in 100 years”. Initially, we wanted to cover all four dimensions of recipients for both the perceived obligation for the individual and the perceived obligation for the community. The

cognitive testing of our questionnaire though revealed that respondents were not able to cope with the question of individual obligation with a view to need satisfaction of future generations. Hence, we reduced the number of dimensions accordingly.

This translated into two questions: In one question, for each of the nine Protected Needs the respondents were asked to what extent they feel obliged as an individual (and within the limits of their possibilities) to contribute to the possibility of (a) people that are living in Switzerland now and of (b) people that are living all over the world now of satisfying this need (Question 9; 7-point scale: 1 = not obliged at all, 7 = strongly obliged, 2–6 not labelled). In a second question, for each of the nine Protected Needs the respondents were asked to what extent they think the Swiss society is obliged as a community (and within the limits of its possibilities) to contribute to the possibility of (a) people that are living in Switzerland now, of (b) people that are living all over the world now, of (c) people that will live in Switzerland in 100 years, and of (d) people that will live all over the world in 100 years of satisfying this need (Question 10; 7-point scale: 1 = not obliged at all, 7 = strongly obliged, 2–6 not labelled).

13.4.2 The Questionnaire

The questionnaire consisted of 20 questions in total. Six of them were devoted to the notion of Protected Needs (Questions 5–10). Respondents were asked about the individual (subjective) importance of each of the nine Protected Needs for their own life (Question 5; results are not presented in this chapter) and about their possibility to satisfy each of these nine needs regardless of the importance they attach to them individually (Question 6; results are not presented in this chapter). Questions 7–10 are described above (Sect. 13.4.1). One question was devoted to the concept of consumption corridors, a concept to guide sustainable consumption governance (Question 11; results see Defila and Di Giulio 2020).

The other questions concerned age (Question 1), gender (Question 2), residence (canton only;

canton question was positioned after Question 2), general life satisfaction (Question 3; accompanied by an open Question 4 asking what the respondents deemed to be crucial to a high quality of life), political attitude (Question 12), altruism (Question 13), current activity (Question 14), education (Question 15), income (Question 16), number of persons living in the same household (Question 17), and nationality (Questions 18–19). Question 20 was an open question asking for comments.

To capture political attitudes (Question 12), we asked “Sometimes one talks about political left or right. Where would you personally classify yourself if 0 means far left and 10 means far right?” with the additional option “I don’t know”. This question was used in the Swiss questionnaire of the European Union Statistics on Income and Living Conditions in 2015 (EU-SILC CH). For data analysis, 0 was coded as 1 and 10 was coded as 11 ($N = 950$, “I don’t know” was coded as missing; min. = 1, max. = 11; $M = 6.41$, $SD = 2.19$). In order to capture the potentially different effects of political attitude and personality, we asked respondents questions capturing altruism (Question 13) by using five positively keyed items chosen from the “International Personality Item Pool” IPIP (<http://ipip.ori.org>, accessed March 09, 2020) and the German “Typentest” by Lars Lorber (<http://www.typentest.de>, accessed March 09, 2020). These five items were: (1) I perceive/anticipate the needs of others; (2) my own advantage is not so important to me; (3) the wellbeing of others is important to me; (4) I help others even when this causes disadvantages for me; (5) I like to be generous without expecting anything in return. The respondents were asked about their level of agreement with each of these items on a 7-point scale (not labelled) with “I don’t know” as an additional option. The altruism scale we used in data analysis was the mean across all five items ($N = 1051$, “I don’t know” was coded as missing; min. = 1.00, max. = 7.00; $M = 5.00$, $SD = 1.08$; Cronbach’s Alpha = 0.84).

Technically, the survey was conducted as an online survey (using computer-assisted web interviewing, CAWI). It was fielded in October 2016, and it took respondents approximately 25 min in total to fill in the online questionnaire.

The thick descriptions of the single needs (see Table 13.1) were provided as pop-ups.

13.4.3 The Sample

The respondents ($N = 1059$) were recruited via an online access panel. The process was managed by M.I.S. Trend. To build a sample representative of Switzerland, we applied quota sampling (crossed quota) using the combined criteria of age, gender, and linguistic region (German-speaking part of Switzerland and French-speaking part of Switzerland, covering 25 out of the 26 cantons that are the member states of the Swiss Confederation). The quota used to build the sample match the distributions in the Swiss population (aged 18 and older; not covering the Italian-speaking part of Switzerland, that is, one of the 26 Swiss cantons; see Appendix, Table 13.10). Because respondents from the French-speaking part of Switzerland were slightly overrepresented in the sample in comparison to the Swiss population, the answers were weighted in the data analysis.

The sample consists of 50.9% women and 49.1% men. The average age of the respondents is 47, the age distribution in the sample is as follows: 2.1% of the respondents are aged 18–19, 34.2% are aged 20–39, 47% are aged 40–64, and 16.7% are 65 or older (min. = 18, max. = 84). The sample shows a distribution of Swiss citizens and non-citizens that is fairly similar to the distribution in the Swiss population (sample: 86.1% Swiss incl. dual citizenship, 13.9% non-citizens; Swiss population in 2015: 76.1% Swiss incl. dual citizenship, 23.9% non-citizens). The sample is fairly comparable to the Swiss population also in terms of size of household (with most of the respondents, 66.6%, living in single households or in two-person households; Appendix, Table 13.11) and political attitude (with most respondents, 43.8%, adopting neither a pronounced left-wing attitude nor a pronounced right-wing attitude; Appendix, Table 13.12), and it shows a diversity with regard to education (Appendix, Table 13.13) and income (Appendix, Table 13.14) that is similar to the diversity in the Swiss population.

Table 13.2 The general importance for human wellbeing attributed to the nine Protected Needs

Do you think it must be possible for a human being to ... (question 7 of questionnaire)	M	SD
Protected Need 1: ... be provided with the material necessities for life?	6.24	1.02
Protected Need 2: ... realize their own conception of daily life?	5.93	1.06
Protected Need 3: ... live in a livable environment?	6.15	1.00
Protected Need 4: ... develop as a person?	6.18	0.96
Protected Need 5: ... make their own life choices?	6.32	0.97
Protected Need 6: ... perform activities valuable to them?	6.00	1.07
Protected Need 7: ... be part of a community?	5.46	1.33
Protected Need 8: ... have a say in the shaping of society?	5.33	1.37
Protected Need 9: ... be granted protection by society?	5.84	1.25

The table shows the answers of the respondents to the question whether they think it to be imperative that humans have the possibility of satisfying each of the nine Protected Needs (Question 7) by presenting the mean (M) and the standard deviation (SD). The respondents answered by using a 7-point scale (1: is not imperative, 7: is imperative; 2–6 were not labelled). They made use of the entire scale (min. = 1, max. = 7)

13.4.4 Data About Perceived Ethical Obligation

In this section, we will present the results of our inquiry into perceived ethical obligation. We will first present to what extent the respondents perceive the nine Protected Needs to be needs that are crucial to human wellbeing and to be needs that cannot on ethical grounds be contested (Sect. 13.4.4.1). Second, we will present to what extent the respondents perceive an obligation both for themselves as individuals and for the community of warranting satisfaction of the nine Protected Needs for present and future generations (Sect. 13.4.4.2). In both parts, we will present the effects of gender, age, income, education, altruism, and political attitude on the respondents' perceived ethical obligation.

For the analysis of the data (using SPSS), no answer and "I don't know" were both coded as missing. Multiple regression analysis was used to test if the independent variables gender, age, income, education, altruism, and political attitude predict the respondents' answers.

13.4.4.1 How the Nine Protected Needs Are Perceived with Regard to Their Importance for Human Wellbeing and with Regard to Their Incontestability

Respondents were asked, for each of the nine Protected Needs (PN), *how imperative* they

think it is *with a view to quality of life* for a human being that he/she can satisfy this need. The mean value (M) that is presented for each of the nine PN in Table 13.2 shows that the attributed general importance is higher for PN 1–6 than for PN 7–9, but that it is rather high for all PN. The standard deviation (SD) that is also presented in Table 13.2 is quite small and thus shows an overall concurrence in how the respondents perceive the importance of the single needs.

The effect sizes (β) presented in Table 13.3 show to what extent the respondents' answers depend on the single independent variables. The table does also show whether the measured effects are statistically significant. Whether respondents attribute the nine PN a general importance for human wellbeing does neither depend on their political attitude nor on their education nor on their income. Rather it depends on gender, age, and altruism with altruism being the outstanding significant predictor for the importance that respondents attribute to the nine PN with a view to human wellbeing. The more altruistic respondents are the more they think these needs to be important for human wellbeing. This applies to eight of the nine PN. It does not apply to PN 1, because for PN 1, the only significant predictor is the respondents' gender (women attribute PN 1 a significantly higher importance than men). Another exception from the rule is PN 3, where the effect of age is stronger than the effect of altruism (the older the respondents the

Table 13.3 The effect of different predictor variables on the general importance attributed to the nine Protected Needs with a view to human wellbeing (Question 7)

Importance of the Protected Needs for human wellbeing (question 7 of questionnaire)						
	Standardized regression coefficients (β)					
	Gender	Age	Income	Education	Altruism	Political attitude
Protected Need 1	-0.12**	0.07	0.02	0.02	0.07	0.01
Protected Need 2	-0.05	0.11**	-0.02	-0.04	0.17**	0.07
Protected Need 3	-0.12**	0.18**	0.00	-0.02	0.12**	0.04
Protected Need 4	-0.12**	0.10**	-0.02	-0.01	0.17**	0.02
Protected Need 5	-0.08*	0.09*	-0.04	-0.02	0.10**	-0.02
Protected Need 6	-0.03	0.09*	0.01	-0.07	0.20**	0.04
Protected Need 7	-0.01	0.09*	-0.01	-0.02	0.23**	-0.04
Protected Need 8	-0.05	0.13**	-0.06	0.02	0.23**	0.01
Protected Need 9	-0.17**	0.07*	-0.01	0.06	0.21**	0.00

The table presents the standardized regression coefficient (β) for each of the variables gender (1 = w, 2 = m), age, income, education, altruism, and political attitude (1 = far left, 11 = far right)

* $p < 0.05$; ** $p < 0.01$

Table 13.4 The scope of persons with regard to whom respondents think it to be blatantly unjust if due to circumstances the nine Protected Needs remain unsatisfied (Question 8)

Injustice if Protected Needs are not satisfied (question 8 of questionnaire)						
	Increasing scope of persons: Unjust for . . .					
	For no-one	For Swiss citizens	. . . and foreigners living in Switzerland	. . . and refugees and undocumented migrants living in Switzerland	For people living all over the world	Total
Protected Need 1	8.9	9.9	10.2	9.0	62.1	100% (N: 847)
Protected Need 2	12.6	14.0	14.9	9.6	48.8	100% (N: 819)
Protected Need 3	10.7	10.3	11.5	10.4	57.1	100% (N: 828)
Protected Need 4	11.9	12.3	11.1	8.9	55.8	100% (N: 835)
Protected Need 5	10.2	12.0	11.1	9.0	57.7	100% (N: 822)
Protected Need 6	11.8	12.0	13.6	9.8	52.8	100% (N: 828)
Protected Need 7	15.9	10.6	9.6	10.9	53.0	100% (N: 832)
Protected Need 8	11.3	18.6	18.0	8.8	43.2	100% (N: 805)
Protected Need 9	10.9	10.9	9.9	8.9	59.4	100% (N: 842)

The scale that was provided were different groups of people that were presented to the respondents as an increasing scope of persons. The respondents answered by indicating whether they felt it blatantly unjust for no-one (= 1), only for Swiss citizens (= 2), also for foreigners living in Switzerland (= 3), also for refugees and undocumented migrants living in Switzerland (= 4), or for people living all over the world (= 5). The table indicates, per group of people, the number of respondents that have chosen this group in percent. "I don't know" and no answer were both coded as missing and are thus not included. It was technically possible to give incorrect answers. For the analysis of the data, incorrect answers were coded as missing. That is, the percentages of respondents given in the table include only those who had given technically correct answers

higher is the importance attributed to PN 3). But although altruism is the strongest predictor for how respondents perceive the importance of seven of the nine PN (PN 2, PN 4 to PN 9), it is not the only significant predictor for these seven PN. For four of these PN, gender is a significant predictor as well (PN 3 to PN 5, PN 9), albeit in one case the effect is rather weak (PN 5), and for all seven of these PN, age is a significant predictor as well, albeit in four cases the effect is rather weak (PN 5 to PN 7, PN 9). For all needs but PN 1, there is more than one variable that significantly predicts how important the need is deemed to be for human wellbeing, but in no case do income, education or political attitude play a significant role.

Respondents were asked, for each of the nine PN, about *intolerable injustice*. Table 13.4 presents for each of the nine PN the scope of persons with regard to whom respondents think it to be blatantly unjust if this need remains unsatisfied due to circumstances. For seven of the PN, more than 50% of the respondents think it is blatantly unjust if people, regardless of where they are living, are prevented from satisfying it (the exceptions are PN 2 and PN 8). Looking at it from the opposite shows that for eight of the PN less than 13% of the respondents do think that it is not blatantly unjust for anyone if he/she is prevented from satisfying this need (the exception is PN 7).

Because the scale that was provided was presented to the respondents as an increasing scope of persons, it is possible to distinguish respondents by whether they adopt (a) a national perspective (unjust only for Swiss citizens), (b) a territorial perspective (unjust for all people living in Switzerland, that is, for Swiss citizens and for foreigners living in Switzerland and for refugees as well as undocumented migrants living in Switzerland), or (c) a global perspective (unjust for people living everywhere in the world). Adding the percentages given in Table 13.4 shows that depending on the PN, 10–19% of respondents adopt a national perspective, 29–45% adopt a territorial perspective, and 43–62% of respondents adopt a global perspective (Fig. 13.1). In total, for each of the nine PN,

the vast majority of respondents (84–91%) think that it is, at least for some groups of people, blatantly unjust if people are prevented from satisfying this need.

The effect sizes (β) presented in Table 13.5 show to what extent the respondents' perceptions of injustice with regard to whether they adopt a narrower or a wider perspective in judging about injustice depend on the single independent variables. The table does also show whether the measured effects are statistically significant. While different variables predict how the respondents judge the general importance of the PN with a view to quality of life (Table 13.3), and while altruism is the most important predictor for this judgement, this is not the case with the respondents' judgment about injustice. The outstanding significant predictor for where the respondents draw the line of injustice is their political attitude. A right-wing attitude predicts adopting a national (= narrower) perspective, a left-wing attitude predicts adopting a global (= wider) perspective. All other variables are significant only in rare cases, and in these cases the effect sizes are extremely small (the one exception is the effect of gender for PN 9). The most striking difference between the judgment about the general importance of the nine PN (Question 7) and the judgement about the injustice if the nine PN remain unsatisfied (Question 8) is the inversion of the importance of altruism and political attitude: while altruism is the strongest predictor for how the respondents judge the general importance of the PN with a view to quality of life, it has no predictive power for the respondents' judgment about injustice, and the same applies, but conversely, to the political attitude.

13.4.4.2 To What Extent the Nine Protected Needs Ground a Perceived Ethical Obligation to Warrant Their Satisfaction for All People

Respondents were asked, for each of the nine PN, to what extent they *feel obliged as an individual* (and within the limits of their possibilities) to contribute to the possibility of other people of

Where is the line of not tolerable injustice drawn? (question 8 of questionnaire)

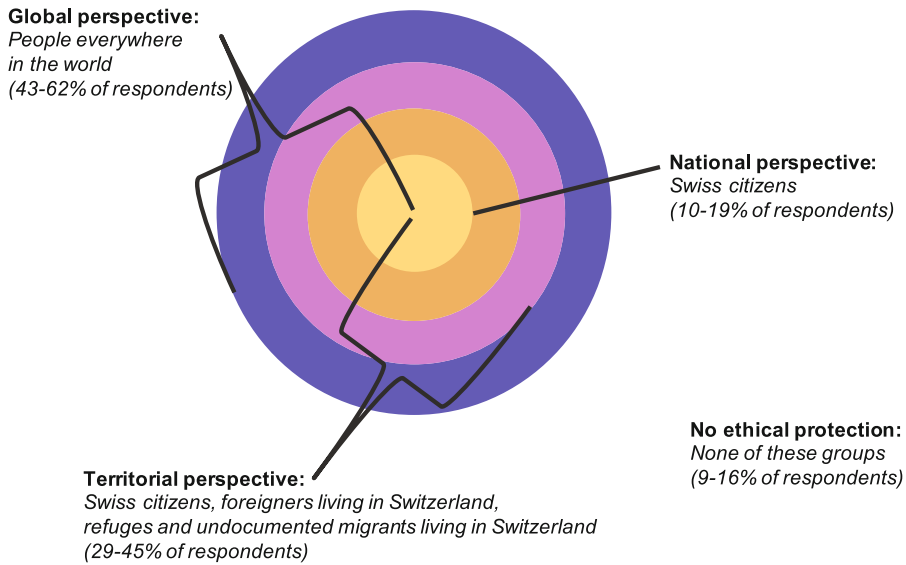


Fig. 13.1 The figure shows how many respondents adopt a national perspective, a territorial perspective or a global perspective, and how many think that the Protected Needs do not need to be protected. All those respondents that think it is blatantly unjust only if Swiss citizens are prevented from satisfying Protected Needs belong to the group of respondents with a national perspective, while those that include all people living in Switzerland (Swiss

citizens, foreigners living in Switzerland, refugees and undocumented migrants living in Switzerland) belong to the group of respondents with a territorial perspective. All those respondents that think it is blatantly unjust if people are prevented from satisfying Protected Needs regardless of where they are living in the world belong to the group of respondents with a global perspective. The percentages are calculated based upon the percentages in Table 13.4

Table 13.5 The effect of different predictor variables on the scope of persons for which it is deemed to be unjust if satisfaction of the nine Protected Needs is prevented by circumstances (Question 8)

Injustice if Protected Needs are not satisfied (question 8 of questionnaire)						
	Standardized regression coefficients (β)					
	Gender	Age	Income	Education	Altruism	Political attitude
Protected Need 1	-0.06	0.00	0.04	0.02	0.06	-0.23**
Protected Need 2	-0.01	0.06	0.01	-0.04	0.00	-0.22**
Protected Need 3	0.01	0.05	0.08*	-0.05	0.05*	-0.24**
Protected Need 4	-0.03	0.04	0.09*	-0.04	0.03	-0.20**
Protected Need 5	-0.05	0.01	0.05	-0.04	0.05	-0.21**
Protected Need 6	0.05	0.06	0.03	-0.06	0.05	-0.20**
Protected Need 7	-0.06	0.08*	0.04	-0.02	0.06	-0.17**
Protected Need 8	-0.02	0.08*	0.02	0.00	0.09*	-0.19**
Protected Need 9	-0.12**	0.03	0.05	-0.02	-0.03	-0.18**

The table presents the standardized regression coefficient (β) for each of the variables gender (1 = w, 2 = m), age, income, education, altruism, and political attitude (1 = far left, 11 = far right)

* p < 0.05; ** p < 0.01

satisfying this need. The dimensions of recipients they were asked to consider were *present generations in their own country* (that is, in Switzerland) and *present generations all over the world*. The distribution of their answers is shown in Fig. 13.2a, b. The nine PN do not differ much with regard to the percentage of respondents that feels more or less obliged, that is, the distribution of the respondents' answers is

similar for all nine PN. The only salient difference between the nine PN is the percentage of respondents that feels strongly obliged with a view to present generations in the own country (Fig. 13.2a, value 7). For all nine PN the pattern of how the respondents answered differs from the normal distribution insofar, as neither Fig. 13.2a nor Fig. 13.2b show a marked peak at value 4. In both figures, the curves drop slightly at value

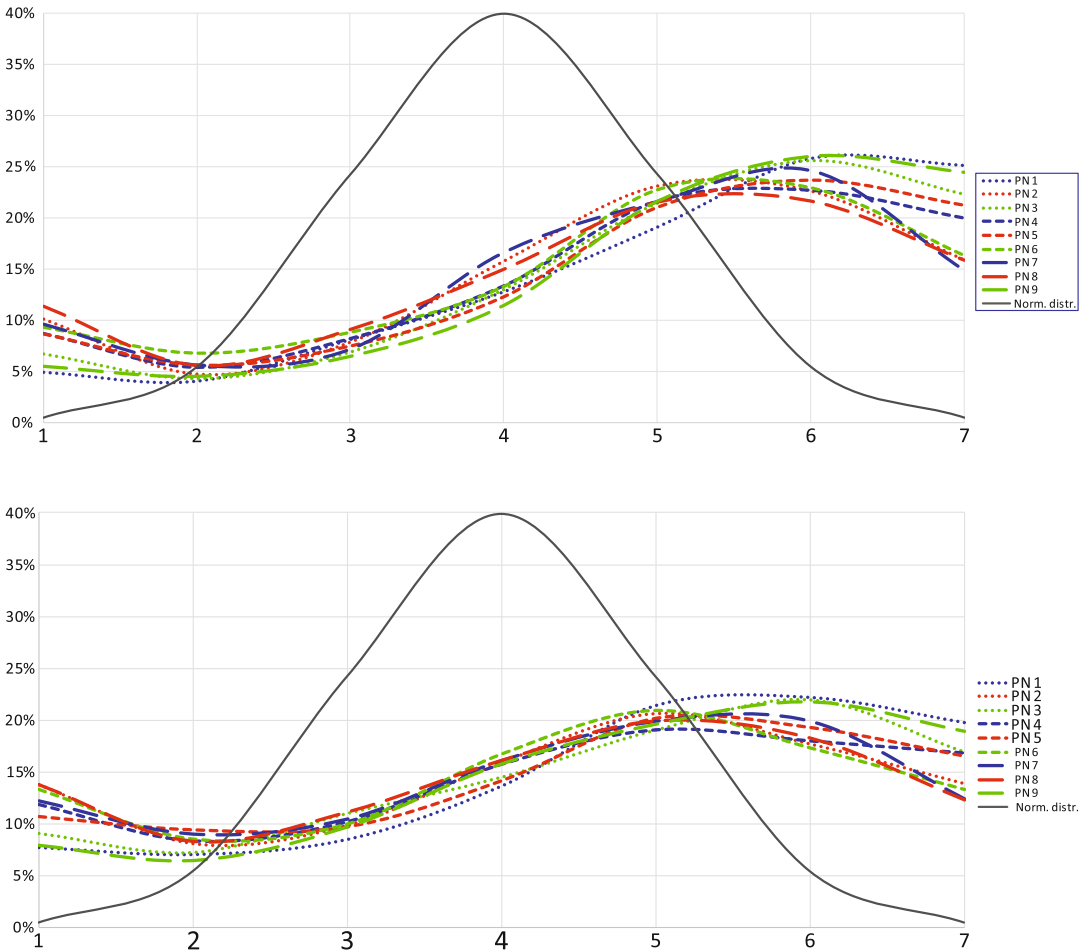


Fig. 13.2 (a) (Top) Obligation as an individual: present generations own country. (b) (Bottom) Obligation as an individual: present generations all over the world. Distribution of respondents' answers to the question to what extent they feel obliged as an individual (and within the limits of their possibilities) to contribute to the possibility of (a) people that are living in Switzerland now and of (b) people that are living all over the world now of satisfying

each of the nine Protected Needs (Question 9). To allow for comparison, normal distribution is shown (Norm. distr.). The y-axis = respondents that have answered, in percent ("I don't know" and no answer were both coded as missing and are thus not included), for each of the nine Protected Needs. The x-axis = scale (1: not obliged at all, 7: strongly obliged; 2–6 were not labelled; min. = 1, max. = 7)

2 and then rise until they reach a peak at value 5 or 6 (this differs across the nine PN), and then either level off on the right or drop again slightly at value 7.

The effect sizes (β) presented in Table 13.6 show to what extent the respondents' perceived obligation as an individual depends on the single independent variables. The table does also show whether the measured effects are statistically significant. Age and income have no significant effect on whether respondents perceive themselves to be more or less obliged. Gender and education have only a negligible effect on how respondents judge their obligation (with the one exception that men do feel significantly more obliged than women to contribute to the satisfaction of PN 8 of present generations in the own country). The strongest and outstanding predictor for how obliged respondents think they are, is, for all nine PN and for both dimensions of recipients, altruism: The more altruistic respondents are the more they feel to be obliged as an individual. The political attitude has some significant effect as well, but the effect sizes are much smaller and the effect is not equally significant. But the results about the effects of the political attitude show the overall trend that a right-wing attitude leads to a less pronounced feeling of obligation.

Respondents were asked, for each of the nine PN, how much they think the *Swiss society is obliged as a community* (and within the limits of its possibilities) to contribute to the possibility of people to satisfy this need. The dimensions of recipients they were asked to consider were *present generations in the own country* (that is, in Switzerland) and *present generations all over the world*. The distribution of their answers is shown in Fig. 13.3a, b. Similar to Fig. 13.2, the most salient difference across the nine PN is the percentage of respondents that think the community is strongly obliged (value 7 in both Fig. 13.3a, b). And again, as compared to the normal distribution, the peaks are shifted to the right in both Fig. 13.3a, b. In both figures, the curves for all nine PN show a steady and marked rise until they reach a peak at value 5 (or value 6 for some of the PN), then the patterns of the two

figures differ. While the curves in Fig. 13.3b either level off on the right or drop again slightly at value 7 (with one exception), the curves in Fig. 13.3a fan out, that is, five of them drop, one levels off, and three show a continued marked rise.

The effect sizes (β) presented in Table 13.7 show to what extent the obligation that the respondents do attribute to the community depends on the single independent variables. The table does also show whether the measured effects are statistically significant. Age, income, and education have no significant effect on whether respondents think the community to be more or less obliged to contribute to providing need satisfaction of the nine PN for present generations in its own country (Switzerland) and for present generations all over the world. The same applies to gender (the only significant effect that can be observed for PN 1 is negligible due to the small effect size). The strongest and outstanding predictor for how obliged respondents think the community to be, is, for all nine PN and for both dimensions of recipients, altruism: The more altruistic respondents are the more they think that the community is obliged. The political attitude has a significant effect as well (and the effect is the same as it is for how respondents judge their obligation as individuals: a right-wing attitude leads to a less pronounced feeling of obligation), but the effect is much weaker than the effect of altruism.

Respondents were asked, for each of the nine PN, how much they think the *Swiss society is obliged as a community* (and within the limits of its possibilities) to contribute to the possibility of future generations to satisfy this need. The dimensions of recipients they were asked to consider were *future generations in the own country* (that is, in Switzerland) and *future generations all over the world*. The distribution of their answers is shown in Fig. 13.3c, d. The comparison of the Figs. 13.3a, c shows that these figures are quite similar, that is, they show only slight differences, and the same applies to the Figs. 13.3b, d.

The effect sizes (β) presented in Table 13.8 show to what extent the obligation that the

Table 13.6 The effect of different predictor variables on the perceived obligation to contribute, as an individual, to the possibility of satisfaction of the nine Protected Needs of people living now in Switzerland and of people living all over the world now (Question 9, recipients a and b)

		Standardized regression coefficients (β)																	
		Gender			Age			Income			Education			Altruism			Political attitude		
		(a)	(b)	(a)	(b)	(a)	(b)	(a)	(b)	(a)	(b)	(a)	(b)	(a)	(b)	(a)	(b)		
(a) in own country																			
(b) all over the world																			
Protected Need 1	0.04	0.00	0.00	-0.03	-0.01	-0.02	-0.02	-0.09	0.34 ^{***}	0.36 ^{***}	-0.10 ^{***}	-0.11 ^{***}							
Protected Need 2	0.07 [*]	0.00	0.00	0.05	-0.06	-0.05	-0.02	-0.05	0.33 ^{***}	0.32 ^{***}	-0.06	-0.07							
Protected Need 3	0.06	0.03	0.00	0.02	-0.01	-0.03	-0.02	-0.06	0.35 ^{***}	0.37 ^{***}	-0.08 [*]	-0.13 ^{***}							
Protected Need 4	0.06	0.02	0.06	0.04	-0.03	-0.07	-0.02	-0.05	0.32 ^{***}	0.35 ^{***}	-0.08 [*]	-0.08 [*]							
Protected Need 5	0.06	0.04	0.02	0.01	-0.01	-0.03	-0.05	-0.07 [*]	0.28 ^{**}	0.31 ^{***}	-0.11 ^{***}	-0.10 ^{***}							
Protected Need 6	0.06	0.02	0.04	0.05	-0.06	-0.06	-0.03	-0.08 [*]	0.29 ^{**}	0.32 ^{***}	-0.04	-0.08 [*]							
Protected Need 7	0.08 [*]	0.08 [*]	0.02	0.02	-0.02	-0.02	-0.04	-0.04	0.35 ^{***}	0.35 ^{***}	-0.07 [*]	-0.07 [*]							
Protected Need 8	0.11 ^{***}	0.03	0.01	0.06	-0.04	-0.05	-0.01	-0.02	0.27 ^{***}	0.30 ^{***}	-0.12 ^{***}	-0.13 ^{***}							
Protected Need 9	0.01	-0.02	0.05	0.03	-0.01	-0.05	0.01	-0.04	0.32 ^{***}	0.34 ^{***}	-0.11 ^{***}	-0.07 [*]							

The table presents the standardized regression coefficient (β) for each of the variables gender (1 = w, 2 = m), age, income, education, altruism, and political attitude (1 = far left, 11 = far right). (a) = need satisfaction of present generations in own country, (b) = need satisfaction of present generations all over the world

^{*}p < 0.05; ^{***}p < 0.01

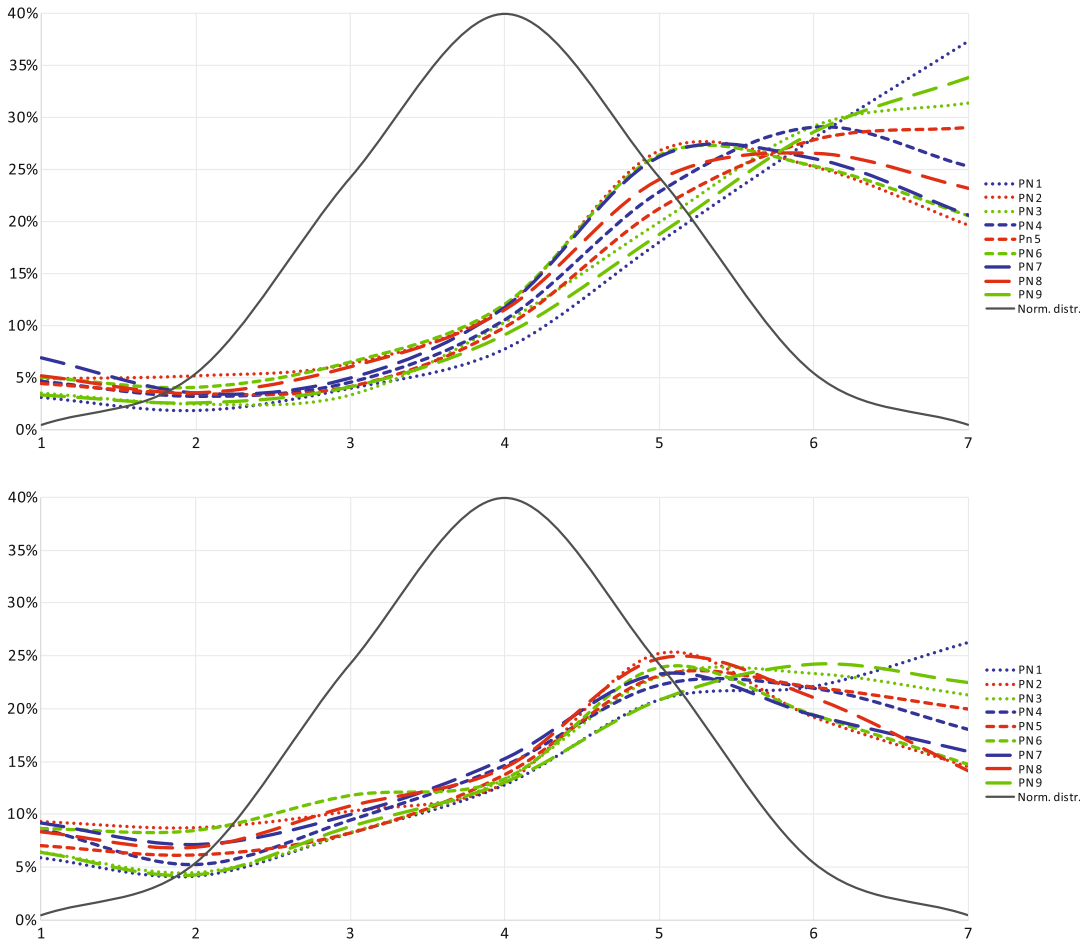


Fig. 13.3 (a) (Top) Obligation of community: present generations own country. (b) (Bottom) Obligation of community: present generations all over the world. (a, b) Distribution of respondents' answers to the question to what extent they think that the Swiss society is obliged as a community (and within the limits of its possibilities) to contribute to the possibility of (a) people that are living in Switzerland now and of (b) people that are living all

over the world now of satisfying each of the nine Protected Needs (Question 10). To allow for comparison, normal distribution is shown (Norm. distr.). The y-axis = respondents that have answered, in percent ("I don't know" and no answer were both coded as missing and are thus not included), for each of the nine Protected Needs. The x-axis = scale (1: not obliged at all, 7: strongly obliged; 2–6 were not labelled; min. = 1, max. = 7)

Table 13.7 The effect of different predictor variables on the perceived obligation to contribute, as a community, to the possibility of satisfaction of the nine Protected Needs of people living now in Switzerland and of people living all over the world now (Question 10, recipients a and b)

		Standardized regression coefficients (β)																	
		Gender			Age			Income			Education			Altruism			Political attitude		
		(a)	(b)	(a)	(b)	(a)	(b)	(a)	(b)	(a)	(b)	(a)	(b)	(a)	(b)	(a)	(b)		
(a) in own country																			
(b) all over the world																			
Protected Need 1	-0.05	-0.07*	0.00	-0.01	0.00	0.01	0.02	-0.02	0.02	0.02	0.26**	0.33**	-0.16**	-0.16**	-0.16**	-0.16**	-0.16**		
Protected Need 2	0.05	-0.01	-0.05	-0.01	-0.06	0.00	0.00	-0.03	-0.06	-0.06	0.24**	0.30**	-0.09*	-0.09*	-0.11**	-0.11**	-0.11**		
Protected Need 3	0.01	-0.04	0.00	0.03	0.01	-0.01	0.03	0.03	-0.03	-0.03	0.26**	0.31**	-0.14**	-0.14**	-0.16**	-0.16**	-0.16**		
Protected Need 4	0.05	-0.01	0.02	0.04	0.01	0.02	0.02	-0.02	-0.04	-0.04	0.30**	0.32**	-0.09*	-0.09*	-0.12**	-0.12**	-0.12**		
Protected Need 5	0.02	-0.06	0.01	0.00	0.00	-0.04	-0.01	-0.01	-0.01	-0.01	0.22**	0.28**	-0.11*	-0.11*	-0.16**	-0.16**	-0.16**		
Protected Need 6	0.02	-0.02	0.02	0.04	-0.02	-0.02	-0.01	-0.01	-0.06	-0.06	0.32**	0.33**	-0.03	-0.03	-0.06	-0.06	-0.06		
Protected Need 7	0.05	0.02	-0.01	0.01	-0.04	-0.03	0.00	0.00	-0.05	-0.05	0.30**	0.34**	-0.08*	-0.08*	-0.08*	-0.08*	-0.08*		
Protected Need 8	0.04	-0.02	-0.04	-0.02	-0.01	-0.03	0.05	0.05	0.01	0.01	0.25**	0.35**	-0.12**	-0.12**	-0.12**	-0.12**	-0.12**		
Protected Need 9	-0.04	-0.08	-0.02	0.02	0.02	-0.02	0.06	0.06	-0.01	-0.01	0.30**	0.34**	-0.12**	-0.12**	-0.15**	-0.15**	-0.15**		

The table presents the standardized regression coefficient (β) for each of the variables gender (1 = w, 2 = m), age, income, education, altruism, and political attitude (1 = far left, 11 = far right). (a) = need satisfaction of present generations in own country, (b) = need satisfaction of present generations all over the world

* p < 0.05; ** p < 0.01

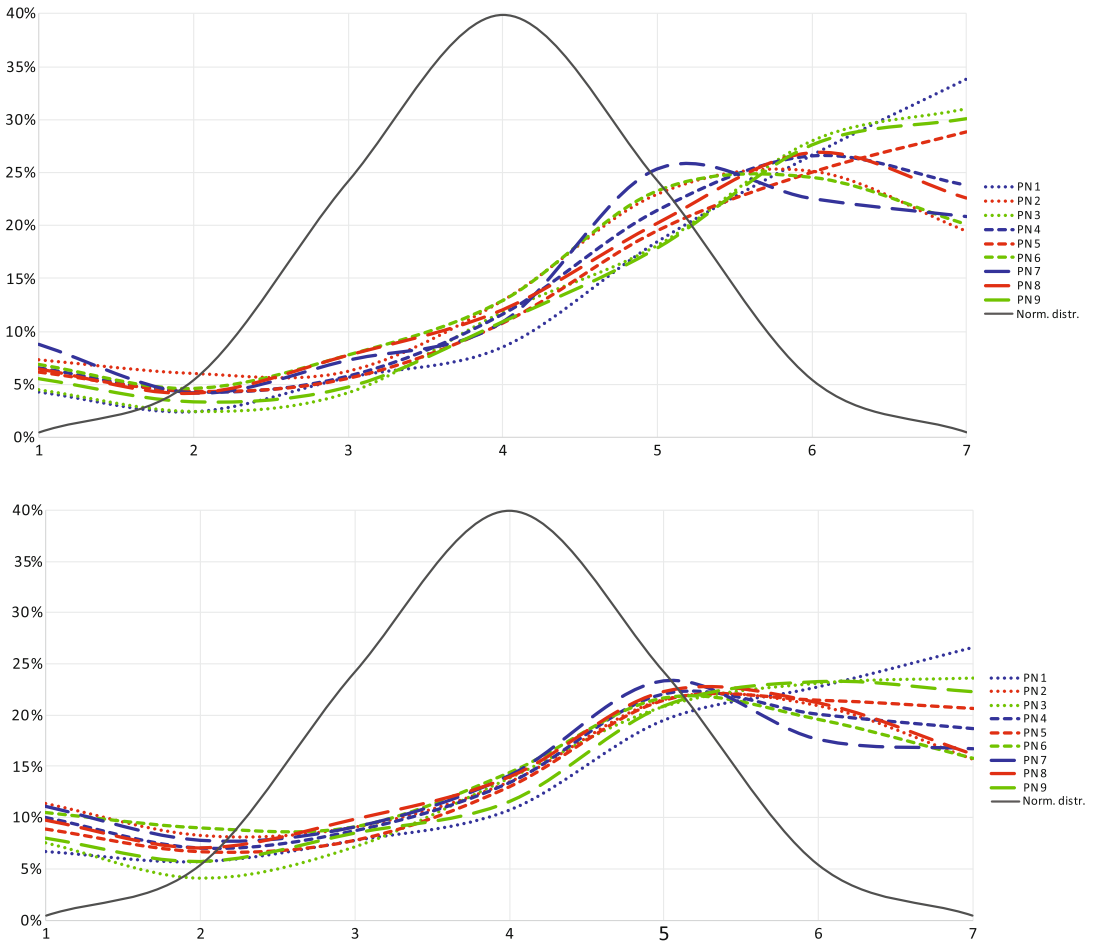


Fig. 13.3 (c) (Top) Obligation of community: future generations own country. (d) (Bottom) Obligation of community: future generations all over the world. (c, d) Distribution of respondents' answers to the question to what extent they think that the Swiss society is obliged as a community (and within the limits of its possibilities) to contribute to the possibility of (c) people that will live in Switzerland in 100 years and of (d) people that will live all

over the world in 100 years of satisfying each of the nine Protected Needs (Question 10). To allow for comparison, normal distribution is shown (Norm. distr.). The y-axis = respondents that have answered, in percent ("I don't know" and no answer were both coded as missing and are thus not included), for each of the nine Protected Needs. The x-axis = scale (1: not obliged at all, 7: strongly obliged; 2-6 were not labelled; min. = 1, max. = 7)

respondents do attribute to the community depends on the single independent variables. The table does also show whether the measured effects are statistically significant. The comparison of the Tables 13.7 and 13.8 shows that the effects of the independent variables on the respondents' answers are similar, that is, their answers depend on the same variables when they are judging the community's obligation for present generations and for future generations: The perceived obligation does neither depend on gender, nor on age, nor on income or education

(the only significant effect of education that can be observed for PN 4 is negligible due to the small effect size), but on political attitude and on altruism with altruism showing the stronger effect than political attitude (here in one case, for PN 2, the effect works the other way round: a right-wing attitude leads to attributing a stronger obligation). The comparison of the effect sizes in Tables 13.6, 13.7 and 13.8 shows one salient difference with regard to how the political attitude predicts the respondents' answers: Its effect (both in terms of the effect sizes and the significance) is

Table 13.8 The effect of different predictor variables on the perceived obligation to contribute, as a community, to the possibility of satisfaction of the nine Protected Needs of people living in Switzerland in 100 years and of people living all over the world in 100 years (Question 10, recipients c and d)
 Obligation as a community to contribute to need satisfaction of future generations ... (question 10 of questionnaire)

	Standardized regression coefficients (β)											
	Gender		Age		Income		Education		Altruism		Political attitude	
	(c)	(d)	(c)	(d)	(c)	(d)	(c)	(d)	(c)	(d)	(c)	(d)
(c) in own country	0.00	-0.16	-0.04	-0.02	0.01	-0.01	0.04	0.00	0.30**	0.31**	-0.14**	-0.17**
(d) all over the world	0.05	-0.01	-0.02	0.01	-0.02	-0.03	-0.03	-0.06	0.27**	0.28**	0.11**	-0.11**
Protected Need 1	0.02	-0.02	0.00	0.01	0.02	0.00	0.04	-0.01	0.30**	0.33**	-0.13**	-0.17**
Protected Need 2	0.06	0.01	0.03	0.04	0.02	0.02	-0.04	-0.07*	0.30**	0.33**	-0.10**	-0.12**
Protected Need 3	0.03	-0.02	-0.02	-0.04	-0.01	-0.04	0.00	-0.04	0.24**	0.28**	-0.11**	-0.14**
Protected Need 4	0.02	-0.03	0.01	0.02	-0.01	-0.04	0.00	-0.06	0.30**	0.31**	-0.05	-0.07**
Protected Need 5	0.05	0.01	-0.03	-0.01	-0.02	-0.05	-0.01	-0.05	0.31**	0.32**	-0.05	-0.08**
Protected Need 6	0.05	0.01	-0.02	-0.03	-0.02	-0.04	0.03	-0.01	0.29**	0.34**	-0.12**	-0.12**
Protected Need 7	-0.01	-0.04	-0.02	0.00	-0.02	0.01	-0.01	-0.05	0.30**	0.34**	-0.11**	-0.16**

The table presents the standardized regression coefficient (β) for each of the variables gender (1 = w, 2 = m), age, income, education, altruism, and political attitude (1 = far left, 11 = far right). (c) = need satisfaction of future generations in own country, (d) = need satisfaction of future generations all over the world
 * $p < 0.05$; ** $p < 0.01$

Table 13.9 The mean values of the perceived obligation to contribute, both as an individual and as a community, to the possibility of satisfaction of the nine Protected Needs of present and of future generations both in the own country (Switzerland) and all over the world (Questions 9 and 10, recipients a, b, c, d)

Obligation to contribute to need satisfaction of ... (questions 9 and 10 of questionnaire)						
	Mean values (<i>M</i>)					
	Individual		Community			
	(a) present generations in own country	(b) present generations all over the world	(a) present generations in own country	(b) present generations all over the world	(c) future generations in own country	(d) future generations all over the world
Protected Need 1	5.15	4.79	5.69	5.10	5.50	5.06
Protected Need 2	4.68	4.30	5.05	4.51	4.92	4.50
Protected Need 3	5.04	4.61	5.54	4.97	5.45	5.00
Protected Need 4	4.82	4.43	5.32	4.74	5.12	4.65
Protected Need 5	4.87	4.47	5.40	4.85	5.23	4.79
Protected Need 6	4.67	4.29	5.09	4.52	4.95	4.50
Protected Need 7	4.68	4.32	5.08	4.58	4.91	4.51
Protected Need 8	4.58	4.24	5.19	4.60	5.06	4.60
Protected Need 9	5.14	4.74	5.59	5.00	5.35	4.91

The respondents answered by using a 7-point scale (1: not obliged at all, 7: strongly obliged; 2–6 were not labelled). They made use of the entire scale (min. = 1, max. = 7)

the strongest when the respondents are judging whether the community is obliged with a view to need satisfaction outside its national borders.

Respondents were asked, for each of the nine Protected Needs, about the *perceived obligation for the individual and for the community* of warranting the possibility of need satisfaction for different dimensions of recipients. The dimensions of recipients that they were asked to consider where (a) present generations in the own country (Switzerland), (b) present generations all over the world, (c) future generations in the own country (Switzerland), and (d) future generations all over the world. Table 13.9 allows to compare all mean values (*M*) of how the respondents answered the questions about the perceived obligation. In general, the respondents attribute a stronger obligation to the community than to the individual. Ranking the mean values (*M*) of the obligation attributed to the community according to their numeric value uncovers a pattern of

diminishing feeling of obligation that applies to all PN but PN 3: (a) present generations in own country, (c) future generations in own country, (b) present generations all over the world, (d) future generations all over the world. That is, respondents think that the obligation of both the individual and the community to contribute to the need satisfaction of people in the own country is higher as it is for other recipients, even when these other recipients are living now.

13.4.5 To What Extent Protected Needs Do Ground a Sense of Ethical Obligation

All nine Protected Needs are attributed a rather high importance with a view to quality of life. How important they are perceived to be for general human wellbeing, depends primarily on peoples' personality (altruism), but age and

gender play a role as well. Less important for this judgment are education, income or political attitude. This picture changes when it comes to judging the incontestability of the Protected Needs. We asked about injustice to inquire into whether the Protected Needs are perceived to be universal human needs and incontestable human needs. The results show that each of the nine Protected Needs is perceived to be contestable only by a small minority of respondents, because for each of the nine needs only a small minority thinks that it is not unjust if circumstances prevent someone from satisfying this need. That is, a vast majority of respondents perceives these needs to be incontestable. But for a part of them the incontestability of these needs is limited with regard to its scope, because they adopt a territorial or even national perspective in judging unfairness. For them, the incontestability does not reach beyond their own country. The predictor for how people judge on the spatial scope of the incontestability of the Protected Needs is their political attitude.

There is no absolute measure that can be used to decide whether someone does or does not feel obliged, and it would not be appropriate to adopt a binary approach in judging about perceived obligation. Rather, people can feel more or less obliged. We used a 7-point scale to inquire into perceived obligation, and we labelled the extremes with “not obliged at all” and “strongly obliged”. Against this background, we interpret choosing values above 4 to be an expression of feeling obliged. Our data does, of course, not tell us how the respondents do define obligation, but the results of our inquiry show that respondents posit both an individual and a shared obligation with regard to warranting each of the nine Protected Needs, because a higher number of respondents chose values above 4 to express their feeling of obligation. And they did so with regard to all four dimensions of recipients. In other words: They perceive both themselves as individuals and their community (the Swiss society) as agents that are obliged to warrant the possibility of satisfying the nine Protected Needs for present and for future generations (the latter was asked only with a view to the obligation of the community, not with a view to the obligation as an individual). But this attributed obligation diminishes the more the recipients are distant in

spatial and temporal terms. The perceived obligation does not depend on gender, age, income, or education. Political attitude has a significant effect, but altruism is a much stronger predictor.

The possibility of satisfying the nine Protected Needs has the potential of serving as a normative criterion of ethical obligation, and it has this potential across segments of society built by gender, age, income, education and political attitude. That is, there is a shared feeling of obligation policy-making and public deliberations could build on. But this potential is limited if a territorial or even national perspective is adopted. Which perspective is adopted, is, in turn, not cast in stone: It is remarkable that the strongest predictor of how the respondents in our study answered to the questions in the questionnaire is altruism with one telling exception: In the one question that did draw the attention to national borders and nationality, political attitude is the strongest predictor of the respondents’ answers while in all the other questions that focus on human beings rather than on nationality, it is altruism. In other words: the respondents did not apply the same criteria in all questions.

13.5 Now What? Food for Thought and Action

The starting point of this chapter was the assumption that the concept of sustainability grounds an ethical obligation of providing the conditions that are crucial for achieving wellbeing, and that this sets a specific stage for how to discuss quality of life. Because quality of life for all people is the ultimate goal of sustainable development, and because sustainability is a concept meant to inform governance on all levels of societal organisation within and across societies, it is necessary to provide a thick theory of the ‘good life’ that is suitable to ground individual and shared obligations on a global scale. Proceeding from the theory of Protected Needs, a theory of the ‘good life’ that has been developed for the context of sustainability, we discussed whether this ethical obligation mirrors in peoples’ perceptions. For this purpose, we recurred on the results of a representative survey that has been fielded in 2016 in Switzerland. In sum, our results show

that the ethical obligation that can be inferred theoretically does empirically correspond to perceptions. The obligation to provide the conditions that are crucial for achieving human wellbeing is not only ingrained in the concept of sustainability and can thus be *posited*, human wellbeing has the potential of actually being the object of *assumed* obligation. Quality of life can provide a “symbolic-interpretative construct” (Klintman and Boström 2004, 2008) for sustainability governance if it is fleshed out in a way that is suitable to be translated into political action. This suitability is claimed by the theory of Protected Needs. We discussed to what extent Protected Needs do ground a sense of obligation of warranting need satisfaction for present and future generations, and we argued that Protected Needs can actually provide a shared normative criterion of ethical obligation. We gained our results in a country with a consensual policy discourse climate. Our results can thus be generalized with a view to cultures and countries with a similar policy discourse climate, such as e.g. other northern European countries (Klintman and Boström 2004, p. 614). They might not apply to cultures and countries with a different policy discourse climate, such as an adversarial policy discourse climate.

The empirical results that we presented show that reflecting about quality of life and corresponding obligations has the potential of bridging social divides and political camps and of transgressing the national borders of perceived obligation. This aligns to previous results revealing that there might be a set of four values that are indicative of a ‘sustainability culture’: organisations committed to sustainability seem to distinguish themselves from other organisations in the importance they attach to the four values quality of life (the ‘good life’), intergenerational justice, intragenerational justice, and the common good (Ruesch Schweizer and Di Giulio 2016). It also aligns with previous research showing that individuals in their role as citizens emphasize quality of life and social justice in judging policy measures (Defila et al. 2018).

But our results do also show that adopting a territorial or even national perspective prevents this potential from unfolding. If quality of life is

to serve as a normative criterion of ethical obligation that is widely shared in a society, the adoption of a global perspective and narrative should be supported. Our results about which question seemed to activate a territorial or even national perspective and about how this paralleled by a change in the predictive power of altruism and of political attitude might indicate that adopting a universal approach in talking about quality of life and thus emphasizing what people have in common rather than emphasizing their differences might have the potential of creating a shared feeling of obligation for people (and their living conditions) that are distant either in terms of space or in terms of time or in terms of both.

We think that this call for promoting a universal perspective in how ethical obligations are reflected, discussed, and communicated, aligns with the critique of the standard model of responsibility by Young. This model, Young labels it the “liability model of responsibility” (e.g., Young 2005, 2006), links responsibility to national (or constitutional) borders, requires tracing “a direct relationship between the action of an identifiable person or group and a harm” (Young 2005, p. 716) and is, accordingly, backward looking. According to Young, this model is inadequate for a “world of global interdependencies” (ibid., p. 725) and complex structural and social processes. She suggests to adopt, instead, a “social connection model of responsibility”, a model that is forward looking, does not rely on a “fairly direct interaction between wrongdoer and wronged party” (ibid., p. 719) but on a shared responsibility for (re)producing structures, and thus accounts for structural and social processes that span across national borders. Yet, the alternative provided by Young is a model of responsibility that grounds ethical obligations in conditions that need remedy because they are unjust. The context of sustainability, however, calls for a salutogenic approach not only with regard to defining quality of life but also with regard to the question of responsibility.

Against this background and against the background that justice theory has neglected needs as something that has a specific ethical force (Brock and Miller 2019), we therefore want to conclude with voicing a call for a salutogenic approach in

how responsibility and justice are conceived and discussed: The scholarly community researching responsibility and justice should reinforce its effort to provide robust concepts that allow to cover not only helping the needy, alleviating suffering, or preventing harm (or being liable for harm) also in the case of distant others, but also the achievement of desired outcomes. For the context of sustainability, this outcome should be a status in which people can satisfy their needs and live a satisfying life. Policy-makers in turn should not shy away from national and cross-national debates about quality of life that are informed by a universal perspective but initiate such debates. And they should make sure that these debates are not defensive but aimed at the vision of a world in which sustainability is achieved because human beings have the possibility of satisfying their needs and living a satisfying life.

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Appendix

The Sample of the Study About Protected Needs and Consumption Corridors (Switzerland, 2016)

Table 13.10 Sample by age, gender, and linguistic region

		Gender			
Linguistic region			Female	Male	Total
German-speaking part	Age	18–30	70	72	142
		31–40	62	63	125
		41–50	65	69	134
		51–60	64	65	129
		61 and older	108	91	199
	Subtotal		369	360	729
French-speaking part	Age	18–30	34	35	69
		31–40	29	29	58
		41–50	32	32	64
		51–60	28	28	56
		61 and older	46	37	83
	Subtotal		169	161	330
Total	Age	18–30	104	107	211
		31–40	91	92	183
		41–50	97	101	198
		51–60	92	93	185
		61 and older	154	128	282
	Total		538	521	1059

Composition of the sample resulting from applying the combined criteria of age (aged 18 and older), gender, and linguistic region (German-speaking part of Switzerland, French-speaking part of Switzerland) in quota sampling (crossed quota). Compared to the Swiss population, respondents from the French-speaking part of Switzerland were slightly overrepresented in the sample. This was considered in the data analysis by weighting the answers

Table 13.11 Sample by size of household

Size of household (persons per household)	Sample (in %)	Swiss population (in %)
1–2 persons	66.6	67.8
3–4 persons	28.4	26.1
5 persons and more	5	6.1
Total	100	100

The household sizes represented in the sample in comparison to the Swiss population in 2015 (Source: Swiss Federal Statistical Office, 24.11.2016). At the time the survey was fielded, most respondents lived in households consisting of one or two persons, and the same applied to the Swiss population

Table 13.12 Sample by political attitude

Political attitude (1 = far left; 11 = far right)	Sample (in %)	Swiss population (in %)
1–4	17	15.4
5–7	43.8	50.5
8–11	28.9	19.7
Missing or no answer	10.3	14.4
Total	100	100

The political attitudes represented in the sample ($N = 950$, “I don’t know” was coded as missing; min. = 1, max. = 11; $M = 6.41$, $SD = 2.19$) in comparison to the Swiss population in 2015 (Source: <http://forscenter.ch/wp-content/uploads/2013/11/SILC-2010-COMPASS-Codebook-D.pdf>, accessed 31.03.2017). Although the general picture with regard to the political attitude of the respondents in the sample reflects the general picture in Switzerland, it is remarkable that the percentage of individuals with a right-wing attitude in the sample is slightly higher than in the Swiss population since the survey’s topic would have led one to expect the contrary

Table 13.13 Sample by education

Education (highest level achieved)	Sample (in %)	Swiss population (in %)
Compulsory school	3.2	24.5
Secondary school II, vocational training	45.9	34.6
Secondary school II, general education	15.2	11.6
Higher vocational training	21.9	12.5
Higher education (e.g., university)	13.7	16.9
Total	100	100

The educational levels represented in the sample in comparison to the Swiss population in 2015 (Source: Swiss Federal Statistical Office, 31.01.2017). A strict comparison of the numbers is not possible since the percentages provided by the Swiss Federal Statistical Office include the population from the age of 15 while the sample does not cover the age span 15–17 (compulsory school ends at the age of 16, and vocational training is not yet completed at the age of 17, so compulsory school was the highest level of education already achieved by respondents who were in vocational training at the time)

Table 13.14 Sample by income

Income (net income of household per month)	N	%
</= 3000 CHF	133	12.5
3001 to 5000 CHF	193	18.3
5001 to 7000 CHF	201	19.0
7001 to 11,000 CHF	240	22.6
=/> 11,001 CHF	106	10.0
I don’t know or no answer	187	17.6
Total	1059	100

The income distribution in the sample (the scale is taken from the Swiss Vox Analysis). For comparison with the Swiss population: The median gross salary for a full-time position in 2016 was CHF 6502 per month; the 10% of employees with the lowest wages earned less than CHF 4313 per month; the 10% with the highest salaries earned more than CHF 11,406 per month (Source: Swiss Federal Statistical Office, 14.05.2018)

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Geography and Quality of Life in Argentine Regions: Socioeconomic and Environmental Inequalities

14

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14.1 Introduction

One of the major attributes of the quality of life (QOL) concept is its intrinsic interdisciplinary character. Therefore, in the last decades, quality of life studies have arisen in a wide range of scientific disciplines. In this context, the fundamental perspective of the role that geography plays in QOL research seems to be precise: Based on the geographer's expertise, to study the spatial variations and distribution of particular, relevant components and processes, and to subsequently synthesize the acquired knowledge. The preferential strongpoint of geography resides in its capability to assess the spatial differentiation of quality of life indicators and indices in a concrete territory (Andráško 2008). According to Pacione (1986), the structure and distribution of QOL constitute a key area of research in geography. Moreover, the analysis of QOL from a geographic perspective relies mainly on the development of indices with the highest possible level of territorial disaggregation, reflecting the relative wellbeing of the population (Velázquez and Celemín 2013). Andráško (2008), Pacione (1986), and Cutter (1985) analyzed in detail the

origin and importance of geography in the study of QOL.

The relevance of geography in this field of work has reached new horizons with the use of Geographical Information Systems (GIS) which facilitate the elaboration of well-being and quality of life maps in different scales and territories based on secondary data and personal surveys. By including not only information on social, economic, climate, and environmental observations, but also its location and spatial arrangement in GIS database the system allows to present data in the form of maps and interfaces and to perform comprehensive and sophisticated spatial analysis. In many countries -both developing and industrial- this system has become the single most important tool for analyzing a wide range of geographic and socioeconomic data and for designing policy measures (Bigman and Fofack 2000, pp. 131–132). Research combining QOL and GIS strongly supports this notion (Celemín and Velázquez 2018; Jensen Rinner 2007; McCrea et al. 2006; Jensen et al. 2004; Lo and Faber 1997, among others).

The risk of mapping QOL data lies in the ecological fallacy of attributing average conditions in any area to an entire population. This trap remains a necessary evil of the spatial or territorial approach to the study of QOL; the larger the unit of inquiry the greater the potential ignorance of internal variations from the mean position (Pacione 1982, p. 509). This phenomenon, typical of geography and geographic

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information systems, is known as the Modifiable Areal Unit Problem (MAUP) (Openshaw 1983). Thus, territorial division and usual clusters are not “neutral”. Therefore, it is possible to cover inequalities by grouping heterogeneous territories and societies, but no territorial division can ever “create” or “reproduce” inequities if they do not exist in reality. This problem is present in all the indicators analyzed at a geographic scale (Celemín and Velázquez 2018).

But what is QOL? Quality of life is a theoretical category that emerges in the second half of the twentieth century, and that remains controversial about its meaning and conceptual range. Sirgy et al. (2006) conducted exhaustive research in which they discuss the past, present, and future of quality of life on a global scale, while Hagerty et al. (2001) looked at 22 of the most widely used quality of life indices around the world. The vast and complex interdisciplinarity of this notion is associated with various conceptions that were recently defined in Michalos (2014). In 1995, the International Society for Quality of Life Studies (ISQOLS—www.isqols.org) was founded with the main objective of promoting the development of quality of life research and encouraging interdisciplinary inquiry (Tonón and Rodríguez de la Vega 2016). ISQOLS released a detailed document about the definition and terminology of quality of life (Cummins 1998).

From an operational point of view, in order to study QOL in a particular place, we need to measure conditions in that territory using sets of indicators. Moreover, we need to observe changes in those circumstances over time in order to evaluate or determine if and how those conditions have changed. And if they have changed, it should be determined if they have improved or deteriorated and to what extent (Marans and Stimson 2011, p. 2).

Life quality (as well as human development) is an achievement measurement regarding an established scale considered as “optimal”, in terms of social, economic and environmental dimensions that depend on prevalent values in society. It may change depending on the historical progress expected by the society under analysis (Velázquez 2001). Poverty is an objective

measure that describes the disability of individuals to achieve generally-established and socially-accepted minimum thresholds of financial conditions. These parameters may reflect either temporary (poverty line) or structural (unsatisfied basic needs) situations. As noted by Sen (2012), life quality can be analyzed by the traditional economic definition (in the sense of welfare) or by a more humanistic explanation (in the sense of well-being).

From a geographic perspective, quality of life studies a cluster of “real-world problems” and it is inevitably connected to applied geography (Pacione 1999) as it not only identifies particular issues, but also points out the possibilities of their solution and outlines the direction the society should follow to ensure a satisfactory degree of QOL in the study area (Andráško 2008).

Indices combining social, economic and environmental variables can be used to inform the general public and decision-makers about the ongoing living conditions of the population. The major constraints for the elaboration of an index are the accessibility, availability, and reliability of statistical data, particularly of those describing characteristics at an urban or a municipal level. Moreover, information aggregation and simplification reduces the analytical power of the results, while, it allows all sectors of society to view a large amount of summarized data (Tanguay et al. 2010).

In this framework, we developed a Life Quality Index (LQI) with two distinctive dimensions: one related to socioeconomic data and the other to environmental characteristics. The first one contains those variables related to education, health, and housing, while the environmental dimension includes those linked to environmental problems as well as to the degree of attraction of “naturally based” landscapes and “socially constructed” amenities.

The elaboration of LQI measures requires an approach that includes quantitative and qualitative procedures and, in order to do so, it calls for a clear conceptualization of the relationship between the variables and a solid structure (Maggino 2009). The present index resorts to an ample notion of the environment, since it can be

seen as the relationship established between society and the physical environment, whether built or artificially made, taking place in a delimited territorial space as it involves simultaneous consideration of overlapping land uses (Herzer and Gurevich 2006). This is mainly seen in large cities and in their surroundings and results in an environment whose principal feature is to be “socially constructed”, making it fundamentally different from the natural environment studied in Ecology (Metzger 2006). Usually, urban indices include the common environmental variables related to pollution, water quality, transportation, and security. However, a very important characteristic is mostly ignored: amenities and cultural displays. Even though many studies link tourism with living conditions, few emphasize the part that cultural industries play in the growth and development of a city and in improving urban aesthetics (Nissan 1997). Consequently, LQI does not only contemplate the usual factors related to environmental quality but also others associated with the elements of the built environment, such as urban amenities. However, it includes the usual environmental problem variables that influence the sustainability of the environment, including society. If the environmental problems are not measured, there is no objective way of quantifying the magnitude of the environmental impact. The inclusion of the environmental dimension allows us to better understand the environmental sustainability of the study area. It is a vague concept addressed by multiple disciplines. It is often associated with other notions, also diffuse and complex, such as quality of life, sustainability, and livability (van Kamp et al. 2003). In fact, according to Fishbein (1969, p. 2130), environmental quality really means quality of life for being a social phenomenon. It is social because man is the focus of concern. A comprehensive contribution is provided by Luengo (2002) who defines it as the optimum conditions that govern the behavior of living space in terms of comfort related to the ecological, biological, economic, productive, socio-cultural, typological, and technological dimensions. Thus, the environmental quality is, by extension, the product of the interaction of

these variables that constitute a healthy, comfortable habitat able to meet the basic requirements of sustainability of individual human life and social interaction within the urban environment. Given the versatility of this concept, Escobar (2006) indicates that environmental quality can be conceived as a component of sustainable urban development, along with economic and social conditions. Sustainable development should integrate social, environmental, and economic sustainability and use these three to start to make development sustainable (Goodland 1995).

The spatial expression of the environmental quality is similar to the spatial performance of other social and economic indicators in Latin America. As a consequence, a new concept, called environmental inequality, emerges, according to which social sectors with fewer resources are often more exposed to and affected by environmental problems (air pollution, poor-quality housing, dirty streets, high traffic, and few local amenities). This sector also has less access to environmental assets (sufficient energy, healthy food, and clean water), a fact with long-lasting deleterious effects on health and welfare (Catalan-Vazquez and Jarillo-Soto 2010). Therefore the notion of environmental inequity refers to a specific social group that is significantly affected by environmental risks, unlike environmental justice with which it is closely associated. The latter holds the fair treatment and meaningful involvement of all people and communities in the development, implementation, and enforcement of policies, laws and environmental regulations (Brulle and Pellow 2006).

14.2 Elaboration of the Life Quality Index

LQI depends on various elements such as historical processes, social value scales, individual and collective experiences and expectations, private dimensions (income, education), public dimensions (utilities accessibility, environmental issues), analysis scales, available information adjustment (geo-referencing), and result validation. This index is intended to overcome the

limitations linked to the temporal and spatial restrictions entailed in the collection of environmental data with respect to the current availability of social and economic information, a problem faced by many developing countries, especially at large spatial scales. As a consequence, we considered socioeconomic dimensions (education, health, and housing), environmental conditions and landscape attractions (nature-based recreational resources, socially constructed recreational resources, and environmental problems) for our study.

Some variables of the environmental dimension of our LQI use subjective data. As Gallopin (1996, 2006) points out, qualitative indicators can be preferable to quantitative indicators in at least three cases: when there is no availability of quantitative information; when the attribute of interest is inherently non-measurable (such as it happens with many variables of cultural or political nature); and when cost considerations become determinant. The use of subjective procedures is already present in the environmental field as it is a very regular practice in the environmental impact assessment (EIA), which is mostly based on professional knowledge. The appraisals of experts engaged in an environmental impact assessment play a significant role in their results due to the considerable subjective decision-making upon which EIA is based (Wilkins 2003, p. 401). Indeed some parallelism exists between this statement and our proposal of variables selection and measurement, in which, just like in the EIA, professional expertise, intuition and value judgment are acknowledged (Weston 2000). As noted by Diener and Suh (1997), the ensembled use of objective and subjective variables contributes to a more robust approach to QL research since both provide alternative views of quality of life, thus breaking the antagonism of purely quantitative or qualitative methods, since each of them regards a distinctive aspect of society welfare.

The index (Table 14.1) is the result of our own experiences, and of our previous papers broadly discussed (Celemín and Velázquez 2012, 2018). It was then normalized to ensure comparability:

The first step in the elaboration of the index was to transform rates into a partial index-

number.¹ This was carried out according to the variable type based on the following procedure:

$$f(a) = (a - \min) / (\text{Max} - \min)$$

Regarding the relative weight of each variable, we determined a life quality index (LQI) whose theoretical value ranges from 0 to 10 to reflect the worst and best situations, respectively.

The Socioeconomic Dimension is composed of six variables:

- Education indicators
 - Percentage of population aged 15 years or older that has dropped out of school or with an educational level below elementary school.
 - Percentage of population aged 15 years old or older who has not attended and/or graduated from university/college.
- Health indicators
 - Infant mortality rate (the number of infant deaths under 1-year-old per 1000 live births).
 - Percentage of population with health coverage or other forms of health insurance.
- Housing and infrastructure indicators
 - Percentage of overcrowded households (those where more than two people live per room).
 - Percentage of population living in homes with no private toilet/restrooms.

The Environmental Dimension is composed of 23 variables (Table 14.2) that integrate the Environmental Quality Index (EQI) with a partial 40% weight of LQI. EQI results from the weighted combination of:

- (a) 30% natural-based recreational resources (NBRR-benefit variables).
- (b) 30% socially-constructed recreational resources (SCRR-benefit variables).
- (c) 40% environmental problems (EP-cost variables).

¹This normalization procedure is also used for the calculations of HDI (Sagar and Najam 1998). It is known as omega (Ω) score or rescaling.

Table 14.1 Dimensions, variables and weights of LQI

Dimension	Variables cost (c) and benefit (b)	Partial weight (%)
Socioeconomic		
Educational	Incomplete primary education (c)	10
	University degree (b)	10
Health	Infant mortality rate (c)	10
	Population without health coverage (c)	10
Housing	Overcrowded households (c)	10
	Lack of private toilet/restroom (c)	10
Environmental		
Environmental	Nature-based resources (b)	10
Quality	Socially constructed resources (b)	10
Index	Environmental problems (c)	20
Total		100

Source: Velázquez and Celemin (2013)

Therefore:

$$EQI : ((3 * NBRR + 3 * SCRR) + (4 * (10 - EP)) / 10)$$

14.3 Spatial Analysis of the Life Quality Index

The spatial units in the study area comprise the 511 departments of Argentina which are grouped into 23 provinces and one Federal District (Autonomous City of Buenos Aires) composed by 15 communes (Figs. 14.1 and 14.2). The country can also be analyzed from the six regions defined by the National Institute of Statistics and Censuses. The Argentine population according to the 2010 census (INDEC 2012) accounts for 40,091,359 inhabitants.

Of the six regions that make up the National Institute of Statistics and Censuses (Fig. 14.3), the Northeastern is the one that exhibits the lowest quality of life in Argentina (6.01 points). This region accounts for the greatest relative presence of peasant population and indigenous people that, throughout the different stages of Argentine economic history, have been relegated to the role of raw material producers with little added value. This economic framework has undergone different cycles depending on the main primary product (quebracho, cotton, yerba mate) resulting in a degraded environment. The lack of employment

and chronic economic backwardness have contributed to a sustained exodus of its population, either to the main cities of the region, or to other parts of Argentina.

The attempts to diversify its productive structure have been mostly unsuccessful. Its demographic structure is young, with higher fertility and mortality rates than the rest of the country. Its urban system is weak, centralized with visible infrastructure deficit. Outside the four provincial capitals, living conditions deteriorate even further, particularly in the west of Chaco and Formosa provinces, where subsistence economy and aridity conditions prevail. In western Misiones and northwestern Corrientes, pauperized peasant families reside.

The Northwest (6.33 points) is the second region with the lowest LQI in Argentina. It is the most ancient and traditional area of the country, also with a high relative proportion of native and peasant populations living in isolated conditions. The regional productive structure is based on few primary products, with sugarcane as the regional “trademark” during the agro-export period. The diversification processes have had greater relative success here than in the northeast, though they have been very traumatic, resulting in mass exoduses of populations, mainly in some provinces during specific periods. Certain provinces (La Rioja, Catamarca) have been subject to industrial promotion regimes for some decades with poor results.

Table 14.2 Indicators, variables (cost (c) and benefit (b)), approach and sources of the EQI

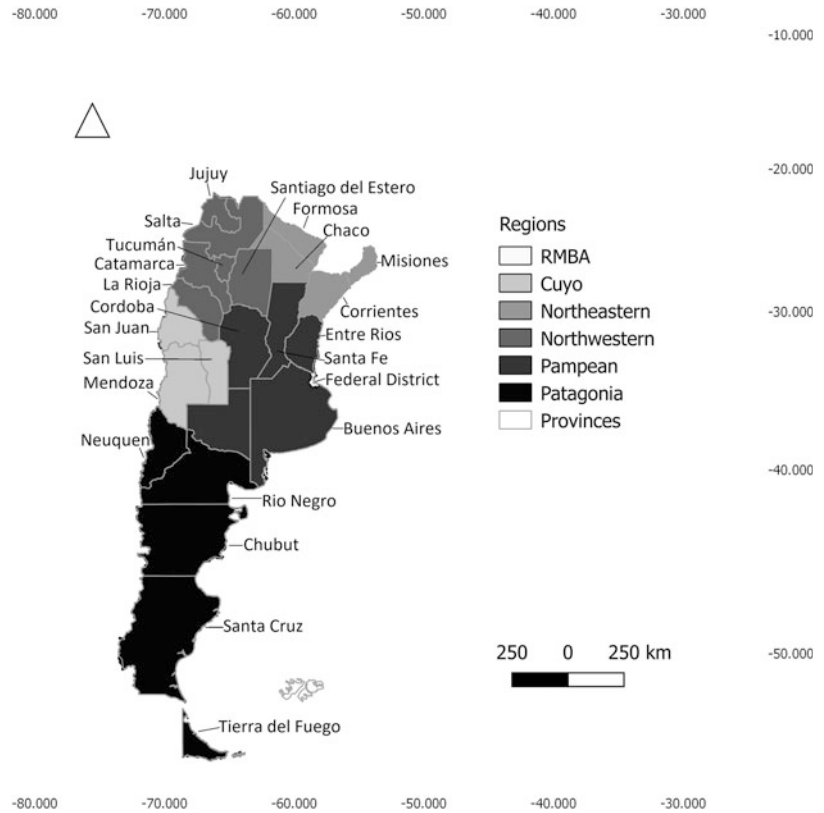
Indicator	Variable	Approach Subjective (direct) Objective (indirect)	Source
Nature-based recreational resources (30% weight)	Beaches (b)	Subjective	Municipal information/field trips/satellite imagery
	Resorts in streams, rivers, and lakes (b)	Subjective	Municipal information/field trips/satellite imagery
	Natural spas (b)	Subjective	Municipal information/field trips/satellite imagery
	Presence of ice and snow for winter activities (b)	Subjective	Municipal information/field trips/satellite imagery
	Relief (b)	Subjective	Municipal information/field trips/satellite imagery
	Lakes and streams (b)	Subjective	Municipal information/field trips/satellite imagery
	Parks and green open spaces (b)	Subjective	Municipal information/field trips/satellite imagery
Socially constructed recreational resources (30% weight)	Urban aesthetic/urban heritage (b)	Subjective	Municipal information/field trips
	Cultural centers (b)	Subjective	Municipal information/field trips
	Shopping malls and other amenities (b)	Subjective	Municipal information/field trips
	Sports centers (b)	Subjective	Municipal information/field trips
Environmental problems (40% weight)	Use of pesticides in agriculture (c)	Objective	PNUD (2010)
	Industry and mining participation in GDP (c)	Objective	National Institute of Statistics and Censuses
	Pollution/Noise/Traffic (c)	Subjective	Municipal information/field trips/urban scale
	Hazardous locations (c)	Subjective	Municipal information/field trips/satellite imagery
	Locations with negative externalities (c)	Subjective	Municipal information/field trips/satellite imagery
	Crime rate (c)	Objective	Ministerio de Justicia y Derechos Humanos
	Percentage of population living in slums (c)	Objective	National Institute of Statistics and Censuses
	Percentage of population living near dumps (less than 300 m) (c)	Objective	National Institute of Statistics and Censuses
	Seismicity and volcanism (c)	Objective	Chiozza and Figueira (1982)
	Tornadoes (c)	Objective	Altinger de Schwarzkopf (1999)
	Flooding (c)	Objective	National Institute of Statistics and Censuses
	Climate (dis)comfort (c)	Objective	Bioenvironmental classification of the Argentine Republic (1996)

Source: Celemín and Velázquez (2012)

Ethnic and cultural elements play a key role with characteristics of their own. Outside the cities, the relicts of pre-capitalist modes of production such as barter are still frequent. The main cities are located in the central valleys, which

concentrate the largest proportion of population and services. Both to the west (Puna) and to the east (Chaco Salta and Santiago del Estero) living conditions are deteriorated by the combination of environmental adversity (aridity in the Puna,

Fig. 14.1 Regions and provinces of Argentina
(Source: Authors' elaboration)



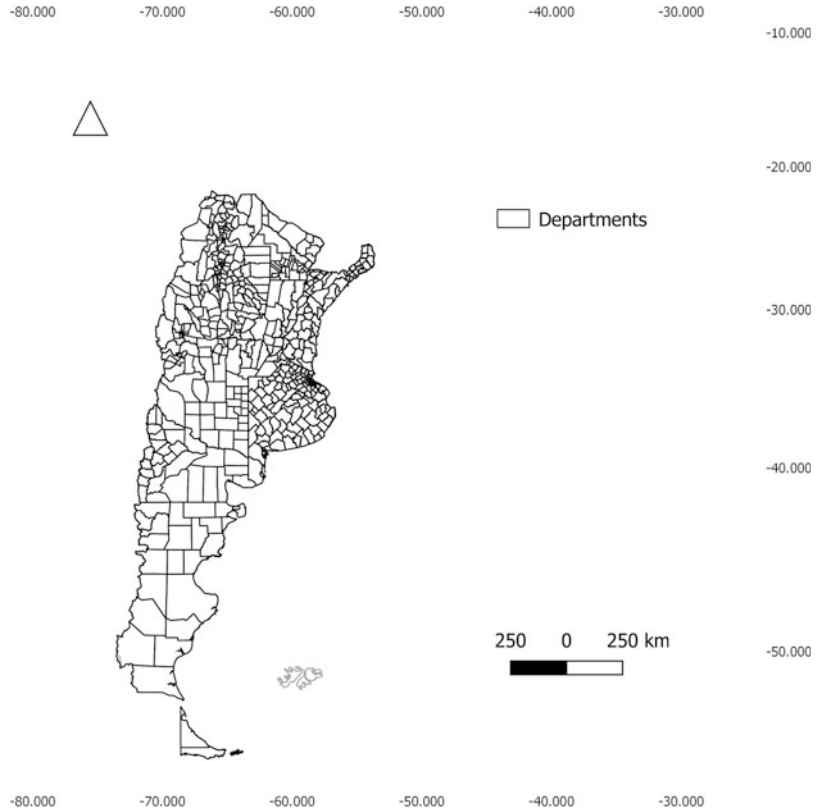
deforestation and degradation in the Chaco), and poor socioeconomic performance: housing, health and education are affected by severe deficiencies.

The Metropolitan Region of Buenos Aires (MRBA, 6.77 points) is the third region with the lowest LQI. It seems surprising that the most densely populated and industrialized region occupies such a relative position. This fact could be ascribed to the relative stagnation of its socioeconomic development when compared to other regions. It could also be explained by the environmental problems –namely pollution, noise, traffic jams, and social conflict- in a framework of relative scarcity of recreational resources in relation to the demanding population (around 13 million inhabitants). In a few kilometers, the process of social fragmentation of this territory is evident. The northern axis of the conurbation shows the best conditions, both socioeconomic and environmental. The same happens in the

north of the Autonomous City of Buenos Aires. In contrast, the second crown of the conurbation experiences the worst conditions, especially towards the west and south. The combination of poor urban infrastructure in a context of social vulnerability, with precarious employment, low educational level and residential overcrowding is reflected in the very-low quality of life scores. The greatest relative deterioration of this region is also linked to the reconversion of its productive apparatus during the nineties. Precisely, between 1991 and 2001 the region moved from the 2nd to the 4th position in quality of life terms among the six regions that make up the National Institute of Statistics and Censuses (INDEC). Since then, self-employment and other forms of precarious work have skyrocketed, deepening social fragmentation in this area.

The Northeastern, the Northwestern, and the MRBA display the worst relative performances. As regards the best-positioned regions, Cuyo

Fig. 14.2 Departments of Argentina (Source: Authors' elaboration)

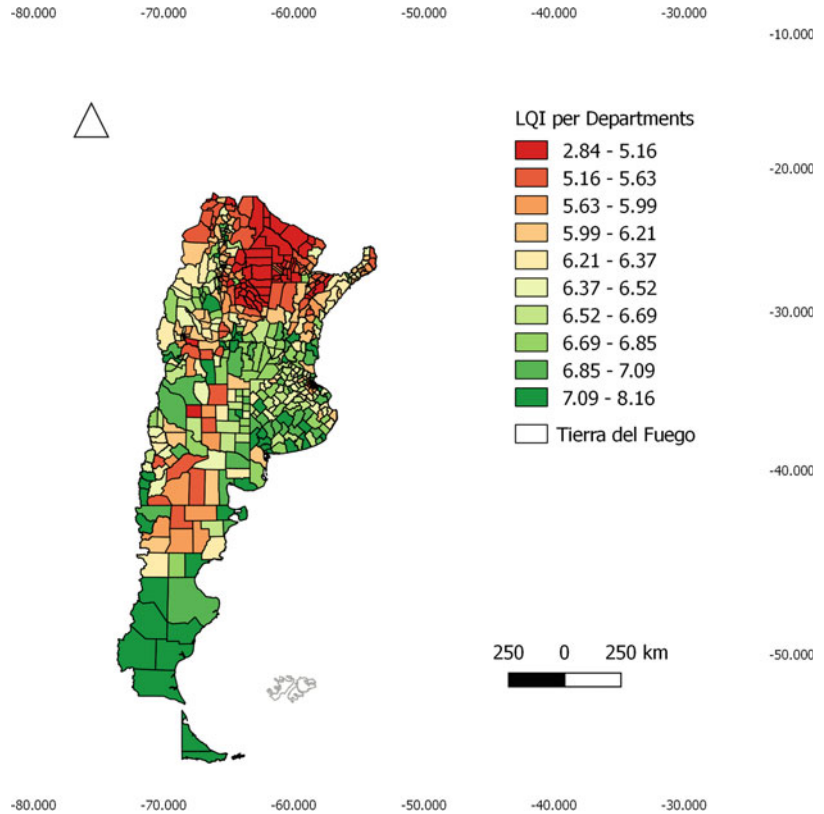


(6.91 points) ranks third starting from the top of the LQI index. This region has a diversified economic structure, originally viable in the wine industry and other derived activities, which take place in the main oases of this arid region: Mendoza, San Juan, and San Rafael. Outside these oases and other minor ones, there are, towards the west, high mountain areas and, towards the east, transitional environments with low population density. This region is characterized by a dichotomy: on the one hand, the most adverse conditions are recorded outside the oases, in the so-called “travesías”, which sustain serious environmental problems (principally water deficits), have a very low population density and have historically been relegated. On the other, in the main oases, the population, infrastructure, utilities and, basically, the allocation of resources by various national and provincial administrations have consolidated Mendoza city, the regional capital. San Juan and San Luis provinces, in turn, have historically been

relegated to secondary roles. Both provinces have tried to revert this situation with industrial promotion regimes during the eighties and nineties, achieving some partial results. During the last decades, San Juan also joined the megamining in an attempt to diversify its economic structure. Even though this process has generated some tax revenues, it has also produced some environmental issues, mostly in the high mountain areas.

The Pampean region (6.93 points) ranks second in quality of life. Despite the fact that, in the imaginary, it constitutes the most privileged region of Argentina due to its diversified economic structure and its leading role as an agro-exporter, it has internal differences. The region concentrates the largest population of Argentina, mainly in the Province of Buenos Aires. Nonetheless, Córdoba and Santa Fe provinces also contain large population areas. Unlike Buenos Aires, which traditionally developed on the basis of livestock production, Córdoba and Santa Fe

Fig. 14.3 LQI for Argentina (deciles) (c. 2010) (Source: Authors' elaboration)



were structured from agricultural colonies, principally in the center and southern areas, which gave rise to important productive chains. As regards Entre Ríos and La Pampa, these two provinces still have little industrial activity, and have tried to diversify their economies with tourism. This initiative was more successful in Entre Ríos, due to its water and thermal resources and its proximity to the MRBA, the quintessential claimant of recreational services.

In the Pampean region, the quality of life degrades from the center towards the periphery (northern Entre Ríos, Córdoba and Santa Fe, and western La Pampa), although there are also adverse nuclei in some areas of contact with the MRBA and the Río Salado basin.

The Patagonia region (7.03 points) leads the ranking in living conditions in Argentina. This role, which, to a certain extent, contradicts “common sense”, is explained by the presence of the State during the last seven decades based on a

series of active policies: salary incentives (salaries are much higher than in the rest of the country), special customs regimes, industrial promotion, subsidized utility rates, among other benefits. Consequently, this region has been receiving migrants from different parts of the country, mainly from the northern provinces. However, the region also exhibits significant inequalities. In general, the coastal axis shows a very good relative situation. The same applies, though to a lesser extent, in the mountain range axis (to the west). The central plateau, however, is affected by adversity and isolation that, by virtue of its low demographic weight, has little effect on the general index of this region. Beyond this regional comparison, which suggests a sort of “latitudinal” gradient in the quality of life, we must point out the influence of a series of differentiation factors: migratory dynamics, centrality and accessibility, urban scale, wealth, and public policies. The demographic dynamics shows that provinces

with an important immigration component in its population (Santa Cruz and Tierra del Fuego) exhibit the highest quality of life indexes, while other provinces with a lower immigration component yield intermediate LQI values.

Regarding centrality and accessibility, a distance analysis of LQI from the federal district (Autonomous City of Buenos Aires) shows that this index decreases sharply only 40 km away from this area, showing a classic center-periphery fragmentation between the capital city and most of the departments that make up the Metropolitan Region of Buenos Aires. Beyond these first 40 km, outside the Metropolitan Region of Buenos Aires, LQI begins to increase (sub-region of the Pampa Ondulada). This trend continues up to reaching 500 km away (rest of the Pampean Region). From this distance onwards, outside the Pampean Region, LQI decreases even more, since the relative demographic weight of the northern regions counteracts the positive values of the Patagonia region.

Considering the urban scale, the highest level of welfare is registered in large to intermediate cities (400,000–999,999 inhabitants, LQI 7.11) followed by middle-sized ones (50,000–399,999 inhabitants, LQI 7.04). The largest cities and the Metropolitan Region appear third in the scale (LQI 6.96), penalized, mainly by environmental variables, albeit the performance at the socio-economic dimension not being entirely satisfactory. Finally, small cities (20,000–49,999 inhabitants) and large towns (2000–19,999 inhabitants) rank fourth (LQI of 6.53 and 6.00, respectively), while small towns (up to 1999 inhabitants) and scattered rural populations have to overcome the worst situations (LQI 5.05), due to the scarce education and health services available, and the relative scarcity of socially constructed recreational resources.

Regarding wealth, the relation between GDP and LQI was very high in 1980, 1991, and 2001. In 2010, this relationship continued to hold, though not so markedly. This decline could probably be explained by certain territorial redistribution policies enforced by the National State during the first decade of the twenty-first century. In this sense, public policies play a decisive role

in the quality of life of the different regions. Regarding the two extreme cases, the Northeastern and the Patagonia regions (areas with the worst and best relative situation, respectively), the relative gap between their average scores narrowed considerably between 2001 and 2010. LQI values for the Northeastern and Patagonia regions were 4.62 and 6.48, respectively in 2001; while, in 2010, the Northeastern accounted for 6.01 and the Patagonia for 7.03 points. The other regions registered the following LQI scores in 2010: Northwestern: 6.33; MRBA: 6.56; Cuyo: 6.91; and Pampean: 6.93.

This regional vision will be complemented with a systematic one, i.e., a vision more focused on highlighting the extreme situations of quality of life in Argentina (Table 14.3).

In decile 10 (10% of the departments with the worst quality of life), there are 54 units that cover just over one million people. Almost all of them reside in the north (660,000 in the Northeastern and another 413,000 in the Northwestern region). The population included in the rest of the territory is small (17,000 in Cuyo and 1500 in the Pampean region).

This is the most unfavorable area with a deficient educational situation (more than one third of the population did not complete primary education and just over 1% completed higher studies). The same applies to health services: 2/3 of its residents still lack health coverage and the infant mortality rate almost doubles the national average. Dwelling conditions are also highly deficient: almost half of the population lacks toilet with water discharge in their homes and almost one sixth lives in severe overcrowding (Table 14.4). Finally, this neglected territory is characterized by its low environmental quality due to the combination of environmental problems and relative scarcity of recreational resources.

At the opposite end, in decile 1, 50 departments and communes of the Autonomous City of Buenos Aires are included, where more than eight million inhabitants reside. Of these 8 million, 3.7 live in the Pampean region and 2.9 in the MRBA. Both regions concentrate a large proportion of the population with the best

Table 14.3 Quality of life in 2010

Decile	N° of Dep.	Population (Thousands)		North-eastern	North-western	Cuyo	Pampean	MRBA	Patagonia
10	54	1092.0	N° of Dep.	27	25	1	1	0	0
			Pobl.	659.9	413.5	17.1	1.5	0	0
9	50	2143.3							
8	49	5128.4							
7	54	2996.1							
6	49	1978.0							
5	52	3618.9							
4	46	2782.4							
3	46	3682.9							
2	49	7308.3							
1	50	8144.0	N° of Dep.	0	1	7	14	14	14
			Pobl.	0	75.1	851.5	3676.1	2889.0	652.2

Number of departments and population, according to quality of life categories, by deciles. Extreme cases
Source: Authors' elaboration

Table 14.4 Quality of life in 2010

	Education		Health		Housing		LQI	EQI
	A	B	C	D	E	F		
Decile 1	36.1	1.2	17.4	66.3	47.2	13.5	5.45	4.65
Decile 10	7.8	13.7	8.9	23.1	18.8	1.1	7.36	7.61

Average indicators for resident population. Extreme deciles
Source: Authors' elaboration

living conditions. This does not mean that in both regions the situation is ideal. There is simply a large population group with excellent living conditions that coexists, on a daily basis, with numerous segments deprived of said conditions, thus evidencing a process of social fragmentation, especially in the MRBA. In the Cuyo and Patagonia regions, also a significant part of the population lives under good living conditions (851,000 and 652,000, respectively). Reaching this decile in northern Argentina is rather exceptional. In the Northwestern, only 75,000 people living in Yerba Buena (Tucumán) achieve this decile, while in the Northeastern none of the departments manages to get to the top of the LQI.

In this territory, education reaches the highest rates in the country: less than 8% do not complete basic education and almost 14% complete full university education. Regarding health, almost 80% of the population has social insurance and

the infant mortality rate is relatively low (8.9 per thousand). Household overcrowding is low (just over 1% of the population), although the absence of toilets is still a problem, as it affects almost 20% of the population (Table 14.4). Finally, the environmental context tends to be favorable since, despite suffering some problems, the recreational resources available to the population are relatively important.

It is worth noticing that, in general, the deciles with the best situation (2, 3, 4, and 5) include most of the population (more than 17 million people, which added to decile 1 would total more than 25 million). On the other hand, the deciles with the worst situation (10 and 9) add up to just over three million people who should be an absolute priority in all public intervention agendas.

Decile 8 (also departments with a poor relative situation) comprises a group with more than five

million people. The presence of the state with active policies is also a number one priority in this case. Finally, groups 7 and 6 show some contradictions as they provide mixed results in the spatial distribution of LQI.

The Socioeconomic Dimension is composed of six UBN variables extracted from the last census conducted in 2010, except for infant mortality rate which is provided by the Ministry of Health.

- Education indicators
 - A. Percentage of population aged 15 years or older that has dropped out of school or with an education level below elementary school.
 - B. Percentage of population aged 15 years old or older who has not attended and/or graduated from university/college.
- Health indicators
 - C. Infant mortality rate (the number of infant deaths under 1-year-old per 1000 live births).
 - D. Percentage of population with health coverage or other forms of health insurance
- Housing and infrastructure indicators
 - E. Percentage of overcrowded households (those where more than two people live per room)

14.4 Concluding Remarks

In one of his works, Pacione (2003) explains that QOL research is the study of the relationship between people and their environments, and that trying to understand the nature of the person–environment relationship is the quintessential geographical question that lies at the core of the sub-discipline of social geography (Andráško 2008). Geographers' major contribution to QOL research has been the introduction of a spatial dimension in their work based on objective territorial indicators. As professionals, geographers can contribute as policy-makers and advisers, as citizens, as managers, and as consciousness raisers, the goal of the quality of life policy is

especially pertinent to the personal idea of leaving the world a better place (Helburn 1982).

Considering these remarks, we developed and applied an LQI for Argentina in order to analyze its spatial disparities. Argentina has indicators that place it in a good relative position in the Ibero-American context. However, when internal differences are investigated at a department level, we see that Argentines residing in the north (Northeastern and Northwestern regions), especially outside the main cities, experience various hardships due to the socioeconomic and environmental conditions. On the contrary, in the south of the country, mainly in southern Patagonia, the best welfare conditions are registered, associated with various factors such as migratory dynamics, centrality and accessibility, generation of wealth and State intervention. In the center of the country, extreme social fragmentation (Metropolitan Region) is evidenced, a sort of center-periphery dichotomy (Pampean Region) and contradictions between dynamic irrigated areas (oases) and lethargic spaces with low population density (Cuyo Region) prevail.

This image of a “latitudinal” Argentina results, to a large extent, from the accommodation of the hegemonic sectors of each region throughout the different developmental stages of Argentina. Historically, the NOA was the most populated and developed region, but several historical processes linked to the agro-export model and import substitution have moved the center of gravity further south.

Finally, the elaboration of QOL maps using Geographic Information Systems has allowed the diffusion of geo-referenced data and facilitated the interpretation of quality of life information and the analysis of its spatial variability.

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A City for Whom? Marginalization and the Production of Space in Contemporary Bangalore, India

15

Chloe Pottinger-Glass and Karin Pfeffer

15.1 Introduction

“Mary is an unlucky name.”

Standing outside her makeshift dwelling—a patchwork of tarpaulin and rags jostling for space with a dozen or so others, Mary tells her story over a cup of black coffee, brewed on a small open fire. Five years ago the bulldozers came. Her husband has gone, most of her children have gone, except her daughter who lives in a tent across the road with her infant child. During the eviction she lost most of her possessions and has been living on the pavement ever since. She was promised refuge, but after her life savings were given in the hope of resettlement, the men she gave the money to never returned.

Mary is one of Bangalore’s pavement dwellers—her living situation not uncommon as the pace of urban development in the last several decades in India has created an increasing gap between the rich and poor. As sprawling IT campuses, multi-story shopping malls and luxury residences have dotted the skyline, informal areas such as the slum formerly known as Ejipura where Mary and over 1000 other families used to live, have become increasingly dissonant with the imaginary of the modern Indian city (Fig. 15.1).

Based on a period of empirical research, this chapter explores the multi-layered and rapidly shifting complexities of city-making and urban regulation in Bangalore through one specific case study: the Ejipura slum eviction. As its key question, this chapter asks what the case of Ejipura can tell us about the way urban development is being carried out in Bangalore; specifically—who are the actors, what are the governance instruments and broader structures, and how are they used by various actors to control, produce, negotiate and contest urban space.

We approach quality of life and sustainability in an urban context, focusing primarily on the socio-political dimension. Various frameworks are offered in the literature for conceptualizing and measuring quality of life in cities. Serag El Din et al. (2013, p. 89) group aspects of urban quality of life into seven main dimensions: (1) environmental, (2) physical, (3) mobility, (4) social, (5) psychological, (6) economic and (7) political. From these, recommendations are provided to improve quality of life for communities, for example “promote social justice and equity by providing equal access to affordable housing, economic activities, services and facilities”. The *World Bank* (2002) takes an urban poverty-based approach, grouping features into four main brackets: (1) income and social poverty which includes lack of access to job markets and lack of access to governance and decision making; (2) environmental poverty which describes risk of disasters and inadequate

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Fig. 15.1 A tent dwelling in the Ejipura eviction site (Source: Author 2017)

housing; (3) education poverty; and (4) health poverty. A livelihood approach can also be taken to understanding urban quality of life in terms of capital—human, social, physical, financial and natural, which includes labour resources, social networks, access to institutions, infrastructure, and natural resources (e.g. Rakodi and Lloyd-Jones 2002). This framework is particularly well suited for a community and household level analysis, for example toward investigating household coping strategies.

Whilst the above conceptualizations can provide practical methods of operationalizing urban quality of life dimensions, this contribution takes a broader approach based principally on Lefebvre’s Rights to the City (RTTC) (1972) and his thinking around the Production of Space (1991). Moving from these foundational theories (described in greater depth in Sect. 15.2.3), a good urban quality of life can be interpreted to rest upon the ability of urban dwellers to control and produce space to fit individual and community needs. This approach is deliberately

non-prescriptive with regard to what features a good urban quality of life might consist of. Rather, it focuses on power relations within urban development and asks whether individuals have capabilities to shape those subjective features of life in the city which may be important to them.

Intimately related, is governance (instruments and structures) which mediate control over space and quality of life features. Instead of understanding governance and participation as one aspect of urban quality of life (as in the urban poverty and livelihoods approach for example), participation is seen as a priori—necessary for empowering individuals to achieve their own conception of a good urban life (Purcell 2002). This does not ignore the negative constraints on individuals, for instance poverty and discrimination, but acknowledges that inclusive governance can be a mechanism for addressing and ameliorating these barriers. Gaventa’s (2006) distinction between “closed”, “invited” and “claimed” spaces in governance processes will help us to

understand political space for participation; in particular, to understand possibilities for engagement with decision making in the Ejipura case.

Following Lefebvre, sustainable urban development within a RTTC conceptualization of urban quality of life therefore entails an inclusive governance which allows various groups to engage in decision making to co-create a city that serves all urban residents. Within this framework, the study provides an exploration of linkages between social, spatial and discursive processes of marginalization, asking who holds the power to shape processes of urbanization, and how. This combination of analytical lenses responds to an exciting but underexplored area of research in urban development; while there is a rich body of academic thinking looking at the intersection between social and spatial dimensions in the city—mainly stemming from Lefebvre, adding a discursive lens permits a deeper analysis of social dynamics and their influence on the production of space.

This chapter first provides thematic context, giving an overview of housing, slum policy and shifting rhetoric towards slum dwellers in India. Next, relevant literature is described to frame the study, centrally around the production of space (Lefebvre 1991, 1972) and scholarly thinking around subaltern urbanism and informality. Presentation of findings is separated into three main sections: (1) background of the case, (2) actor blocs and discursive framings, (3) tactics and governance: instruments and structures. The discussion section focuses on understanding mechanism of marginalization through these interlinked social, spatial and discursive lenses. In the conclusion we take a step back from the case, returning to the main question of the characterization of urban development in Bangalore, before a final reflection on limitations and directions for future research.

15.2 Background

15.2.1 Housing and the Urban Fabric

As processes of accelerated urbanisation create radical spatial, demographic and social shifts

across the Global South, cities are playing increasingly dominant roles as centres of production, consumption and power. Yet, they are also serving as sites of magnified inequality as development occurs alongside the deprivation and marginalization of certain groups. One of the most important units of urban capital, and an essential component of quality of life, is decent housing and access to basic services. In its most foundational sense, this means a secure structure sheltered from weather, affording a sense of personal security and privacy (Streimikiene 2015). Yet as a dimension of urban quality of life, housing is much more than this. It is also a node in the complex urban fabric which facilitates mobility, livelihoods, identity and sense of place, neighborhoods and social connections (Serag El Din et al. 2013).

Housing determines the mutual relationship between every human being and surrounding physical and social space. This involves degrees of exclusion or inclusion in terms of collective and civic life, which together with socioeconomic conditions, are the essence of urban dynamics. This is why the fate of housing will largely determine the fate of our cities (UN Habitat 2016, p. 49).

In developing country contexts, the urban poor often rely on informal strategies to gain access to housing or land on which to construct dwellings, or reside in low-income state sponsored housing. These housing areas can be integrated to varying degrees, but often emerge as “ghettoized” low-income or slum areas, as shanty-towns in city outskirts, or in the case of Ejipura, as pavement dwellings, erected in the wake of an eviction.

India contains a large population of slum¹ dwellers—approximately 17% of urban

¹ It is important to note the sensitivities associated with the nomenclature around such settlement areas. Gilbert (2007) has problematised usage of the word “slum” due to its negative connotations, which can in turn legitimise the demolition of slums in order to “help” inhabitants. However, following Kuffer et al. (2016), we utilise the word as the term slum explicitly expresses physical characteristics such as high density and/or irregularity, as opposed to other popular terminology such as ‘informal settlement’ which also implies the legal tenure status of an area. Said physical characteristics follow the UN Habitat definition of slum, which includes inadequate access to safe water, sanitation and other infrastructure, poor structural quality

households in 2016 (MHUPA 2016). While the Indian state previously played an active role in generating housing for low and middle income households, since the mid-1990s, housing for the poor has been de-prioritized and the private sector has tended to target the more lucrative middle and upper classes (UN Habitat 2016; Kundu 2011). Along with this decline in state patrimony, larger roles have been carved out by market forces, including the advent of public-private-partnerships (PPPs) as an urban development prerogative (Batra 2009; Burra 2005). These economic shifts have coincided with social shifts: an emergent middle class and a new mentality—as Ong (2006, p. 6) describes, an “infiltration of market logic into politics.” With this, economic productivity comes centre stage as a new political culture is cemented based on middle class consumption (Fernandes 2004).

Accordingly, rhetoric and popular sentiment towards slum dwellers has shifted. A landmark court case in Bombay 1985 ruled that “[...] the right to livelihood is an important facet of the right to life...” and “the eviction of the [slum dwellers] will lead to deprivation of their livelihood and consequently to deprivation of life”. Since then, a new lexicon has emerged. Bhan (2009, p. 135) charts this change, noting that by 2000, in the case of *Almitra Patel vs. the Union of India* in 2000, it was ruled that Delhi should be the “showpiece of the country,” yet “no effective initiative... has been taken for cleaning up the city.” Slums, in this case, were described as “large areas of public land, usurped for private use, free of cost”, and slum dwellers framed as “encroachers” (“rewarding an encroacher on public land with an alternative free site is like giving a reward to a pickpocket for stealing”). According to Bhan (*ibid.*), from this point on, the courts

of housing and overcrowding (UN Habitat 2003). “Slum” can also be an empowering term, in a similar sense to how the word “Dalit” has been reclaimed. As Rao (2009, p. 1) explains, “to call oneself a Dalit, meaning ‘ground down,’ ‘broken to pieces,’ ‘crushed,’ is to convert a negative description into a confrontational identity and to become a particular sort of political subject for whom the terms of exclusion on which discrimination is premised are at once refused and reproduced in the demands for inclusion.”

continued to refuse to hold the government accountable for its failure to provide low income housing and to erode the right to resettlement.

Several national drives have attempted to tackle the “problem” of slums, beginning with the Jawaharlal Nehru Urban Renewal Mission (JnNURM) which was launched in 2005, the Rajiv Awas Yojana (RAY) in 2010, and most recently the Pradhan Mantri Awas Yojana (PMAY) which replaced RAY under the government of Narendra Modi. In 2010, the mantra of RAY was boldly pronounced—to achieve a “slum free India.” Yet, although the state line was “inclusive and equitable cities in which every citizen has access to basic infrastructure, social amenities and decent shelter” (MHUPA, p. X), the reality entailed widespread evictions, demolitions and the creation of resettlement sites often located on the outskirts of cities, far away from the livelihood networks slum dwellers depend upon (Arabindoo 2011; Sheth 2013; Chaturvedi 2013; Dupont 2011; Alberts et al. 2016).

15.2.2 Bangalore: India’s New Silicon Valley?

The city of Bangalore in many ways epitomizes such phenomena. Aided by India’s IT revolution, Bangalore is now nicknamed India’s “Silicon Valley”—a city at the forefront of the India’s “World City” visions (Nair 2005; Benjamin 2008). Between 1992 and 2017, Bangalore’s population doubled from four million to over eight million, and between 2001 and 2011 it was the fastest growing city in India (Bangalore Development Authority 2017). This rapid growth has placed massive stress on infrastructure. Water scarcity, congestion and pollution are among the challenges currently facing Bangalore’s policymakers and urban planners.

One of the most pronounced problems Bangalore is facing is a shortage of housing for low income groups. Estimates of the number of people currently living in slums vary from 10 to 26% of the total population (HLRN 2017, p. vii). Despite this, unbridled commercial development

has produced an excess of high-end housing, exacerbating the gap between supply and demand as many luxury properties lie vacant. With the expansion of the IT industry, specially designed enclaves have been formed such as Electronic City—a vast, self-contained industrial park for residents to live and work, based on the original Silicon Valley model (Dehejia 2011). Enclaves such as these emerged mostly in the city's peripheries, but gradually as the city grew, became part of its sprawl (Sudhira et al. 2007).

Meanwhile, governance strategies have entailed an increasing popularity of PPPs as a method to expedite developments. A draft housing policy from Karnataka in 2010 stated that there is a need for the government to act as “facilitator” instead of “builder and provider” to achieve the goal of housing for all in the state (HLRN 2017, p. 8). These trends have led critics to claim that the paradigm of development visible in Bangalore is one of “exclusion and profiteering with the state relegating its welfare function to private actors,” whilst forced evictions are carried out under the guise of beautification, urban renewal and slum free cities (HLRN 2013, p. vi).

Institutionally, there are deep inefficiencies in city administration and in-fighting between departments. Roy notes that, “most road and rail links that the government had promised to build to the airport have been delayed or scrapped, in part because lawsuits over acquiring the land and in part because they involve 32 government agencies” (Roy 2011, p. 78). In a master plan for 2031 produced by the Bangalore Development Authority (2017), despite a strong focus on transport, water, solid waste management and electricity, in the 30 page document, housing is mentioned just once.

15.2.3 Theoretical Grounding

The groundwork for this study rests upon the thinking of Marxist scholar Lefebvre. His hugely influencing writing on the Production of Space (1991) conceptualised space not just by its materiality and physicality, but on its inherently social nature, making a distinction between “perceived

space”—the intuitive, concrete space that people encounter, “conceived space” referring to the subjective representations of space, and “lived space”—a person’s actual experience of space in everyday life (Purcell 2002, p. 102). According to this definition, Purcell (ibid.) argues that the production of space necessarily involves “reproducing the social relations that are bound up in it.”

Lefebvre’s earlier 1972 work on the Right to the City (RTTC) argued that “urban citizenship” is formed by two basic principles: the right to participation and the right to appropriation. The right to participation holds that citizens should play a central role in any decision that contributes to the production of urban space. The right to appropriation entails the rights of citizens to physically access, occupy and use urban space according to individual and community needs (Purcell 2002, pp. 101–102). Lefebvre insists that inhabitation in a city alone ought to be a basis for these rights rather than any formal status. Utilising a rights-based approach to urban development can provide a strong moral and institutional imperative for equitable growth with a focus on the most marginalised in the city (Parnell and Pieterse 2010).

From this foundational thinking, other scholars have examined space as it relates to politics and power. From the perspective of governance, Gaventa’s (2006) framework, defines “closed” spaces as those in which decisions are made by a set of actors such as the state or private sector groups behind closed doors. “Invited” spaces refer to those into which citizens, beneficiaries or stakeholders are invited by power holders (e.g. government agencies, international organizations) for consultation or into systems of participatory governance. The final category of “claimed” space refers to less powerful actors creating space for participation from outside of formal structures through mobilization or confrontational means such as protest.

In the Indian context, and incorporating a discursive lens, Fernandes (2004) examines discursive-spatial strategies which serve to render invisible marginalised groups from the dominant national political culture in what she terms a

“politics of forgetting.” This process entails a purification of space centring around middle class and aesthetic claims to space, which creates an “exclusionary form of cultural citizenship” (ibid., pp. 2416–2417).

A further realm of academic thought which delves into the power relations behind city-making has been termed “subaltern urbanism,” referring to tactics of the disenfranchised to claim and produce space. This can range from the “everyday appropriation of space” whereby land is incrementally adapted to fit uses (e.g. Lombard 2015; Benjamin 2008) to more active forms of spatial appropriation and/or contestation. Bayat (2000, p. 547) speaks of the urban poor in Cairo creating spontaneous communities housing over five million people, against formal laws adding rooms onto dwellings and forcing authorities to provide urban services by otherwise tapping them illegally. Benjamin (2008, p. 719) discusses systems of “vote-bank” politics which exist in India, when poor groups form blocs to lobby municipal agents for some specific demands, such as protection from eviction in return for their loyalty.

What these tactics largely have in common, is that they are informal. Space has not been given to the urban marginalised, rather they negotiate and maneuver for it. Some contend that such tactics show the capacity of the urban marginalised to incite change, constituting a subaltern form of participation, “deep democracy” or “democracy from below” (Benjamin 2008; Baviskar 2003; Lombard 2015; Bayat 2000). Yet, the embedding and normalisation of informal systems can also serve to weaken the position of the urban subaltern. Vote-bank politics has been described by others as “patron-clientelism” in which skewed power dynamic leads to so called “appeasement” politics (e.g. Singh 2012). Van Dijk (2011) highlights the insecurity of poor groups within this structure, arguing that they are more likely to rely on “clientship than citizenship.” Informality is also far from the sole realm of the poor. In India, in trying to push through urban developments, the state has in some cases created Special Economic Zones to overrule its own environmental protection and zoning

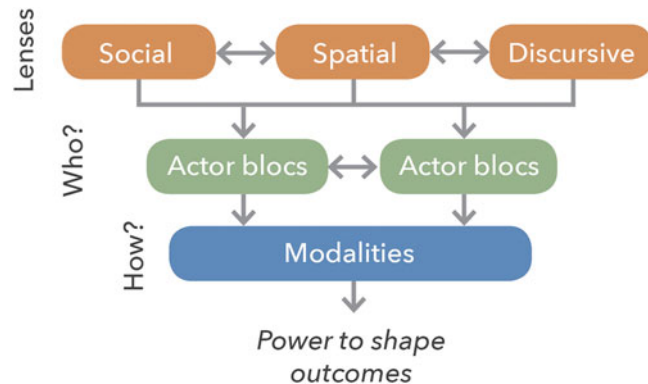
legislation (Roy 2011; Follmann 2015). The implications of such systems of informality as they emerge from the case of Ejipura impacting the quality of life of different social groups and the sustainability of urban development will be analysed and discussed in the course of this chapter.

15.3 Methodology: Researching Marginalization

From this theoretical exegesis and as a lens through which to view the events of Ejipura, three processes of marginalisation are researched—social, spatial and discursive—using different methods in the case study: qualitative data collection, spatial mapping and discourse analysis. We focused on social—due to deep-rooted class (and caste) discrimination; spatial, as the physical parameter, embedded in other forms of socio-economic power dynamics; and discursive—as language relates to power, and serves to legitimize actions from certain actor blocs via particular framings. The operationalization of these broad concepts is informed by Peyroux et al. (2014), who in their study of participatory governance in cities of the Global South, investigate spatial knowledge management, defining it as an “ensemble” of (1) discourses and framings; (2) actor coalitions and/or networks and their power relations in managing spatial knowledge; (3) main processes of knowledge generation; and (4) spatial knowledge platforms and products. Similar questions have guided this research process, with this study asking who controls space and how—what are their discursive tactics and framings, and what are the instruments and processes by which power is exerted. Figure 15.2 describes this process and the ways that the three analytical lenses (social, spatial and discursive) were used to examine the actor blocs and modalities which influenced outcomes in this case.

Data for this study was collected during a period of 10 weeks of fieldwork in Bangalore, India. The main method for data collection was semi-structured qualitative interviewing of a

Fig. 15.2 Methodology process (Source: Author 2019)



range of relevant identified stakeholders, from evictees, the private entity of the partnership behind the development in the former slum site, government officials and NGO staff from organisations which were heavily involved in supporting evictees. In total, over 30 interviews were collected, including evicted residents (dwelling on the pavement or in the neighboring low income housing area), NGOs, representatives from the state (the Karnataka Slum Development Board, Bangalore Municipal Corporation- BBMP) and officials from the slum relocation site), and the private developer in the case. Participants were selected on the basis of being broadly representative of the identified key stakeholder groups. A snowball sampling technique was utilised, which involved identifying respondents who were then used to refer us to other respondents. This technique is well suited to accessing hard to reach populations such as in this case, vulnerable slum dwellers and evictees, as many people would not consent to an interview without having been referred previously by a trusted person.

The interviews were then transcribed and analysed via an inductive coding process to draw out and triangulate key themes and discourse. Material was first scanned for repeated themes and phrases, then findings analysed against literature and other relevant documents such as the HLRN reports (2017)—investigative reports on the events of the Ejipura eviction and impact on slum dwellers. In addition, we collected spatial data through field observations and Google Earth.

15.4 Findings

15.4.1 From Swamp to Shopping Mall: The Story of Ejipura

Prior to the 1980s, Ejipura, the site of the eviction, was a former water tank bed, at that time situated outside of official city boundaries. Gradually, the site was occupied and developed by low income residents, many of whom were migrant labourers from neighboring state Tamil Nadu (HLRN 2013, p. 10). By the early 1980s, the BBMP took control of the site to build low income housing. However, the apartments which were constructed were found to be seriously sub-standard. When allottees found the flats without water, electricity or sanitation, many instead sub-let the flats, or sold them via power of attorney deeds. A survey conducted in 2003 found that there were only 248 original allottees remaining in the flats. The majority of remaining sub-tenants were Dalits and other marginalised minorities (HLRN 2013, p. 11).

Between 2003 and 2007, three of the blocks had collapsed, prompting the BBMP to move residents to tin sheds on the land, under the promise that the land be maintained for low income (or “Economically Weaker Sections”—EWS) housing as they are commonly referred to). However, in 2004, the BBMP also decided, “unilaterally and without consultation with present residents” (respondent interviews) to enter into a PPP arrangement, awarding the contract to a

Bangalore based company already implicated in controversy over construction violations. Under the terms of the deal, 50% of the land should be used to construct flats for EWS, and the other 50% free for commercial development, upon which the private developer proposed to build a shopping mall.

In 2011, a Public Interest Litigation (PIL) was brought to the Karnataka High Court on behalf of the evictees. An interim order was passed, holding that the BBMP should not be allowed to enter into any third party contract for reconstruction of flats as the land had previously been earmarked as “public purpose.” However, just 15 days later, another judgement came, reversing the earlier decision and stating that the current residents were “encroachers, non-original allottees” and the site ought to be cleared.

Between the 18th and 21st of January 2013, the slum was forcefully evicted and 1512 homes bulldozed. Of the approximately 1200 families evicted, 900 of these were promised alternative housing at a site near Sarjapur, around 18 km from Ejipura. However, this resettlement site was not to be completed for several years, only nearing completion by late 2017. The in-situ housing to be built would only be for original allottees. In the absence of alternative housing or provision or relief to the evictees, some found shelter elsewhere, many moved to other slum sites in the city, and others remained—setting up shelters in drain pipes and along pavements, a number of whom remain to the present day.²

From an analysis of aerial photographs from Google Earth (Fig. 15.3), we can see a stark difference between the affluent area of Koramangala adjacent to the site, the National Games Village (NGV)—a gated housing area constructed in 2003 (shown in green) and the eviction site (in red) and surrounding EWS area (in orange). In Koramangala and the NGV, houses are larger and formally laid out with trees and green areas. In the EWS area, houses are dense and clustered tightly together with few green spaces. The sharpness of this contrast is striking, with the road serving as a physical

barrier between deprivation and affluence. Although this area was formerly on the outskirts of the city, as Bangalore expands, the site has become increasingly central causing land value to rise rapidly.

15.4.2 Actor Blocs and Their Discursive Framings

In this section, the main actor blocs as emerged from this case are described and their discursive framings analysed. Actors fell into two broad camps: (1) Evictees and the NGOs that supported them, and (2) private and state actors—namely the private developer, the BBMP and the Legislative Assembly.

15.4.2.1 Evictees and NGOS

The majority of the evictees were from minority groups: around 75% Dalits, Other Backwards Caste (OBC), or religious minority—mainly Christians and Muslims. Many came to the city as migrants, often due to agrarian crises in neighboring states. Settlers of the site at Ejipura had a varying relationship with the site depending on the length of time they had lived there; those who had lived there the longest were far more likely to take part in protests, while those who had recently moved were more willing to move to the proposed relocation site. In general terms, the dominant concern of the evictees in relation to the space, was in terms of its economic potential—with for example many women working as housemaids in the wealthy houses in Koramangala nearby. Most evictees were concerned about finding jobs and the costs of bus travel to and from the relocation site.

Critical in supporting the evictees were several local NGOs, specifically Action Aid, the Alternative Law Forum and the People’s Union for Civil Liberties. Notably absent in this case were Dalit political groups such as the Samta Sainik Dal (SSD) which historically have played a strong role in supporting slum dwellers. For example, Vanka (2014) describes how SSD supported the weaver community who typically traded on the sidewalk from eviction from local authorities.

² Correct at time of research (June–August 2017).



Fig. 15.3 Aerial view of eviction site and surrounding area. Images (top left to bottom right): JnNURM blocks beside private houses, BBMP fence, NGV gate (Source: Google Earth 2017, fieldwork data)

Respondents from the NGO bloc speculated that in this case these groups were bribed to stay away. Their absence was most likely a factor in the failure of mobilization.

In terms of discourse, there was no distinct strategy from the evictees themselves, other than speaking of the injustice of the eviction. However, from the testimonies gathered from evictees in the HLRN report (2013), insights can be discerned:

This place was like a jungle. We made this place better; we made this place our home. If we go elsewhere, what will we do? [...] a whole village is wiped from the face of the earth, our community has also been erased from existence (2013, p. 60).

What is important to note here is the meaning of place and the way in which powerful actors can

reframe, and redefine place. The slum community created Ejipura as it was formerly known, transforming the meaning from “jungle”, i.e. uninhabitable, to “home”. Under the opposing conception of the space as “illegal” by the power holders, the place meaning was subsumed and a different conception cemented—a recreational site for middle and elite classes. Under Lefebvre’s contention (ibid.) that the production of space reproduces social relations, we see here the social parallel with spatial change as the slum dwellers themselves are castigated as illegal and occupying space that local authorities and the private developer had envisaged as a lucrative site for gentrification.

Respondents from the NGO bloc frequently employed a lexicon of theft, using words and

phrases like “land grab”, and “looting”. The title of the initial influential investigatory HLRN report (2013) is “Governance by denial: forced eviction and demolition of homes.” A petition which was started at the time of the eviction (change.org) was entitled “Garuda Mall: Don’t steal the homes of the poor in Ejipura!” One respondent stated “today the corporate houses grab the public commons”. The idea of theft emphasizes the legitimate ownership of the land by the original inhabitants, and the vulnerability of the poor in the face of large corporations. It is a powerful message, which was used by the NGO bloc to garner public support, and rally various other groups to protest the eviction in the months preceding it, including students and other low-income urban residents like street hawkers.

15.4.2.2 Private and State Actors

The second bloc was constituted by private and state actors, the interests of whom were mostly intertwined—raising serious concerns around corruption and proper democratic process. The private developer involved was a Bangalore based company fronted by a CEO who was also an active member of one of India’s ruling political parties, and ran as a candidate of the legislative assembly in a constituency in Bangalore. His father formerly served as a Police Inspectorate General, an influential position in India. At the time of the concession agreement for the mall development being signed, the company was already embroiled in an inquiry regarding the construction of another mall, specifically relating to the construction of seven extra floors (having only been granted permission to build a parking area on the land).

While the position of the private developer was at the outset pragmatic—focused on the lucrative nature of the site—in later interviews, a senior member of the company stated that the eviction was necessary for the “betterment” of the people due to their “squalid” living conditions. The deal was framed as a “win-win”, benefitting both the company and the BBMP, as under the terms of the deal, the private developer would provide relocation housing to the evictees on behalf of the BBMP.

The state actors primarily consisted of the BBMP—the city’s administrative body, the Member of the Legislative Assembly (MLA) at the time and members of the judiciary. The notion of “win-win” was echoed by a respondent from the BBMP who spoke of the need to provide adequate housing without significant financial input. Here it is important to note that the BBMP functions under severe constraints: one single corporation administrates a city of nearly ten million, and the state respondent emphasized insufficient funding coming from central government. This means that methods such as PPPs for the provision of infrastructure at little upfront cost are an attractive solution. However, before the 32 year concession period is completed, apart from a small quarterly management payment, the state will not receive any revenue from the site. A respondent from BBMP cited the main motivation for the PPP as social benefit: “the profit is that we’re doing good for the people.” Yet, considering the eviction of over 1000 families, the failure to provide adequate transit accommodation and the relocation site only due for completion late 2017, some 5 years after the eviction itself, the legitimacy of this sentiment can be called into question.

The role of the MLA in this case was highly significant. The former MLA had promised all residents of the site housing in-situ, regardless of whether they were original allottees or informal subtenants. The MLA at the time of the eviction promised residents the same thing, yet later reneged on the promise. One respondent from the NGO bloc stated:

Here nobody cares. He came and stood there and made sure the slum was cleared completely. . . the same people who voted for him, with what trust?

The judiciary were uncooperative in participating in this research, hence data is limited to secondary sources. Allegations were made against them suggesting a degree of questionable practice: the judge who delivered the verdict in the PIL had been promoted by the time the case was appealed, so the case was again rejected. When the case was appealed to the Supreme Court, after being heard for several hours, it was

decided they did not want to take it further. No reason was given for the rejection.

Despite the assertion of concern for wellbeing of the slum dwellers, the dominant usage of language within the state and private actor coalition concerned the framing of the people of the Ejipura slum as “cheating the system”. They were described repeatedly as “encroachers,” on “public” land, and the disparity between them, and those who could lawfully pay for their houses emphasized. One state actor denied that people were poor, stating that they were living on the pavements and “faking it” to get attention and subsidies from the state. Another described resettled slum dwellers as “pampered”. In a letter written in response to the HLRN report, the CEO of the private developer stated:

As for the allegations that the encroachers have been injured in the eviction, they are fake. They are all acting, they are very good artists. . . . They are all staying in dwellings of their own in nearby localities.

A respondent from the private firm criticized the word “eviction” itself, stating that it was for the purpose of misleading the public as the land never rightfully belonged to the slum dwellers in the first place.

15.4.2.3 Public Interest and the Role of Citizenship and Identity

To surmise, both of these discursive framings (from the NGO-evictee bloc and the private-state bloc) draw on the same theme—that of stealing and cheating from the public, but with each case resting upon a different understanding of who the public really refers to. From the state and private sector bloc, the “public” is predominantly framed as the middle and elite class—those with the ability to rightfully own property. On the other hand, “public” within the NGO framing refers to the lower socio-economic strata of society who need to be protected by those who would exploit them.

Within these framings there is an important underlying resource to citizenship and identity, with in each definition the individuals who are outside of the public framing cast as “other”. This can also be understood as a challenge to their

urban citizenship, as contrary to Lefebvre’s contention that inhabitation in a city alone should be basis for citizenship, the outsider group is villainized, and particularly in the case of the slum dwellers, pushed not only outside of the former slum site, but outside the city boundaries (the relocation site 20 km from the city).

The discourse which prevailed (or was “institutionalized” following Hajer 1993), was that of the slum dweller as encroacher, particularly as it was decreed in the court judgment and further exemplified by the way slum dwellers were talked about by middle class residents.³ This discursive framing was a vital tool in legitimizing the eviction, and influencing the physical division of legitimate vs. illegitimate urban citizen, this tying into broader national rhetoric as described by Bhan (2009).

The bloc with the greatest ability to manipulate outcomes was the private developer, enmeshed in a web of powerful connections with state actors. The intertwining of private/elite interests with actions of the state—crucially, involving the judicial system—has been called “elite capture governance” by respondents from NGOs, referring to the extent to which elite and private sector bodies can influence governance decisions. These connections within the judiciary were a vital tool in pushing through the ruling of the slum dweller as encroacher. This judgement, and the corruption

³ Represented by residents of the NGV opposite the site, the middle class occupied a distinct positionality, separate from elite and private sector interests on one hand, and the EWS on the other. Respondents were mistrustful of the state, private parties and the slum people. Their concern lay mainly with themselves, stating “we need to fight for the right people,” the right people being the “common man—the common citizen,” i.e. them, the middle class. They were against the construction of the mall, primarily as they anticipated extra people trying to park in their streets. Whilst displaying some sympathy with the eviction, they were also indignant, asking “why should people [the evictees] get compensation? The government cannot provide houses for everyone,” and “[. . .] even I need a property.” Following the idea of the slum dwellers as cheating, a common opinion was that slum people were receiving subsidies from both, their own states and from Bangalore. Regarding the state, they astutely noted that “the politicians are not bothered because of vote-bank (“they give the slum dwellers false promises”).

which has been implicated in the case, has severe implications for the integrity of rule of law in Bangalore. One respondent from the Alternative Law Forum predicted that:

Ejipura can expect a mall and high-end residential complex. The promised houses for the original allottees are not going to be seen through. Just like the mall case where parking was never delivered. . . the original allottees will be forced to move out of the houses. . . they will create hassles such as water or electricity issues. The profit will go back to the builders and houses will be given for rent or re-sold to richer people.

15.4.3 Tactics and Governance: Instruments and Structures

In this section, the tactics, governance instruments and broader structures through which the actor blocs sought to achieve their goals are examined, and analysis provided as to what this can tell us about the current characterisation of Bangalore's urban development and its impact on marginalized groups.

15.4.3.1 Tactics

15.4.3.1.1 Tactics from Below

Initial tactics taken by the slum dwellers centred on legal judicial action in court. When their claim was quashed, they resorted to more confrontational methods of protest. One respondent tells of how together with other slum dwellers, she burned her biometric ID (*aadhar*) card in protest at the court premises in order to draw attention to the issue (the cards being the manner through which resettlement houses are allocated). A petition was also circulated by NGO staff calling on Bangalore's residents to boycott the other mall owned by the private developer.

There were also tactics of desperation: one respondent talked of a woman pouring kerosene over herself to try and self-immolate, having nowhere else to go with her children. Reportedly, it was due to this woman's actions that the remaining community members were allowed to stay camped around the periphery of the fence.

This indicates that forcing the issue into the public sphere in such a prominent way was an effective method of invoking response, yet a strong sign of the dysfunctionality of the political system and lack of safeguards that vulnerable urban dwellers feel forced to this extreme.

15.4.3.1.2 Tactics from Above

During the eviction and in the days and months preceding it, strategies used by state and private actors included brutality, intimidation, and crucially—keeping slum dwellers un-, or misinformed about eviction proceedings. Slum dwellers were repeatedly told by officials including BBMP commissioners some days before that they would not be evicted, or at least not until the end of the school year, a promise which was not kept. Another respondent describes a public meeting held between the evictees and the MLA in the days prior to the eviction in which residents were asked if they had objections. This respondent said that the MLA—their elected representative—said:

Your answers should be you shake your head like this. . . if anyone dares to nod your head, just take it from me, your head will no longer be on your body.

In further reports of intimidation, the respondent who mobilized slum dwellers to burn their *aadhar* cards said that during these days she was attacked by *goondas* (thugs), leaving her partially blind and with vertigo.

When the court case failed, every day residents would go to the BBMP to protest, and every time the BBMP would agree to their demands. But, in the early morning as they slept, trucks would come and carry out the demolition. As this continued, respondents say that the people finally gave up. Accounts describe that over 500 police accompanied the bulldozers, with residents beaten and women reportedly dragged into police vans by their hair when they refused to leave their dwellings (HLRN 2013).

When historical tactics of state and private actors are considered, what also emerges are accounts of thinly veiled corruption and bribery. One respondent described a former slum leader who ran a welfare association, and who claimed

to represent the evictees. Everyone was asked to pay 500 rupees (approximately US\$7) to fight the case and get proof of residency for the sub-tenants. Yet, the respondent claims that the private developer had a secret understanding with this individual, who has since disappeared and who the respondent believes is responsible for the attacks on residents. Another respondent says that some youths from the slum were bought off—given money in return for discouraging protestors. Many accounts implicate the local MLA; in addition to his threats at the public meeting, one account recorded in the HLRN report (*ibid.*, p. 57) claims he promised 15,000 rupees (approximately US\$200) to those who will leave, then used *goondas* to threaten residents, saying that they would harm their daughters if they did not move out.

15.4.3.1.3 Fragmentation of Solidarity and Withholding of Space

From the analysis of the tactics from below (judicial action and protest) and above (information delivery, intimidation and bribery), returning to the conceptualization of closed, invited and claimed spaces by Gaventa (2006), at no point were the direct stakeholders of the eviction plans (the slum dwellers) invited into decision making. Moreover, plans set out by public officials regarding the eviction was retracted and changed without notifying slum dwellers and information delivered under thinly veiled threats. The evictees attempted to claim space in formal decision making processes within the judiciary system, and when this failed via confrontational means of protest with the support of civil society groups (NGOs). These methods also failed to affect the eventual clearance of the site. The tactics and outcomes of the case demonstrate the active withholding of space by the public-private bloc, with solidarity among the evictees deliberately fragmented, de-escalating possibilities for mobilization and subverting their capacities for appropriation and participation.

15.4.3.2 Governance Instruments

In addition to these tactics, claims to the space were also controlled via certain instruments—

namely, the “list,” i.e. allocation of relocation housing, and the biometric ID *aadhar* cards entitling evictees to allocation. As instruments of governance, these are highly important methods through which the state can keep track of citizens, and as citizens, provide access to schemes and benefits. However, getting onto the list is a complex and bureaucratic process which slum dwellers found difficult to navigate.

What seemed to be required is:

- A biometric ID (*aadhar*) card showing that the individual is below the poverty line and providing that they are residents of the slum; and
- A contribution of 10% of the cost of resettlement housing.

However, during the eviction, many evictees had lost their belongings as they were not given time to gather their possessions. Additionally, some who were involved in the struggle against the eviction were denied cards. The respondent who had burned her card said that some of those who did the same either had another family member in possession of a card, or managed to bribe officials to get the cards, a situation she was unaware of. Without a card, this respondent was not entitled to resettlement housing, leaving her with no other option than to remain on the pavement.

An account from a member of NGO Lifeline Foundation published in the HLRN report (2013), stated that people were falsely told that these biometric cards would serve as their guarantee towards rehabilitation in roughly a year, describing this as a “means of distraction from political mobilization.” Consequently, just like the strategies of intimidation and misinformation, the ID cards and systems of allocation might also be understood as instruments of manipulation—persuading people that unless they behave, they will not be given cards and thus excluded from resettlement. Even for those who were in possession of the cards, some simply could not afford the down payment. Additionally, there were accounts of exploitation from fraudsters, extorting money under the pretense of providing

resettlement housing, such as those that targeted Mary.

Indeed, the entire process has been fraught with corruption, not just from opportunists, but also from the inside. One story relayed by multiple sources concerned the way in which people got on the list, with spaces often being given to party members of the congress or their supporters. Respondents claimed that this was the case with the original allocation of the apartments at Ejipura prior to demolition; many of the residents were not actually EWS, rather the apartments were owned by those who had connections with political agents who could pay the deposits and secure the flats. When the apartments were found to be low quality, allottees instead rented them out to the poorest who had no other option.

15.4.3.2.1 Cooption of Governance Instruments

To summarize, governance instruments—the *aadhar* cards—identity cards showing that the individual is below the poverty line and residents of the slum, and the “list”—those entitled to relocation housing—were manipulated by power holders to achieve their own ends, despite being originally designed as methods of safeguarding the poor. This outcome is not an isolated incident: in another case in Bangalore described by Dhananka (2016), after a slum community was informed that housing would be delivered in-situ to their slum, the local slum leaders took control of the negotiation process. However, after 1500 units were promised, only 850 were constructed and the interiors not finished. Additionally, over 170 names were missing from the list of beneficiaries and there were reports that outsiders had been included instead. Processes were kept opaque, and slum dwellers were discouraged from coming forward out of fear of losing housing.

Through this manipulation of governance instruments, we can see further modalities through which the public-private bloc is able to maintain control over the production of space. In the case described by Dhananka, although initially it seemed the slum community was able to claim space in the decision-making process,

corruption prevented the positive outcome of this case for the slum community.

15.4.3.3 Governance Structures

A final layer to consider comes from the wider governance structures exemplified by this case. Firstly, systems of vote-bank politics, and secondly, the PPP arrangement itself.

Regarding systems of vote-bank, one respondent described how “someone will come and do a favour, and loyalties will be won.” However, promises are not always kept, as was the case in Ejipura with the former MLA stating that the land belongs to the poor and promising that houses would be built for them there. When the current MLA was elected, reportedly he came to the area asking for votes, also pledging to build them all houses in the site. However, later it transpired that the houses would be built for original allottees only, and not the subletters. One respondent described how:

These spaces [for corruption to take place] exist because of the informal arrangements from vote-bank politics.

Within a structure of vote-bank, a patron-clientelistic relationship emerges whereby the political leader faces a lack of accountability due to the extreme power imbalance preventing residents from holding them to account. Where such a system may afford slum people a stronger voice in some cases, in Ejipura it seemed to work against them. Although initially it might seem unwise for an elected representative to betray a vote-bank in such a major way, with the clearance of many of these slum dwellers outside of his constituency, there would likely be few repercussions for these broken promises. One respondent speculated that Ejipura is simply a case where “money won over votes.” Ultimately, one must question how this sort of relationship has emerged whereby poor people are reliant on a local “don” to provide protection.

As for the PPP itself, although not new, the prevalence of these deals in Bangalore and across India’s urbanities, are indicative of a changing balance of power from state managed to private-led development. Despite this, many respondents

described the PPP deal as a “smokescreen” for corrupt practices and “land-grabbing”. One respondent from the NGO bloc describes this process as: “corporatization of the commons” whereby land is sold off to the highest bidder. Similarly to vote-bank systems, a serious lack of accountability emerges when PPPs become the main avenue for infrastructural development and service delivery. Private entities bear no formal responsibility to citizens, thus citizens cannot effectively hold private entities to account. In the case of Ejipura, one main problem was the lack of provision of transit accommodation after eviction. Although it was required in the court order which permitted the site to be cleared, when questioned, the BBMP claimed that the developer was responsible for providing sheds, yet the official from the private developer denied this. Indeed, both the respondent from the developer and from BBMP denied that people were still living on the pavements, the respondent from the developer claiming that they had been given wrong information. One NGO respondent argues that if it was indeed the developer’s responsibility, then the BBMP ought to have:

“[. . .] pulled up their [the developer’s] collar” and asked why they had not yet provided sheds; it was their responsibility as they are accountable to the people.

15.4.3.3.1 Accountability Deficit within Governance Structures

To conclude, while the growing popularity of PPP deals certainly gives a cause for concern, what the Ejipura case demonstrates is that there was a distinct lack of accountability to begin with. From the substandard dwellings initially built, to the broken promises from the MLA, channels of effective formal participation between urban disenfranchised and the state had long been broken. Slum dwellers were not able to take part in decision making processes, their only avenues of participation via the organisations such as the NGOs that represented them and vote-bank politics that allowed political actors to garner support, while later renegeing on promises. Via tactics of contestation, slum dwellers could protest, but ran

the risk of brutality and intimidation. Meanwhile, individuals with money, power, and influence (including slum leaders) were able to manipulate these arrangements to their own advantage, seeing the extortion of slum dwellers and widespread practices of corruption. A key informant described this as:

“Non-coordinated space” which is “almost capillary,” in the way that “calculated practices of corruption become the norm and even small scale builders face a network of agents who take money here and there.”

This description is interesting under Gaventa’s (2006) framework of closed, invited and claimed space, as this informal or “non-coordinated” space through which corruption can manifest falls outside of the framework. It is a space used by both the power holders and the urban vulnerable in the city (e.g. street hawkers violating zoning laws), yet one in which the urban poor are clearly losing ground.

15.5 Discussion: Mechanisms of Marginalization

Bringing these different elements together, we can see how various actors have utilised governance instruments and structures, and discursive framings to control and produce space in a way that contributes to social marginalisation. The tactics of intimidation, corruption and deliberate fragmentation of solidarity, facilitated by instruments of allocation, were arguably only possible within the broader governance structure of the patron-clientelistic vote-bank system, and the corporate dominated developmental space of the PPP—both structures which facilitated informal maneuvering and manipulation by powerful actors. These dynamics are perpetuated and legitimised by a monopolisation of the definition of “public interest” by political and corporate power holders, which also serves to mould the definition of urban citizenship according to these emerging norms.

These elements are also mutually reinforcing: as the urban poor are pushed to the peripheries, their claims on space further weaken as critical

livelihood opportunities and social networks are lost, and their ability to engage in (formal and informal) governance structures weakens. In such a way, we can view these different processes—discursive framings, governance structures and production of space—as both mechanisms *and* outcomes of marginalization. Cumulatively, these processes have a severely detrimental effect on quality of life as capacities for social mobility are limited through insecure tenure, discrimination, and associated implications for other features of quality of life such as secure work, education and neighborhood identity.

15.5.1 Situating Findings Within Theory

With regard to discourse, the discursive framing of slum dwellers as “other” aligns with Fernandes’s (2004) hypothesis that discursive-spatial strategies employed by dominant groups have led to an exclusive form of cultural citizenship. Following from this, and considering the evolving court rulings as highlighted by Bhan (2009), Ejipura brings to light the shifting parameters of citizenship to a definition based on the ability to “buy-in.” While corruption and motivations of personal gain may have had much to do with this particular case, the eviction was arguably only successful due to this discursive framing, creating legitimacy in their removal. Fernandes’ (2004) hypothesis of the “politics of forgetting” via which marginalized groups are rendered invisible is applicable here, but arguably insufficient—as the poor in this case are not being forgotten—but actively excluded; not just from the city, but also from any legitimate claims to it.

Accordingly, viewed within Lefebvre’s wider theory of RTTC, the residents of Ejipura have been able to claim little, if any shaping power over the processes of urbanization—either through participation, excluded and deliberately uninformed during the eviction process, nor appropriation—their right to physically access, occupy and use urban space. Returning to the case highlighted by Dhanaka (2016, p. 2), she states that: “The housing outcome [whether

slum dwellers are successful in protesting their eviction] is heavily shaped by relations within the community and the inhabitants’ capacity to navigate through networks of power and stealth”.

Specifically, in the failure of mobilization, she argues that this shows how an urban poor community living in a “locality saturated with patronage networks limits insurgent performances” (ibid., p. 10). Strong unity within the community creates the means to resist informal oppression (ibid.:13). However in the case of Ejipura, deliberate moves were made to fragment possibilities for unity within the slum community, contributing to the failure of the protests.

15.5.2 Shifting Power

From an analysis of the actor blocs involved in the land dispute, we see a strong overlap between corporate and elite political interests and cooption of government actors and structures, or so-called “elite capture governance.” In India, Patel et al. (2016), in exploring local governance in Asian cities, note that while in some cities the poor have successfully engaged with elected representatives through clientelism to negotiate their needs, in Ahmedabad (their site of study), that platform is “captured” by the elite middle class. The phenomenon of elite capture is also mentioned in literature in other country contexts. For example, Lemanski (2017, p. 29) notes that the spatial and socio-economic inequalities entrenched in urban spaces and social fabrics after apartheid permit elite residents to use their connections and expertise to control access to local resources in low-income areas situated close to affluent suburbs, diverting public funds to support their own interest and activities—for example golf clubs and horse riding. This echoes broader trends in Bangalore, for instance with the rise of organisations such as the Bangalore Agenda Task Force, Janagraha and the Namma Bengaluru Foundation—“non-profit” political interest groups with powerful elite and corporate individuals on the board who are able to lobby for land. One respondent described the Namma Bengaluru Foundation as a “vehicle for right-

wing propaganda” and “front for the BJP [which has] monopolised urban causes and become the champion of the middle class.”

What can be induced from this is a shifting balance of power from vertical, state driven development (as characterised the pre-market liberalization years in India), towards a nexus of power constituted by elite, middle class and corporate groups who withhold space. Building on this conceptualization, we might view the role of the state not as manager or developer, but as *broker*, auctioning land as its most valuable asset. Meanwhile, poor groups have seen their bargaining power stagnate, while channels of participation remain opaque and inaccessible.

15.5.3 Informality and the Agency of the Poor

From analysing the tactics, instruments and structures which served to allow certain actor groups to push through the PPP deal and subsequent eviction, and the recurrence of similar tactics in other cases in Bangalore, (Dhananka 2016), we contend that Bangalore is experiencing a democratic crisis in governance as elite capture prevails and poor groups are fundamentally and persistently excluded. A key characteristic of this has been “non-coordinated space”, in which informal tactics are employed by all actor groups; for instance, squatters moving into slum areas, state actors manipulating housing allocation, and private groups violating planning restrictions. These tactics also extend to the national level; Roy (2009, 2011) discusses cases in India where the state, in trying to push through mega-developments, created Special Economic Zones to overrule its own legislation protecting the area for agricultural purposes. Similarly, Follmann (2015) discusses the state intentionally empowering riverfront property megaprojects to bypass environmental regulations. These authors suggest that informality, from being the object of state regulation, when produced by the state itself undermines its legitimacy and creates a roadblock of effective governance (Roy 2005; 2009; Follmann 2015). In the context of Bangalore,

developers can leverage financial capital to achieve greater economic and political agency, and, although their strategies may align with governmental agendas for city modernization, they can also constitute an obstacle as the state is “outdone by developers ability to work through the intricacies of local land markets and bureaucracies” (Rouanet and Halbert 2016, p. 1401).

In the case of Ejipura, tactics of informality from above became a critical tool for powerful individuals who were able to circumvent laws and bend regulations to their own advantage, facilitated by a monopoly of the rhetoric which legitimises such moves—“informality” and “public purpose” defined according to these produced norms. Although the eviction site had previously been guaranteed for the usage of poor groups, this was revoked, the slum site becoming “informal”, while the mall, although flouting many building regulations and the actual terms under which permission was granted for its construction, accepted as a “formal” part of the cityscape. Returning to the earlier debate about the capacity of the poor to muster informal systems to their advantage, on the one hand, we might view the actions of the pavement dwellers in constructing their dwellings as such as an “everyday form of resistance” or “everyday appropriation of space” whereby land is incrementally adapted to fit uses (Lombard 2015). Yet, we question whether it can be seen as such in this case, because—crucially—these forms of subaltern urbanism imply a degree of agency. From the evidence from this case, it seems clear that the evictee’s habitation of the pavement comes from desperation, rather than in an active or politicized desire to subvert planning decisions. While perhaps the original occupation of the site could be described as appropriation of space, this claim to space was lost as they were pushed from the site and their capacity for resistance diminished.

Ultimately, in this case at least, embedded systems of informality and non-coordinated space create challenges for sustainable urban development as the poor are systematically excluded. Agents with money, power and connections are better placed to navigate these

informal structures and arrangements, undermining legitimacy in governance and leaving the poor in a weakened position, vulnerable to exploitation or eviction, thereby severely impacting their quality of life.

15.6 Conclusion

This chapter aimed to examine the dynamics of the production of urban space in Bangalore under a Rights to the City (Lefebvre 1972, 1991) conceptualization of urban quality of life as exemplified by the case of the Ejipura slum eviction. It considered various processes of marginalization, examining actors, discursive framings, tactics, and instruments and structures of governance. Findings indicate a democratic deficit in governance characterized by endemic informality which is fueling and perpetuating socio-spatial polarization and severely impacting the quality of life of the urban poor. A powerful feature of these processes has been the discourse institutionalization of the poor as “encroachers” and the cooption of the definition of “public interest” by dominant groups, creating an exclusionary form of urban citizenship. In turn, this has entailed the definition of “informality” according to these emergent norms, with shopping malls flouting planning restrictions accepted as formal, while the semi-autonomous dwellings of Ejipura condemned as informal. Both of these framings—the dwellings as informal, and the dwellers as encroachers were key in legitimizing their removal.

While this case is a site-specific and small-scale qualitative study and so cannot be generalized to Bangalore as a whole, findings cohere with other literature; for example Dhananka (2016) and the manipulation of allocation of relocation housing in Bangalore, Bhan (2009) regarding the shifting rhetoric towards slum dwellers as a symptom of a shifting socio-economic fabric which includes rising middle class consumerism, declining state patrimony for the poor and increasing dominance of private and elite factions in controlling and producing city space, and Roy (2009, 2011), Follmann (2015)

and Van Dijk (2011) that claims of agency and empowerment within tactics of subaltern urbanism are misplaced.

In terms of methodological contribution, by combining social, spatial and discursive angles of analysis, and unravelling actors, tactics, discursive framings and instruments broadly following Peyroux et al.’s analytical categories (2014), a deep level of understanding of urban development was afforded, particularly with respect to linkages between the physical changes to the Ejipura site over time, and how these relate to the non-physical—the socio-economic and political dynamics which shaped the evolution of the site. The inclusion of discourse in particular was valuable in uncovering latent positions and agendas of actors and how these relate to broader national socio-economic shifts and sentiment.

In Bangalore, the developmental trajectory is likely to continue in an exclusionary path, unless the capacity of marginalized groups can be bolstered. While reliance on the market for urban development and the delivery of effective public services can no doubt be an effective strategy, it requires stronger channels of participation via invited space and transparency in governance to combat elite capture and meaningfully engage poor groups in decision making processes which would strengthen their capabilities to enhance their quality of life. Ultimately, a city that works for all requires co-creation from all urban dwellers, nurtured by inclusive governance. Following this line of thinking, a sustainable model of city development would be well framed within Lefebvre’s guiding principles of participation and appropriation under RTTC, but application of this model in cities such as Bangalore will require a fundamental restructuring of the power relations which currently govern the production of urban space.

15.7 Limitations and Future Research

Key limitations of this study were time—specifically limiting the building of trust with evictees to explore more complex perceptions, discursive

framings and tactics. Furthermore, there was a limited number of respondents from the private and public bloc and no respondents from the judiciary (due to a lack of willingness to participate in the research). These limitations meant that secondary sources (such as the HLRN reports) were an important source of information, yet these have their own framings which needed to be untangled from the source material.

Further directions for research might focus on successful cases of contestation in the Indian context, examining in depth the actor networks, tactics, framings, instruments and governance structures which facilitated their ability to maintain, or gain control over the means to produce space in the city. Methodologically, techniques such as participatory mapping could be valuable in gaining a more complex, insider or “emic” understanding of slum dwellers’ capability to appropriate and participate in the production of space. However, in this study, considering the limited timeframe and extreme vulnerability of the pavement dwellers, engaging in this type of research felt inappropriate.

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development of new urban planning practices and address issues of urban sustainability. Key questions are how urban governance actors develop, organize and practice access to urban infrastructure and how geo-spatial technologies can enhance the planning of and access to urban infrastructures. She has participated in NWO and EU-funded research programmes on spatial information

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Risk Management of Groundwater Pollution, Sustainability and Quality of Life: The Gap Between Theory and Practice in an Intermediate City of the Global South (Mar Del Plata, Argentina)

Agustina Barilari, Gabriela Calderon, and Héctor E. Massone

16.1 Introduction

Within the multiple approaches to the concept of quality of life, access to safe water is, directly or indirectly, part of the variables that define its components. However, this ability to access safe water brings into play the environmental, socio-cultural, political and economic dimensions of sustainability. Thus, this set of dimensions is also included in the concept of sustainable development. Furthermore, since 2010, access to safe water and sanitation is recognized as a human right by the United Nations (UN) General Assembly. It is critical to highlight that three out of 10 people (2.1 billion people, or 29% of the global population) did not use a safely managed drinking water service in 2015, while 844 million

people lacked even a basic drinking water service (Fig. 16.1). Of all the people using safely managed drinking water services, only one out of three (1.9 billion) lived in rural areas. Coverage of safely managed water services varies considerably across regions (from only 24% in Sub-Saharan Africa to 94% in Europe and Northern America). There can also be significant variability within countries and between rural and urban areas, wealth quintiles and subnational regions (WWAP 2019; World Health Organization [WHO]/United Nations Children's Fund [UNICEF] 2017).

Regarding sanitation, only 2.9 billion people worldwide (or 39% of the global population) used safely managed sanitation services in 2015 (Fig. 16.2). Two out of five of these people (1.2 billion) lived in rural areas, while another 2.1 billion people had access to 'basic' sanitation services. The remaining 2.3 billion (one out of three people) lacked even basic sanitation service, of which 892 million people practiced open defecation. Similarly to drinking water, a substantial level of variability can be observed in terms of access to basic sanitation within countries (WWAP 2019; WHO/UNICEF 2017).

Water quality problems persist in developed and developing countries alike and include the loss of pristine quality water bodies, impacts associated with changes in hydromorphology,

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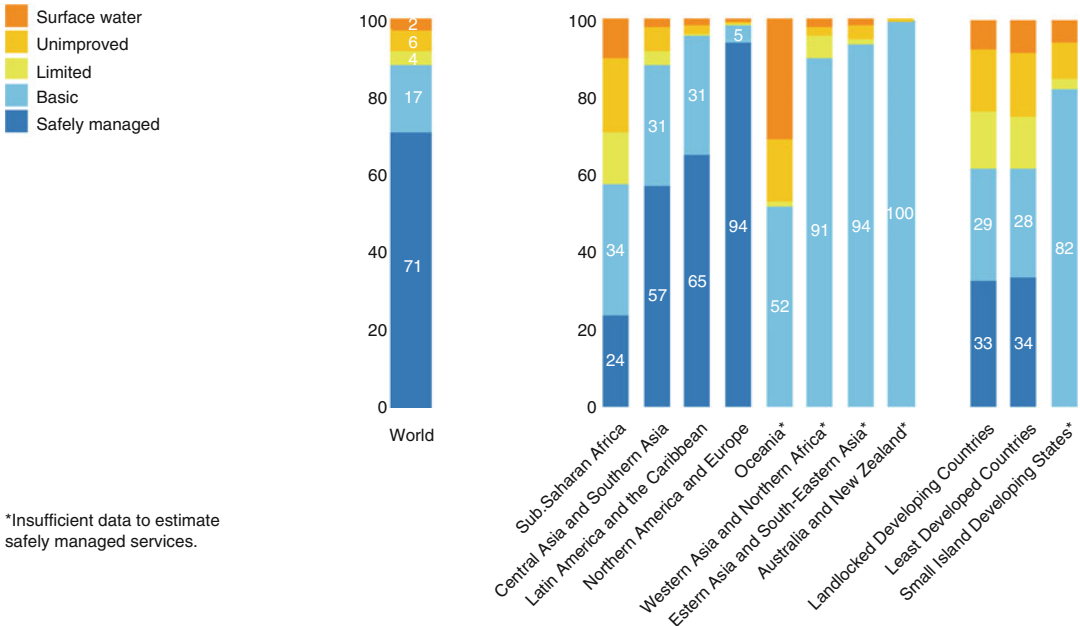


Fig. 16.1 Global and regional drinking water coverage in 2015 (%). Source: WHO/UNICEF (2017)

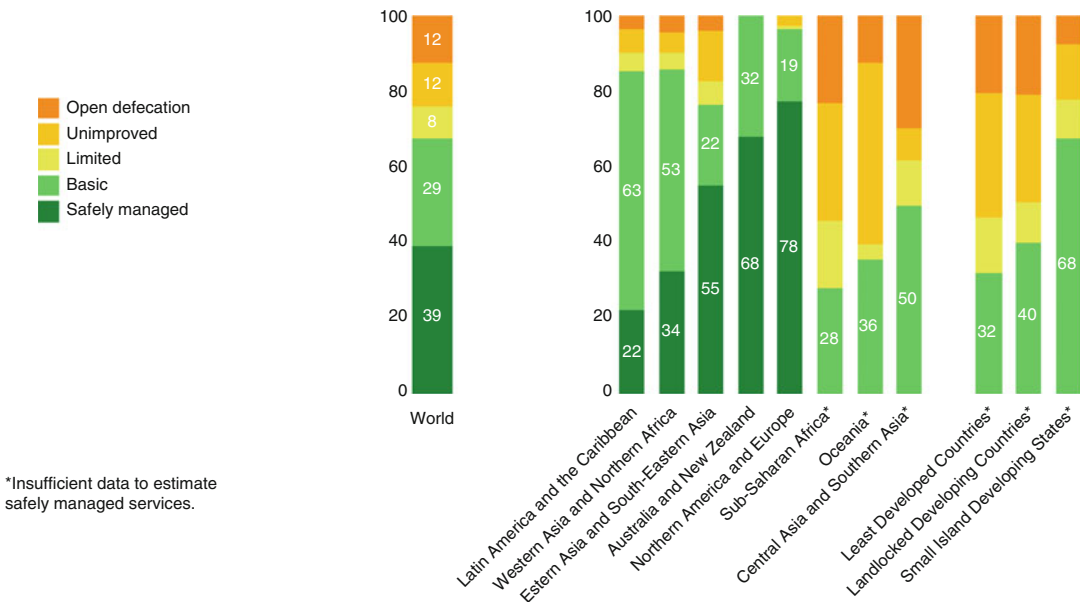


Fig. 16.2 Global and regional sanitation coverage in 2015 (%). Source: WHO/UNICEF (2017)

increases in emerging pollutants and the spread of invasive species (United Nations World Water Assessment Programme [WWAP] 2018). Moreover, poor water quality directly impacts people by further limiting their access to water (including

groundwater as surface water availability) and increasing water-related health risks, not to mention the population’s overall quality of life (WWAP 2019).

Very progressively, from the middle of the twentieth century, the management of these quality problems evolved from an exclusively reactive view to a proactive one, explained mainly by pollution risk management process, including the assessment, prediction, prevention and warning system stages.

The aim of this chapter is to analyze the relationship between sustainability and quality of life from the groundwater pollution risk management perspective, comparing “what it should be” with “what it really is” in each of the process stages and proposing adjustment actions for the study case of an intermediate city of the Global South.

16.2 Global South and Intermediate Cities

As can be seen in Figs. 16.1 and 16.2, the difference in the quality of safely managed water and sanitation services globally is biased by the socio-economic level of the region. In this sense, developed and developing countries are clearly differentiated. North-South terminology arose from an allegorical application of categories to name patterns of wealth, privilege and development across broad regions. The term “Global South” functions as more than a metaphor for underdevelopment. It references an entire history of colonialism, neo-imperialism, and differential economic and social change through which significant inequalities in living standards, life expectancy and access to resources are maintained. Thus, the phrase “Global South” refers broadly to the regions of Latin America, Asia, Africa, and Oceania. It is one of a family of terms, including “Third World” and “Periphery” that denote regions outside of Europe and North America, mostly (though not all) low-income and often politically or culturally marginalized (Dados and Connell 2012). A large part of the progress expectations of the Global South is related to the strengthening of intermediate cities in the national urban system (Iglesias 2016).

Today, intermediate cities are home to 20% of the world’s population and one-third of the total urban population and play a major role in

migration, administrative, economic, and logistics processes. In 2015, approximately 36% of the world’s urban population lived in 8,923 intermediate cities with a population between 50,000 and 1 million inhabitants (Roberts et al. 2016). These cities are increasingly gaining prominence in Latin America’s economic and social development. They are crucial for increasing national and regional productivity and competitiveness, creating more prosperity for their residents (Development Bank of Latin America 2019). Furthermore, they are home to 2% of Latin Americans and some estimates indicate that they may comprise up to 17% of the Gross Domestic Product (GDP). Additionally, they are the fastest growing cities in the developing world and play a fundamental role in connecting both rural and urban areas through so-called “peri-urban” areas, which provide basic facilities and services (Gorelick and Moktar 2018; Bolay 2018). Peri-urban areas, in these cities, consist of informal land-use patterns, accompanied by impoverished or practically non-existent public services, along with inferior quality of housing and bread-line families living in poverty (Wandl and Magoni 2017). A substantial part of the population living in these areas can be considered as a population “below the radar” in terms of the UN World Water Development Report 2019 (WWAP 2019).

Argentina is a South American country, representative of the Global South, which has 2,780,400 km² of surface and a total population of 43,131,966 inhabitants. Moreover, 92% of its population lives in urban areas. Argentina is a federal country and is subdivided into 23 provinces and one autonomous city (Ciudad Autónoma de Buenos Aires), which is the federal capital. Environmental governance in Argentina is multilayered and cuts across federal, provincial and municipal levels (World Bank Group 2016), while the legal system is ordered by the National Constitution. According to its article no 123, “Each province can enact its own Constitution, which ensures its own administration of justice and municipal autonomy, and regulates the scope and contents of the institutional, political, administrative, economic and financial order” (2016, p. 58). Despite this, the National

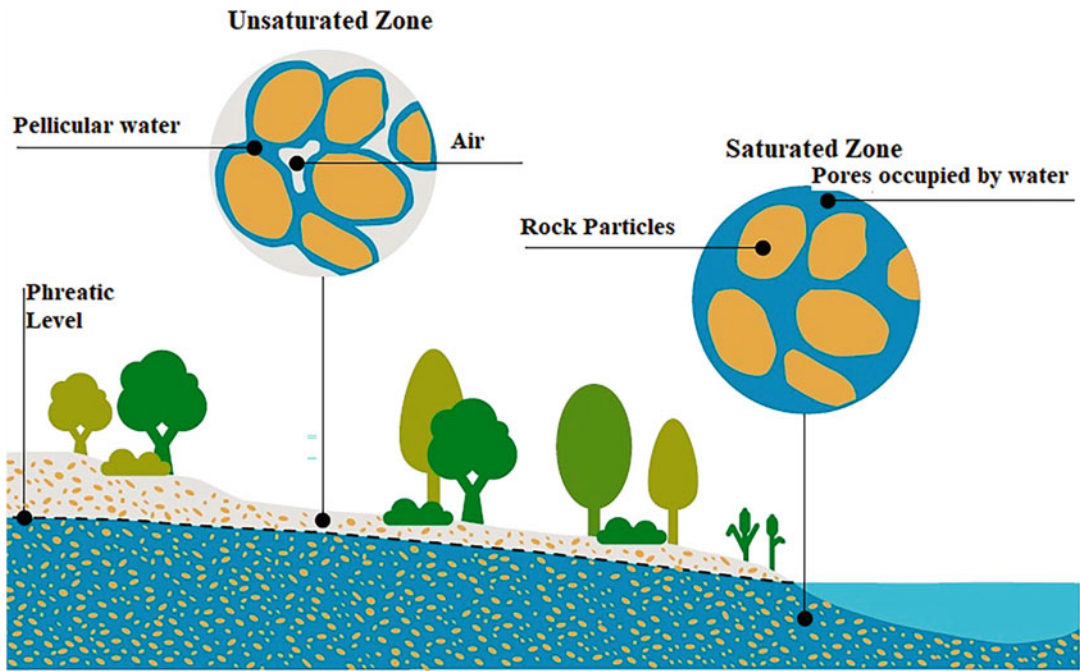


Fig. 16.3 Aquifer schematic representation (Source: Massone and Grondona 2018)

Constitution sets the so-called “constitutional supremacy” which establishes that provincial regulations must be adapted to the national prevail in case of conflict with the last. Thus, the provinces can dictate its own formal laws and are empowered to celebrate international agreements as long as they are not incompatible with the nation’s foreign policy and do not affect the faculties delegated to the federal government (Organization of American States 2016). It is also important to note that according to the National Constitution, provinces keep the domain of its natural resources and can regulate the use of natural resources in their jurisdiction without contradicting national laws.

Mar del Plata is an Argentine intermediate city located in the Buenos Aires province. The only source of water supply in this area is groundwater (“Pampean aquifer”). Groundwater is water found in the subsoil and occupies the tiny existing spaces between the component particles of sediments and rocks (pores) (Fig. 16.3). In the Mar del Plata region, two areas with different hydrological characteristics are present in the

subsoil: an unsaturated zone, in which the sediment pores are occupied by air and where there can be water in transit (infiltration process) and below, the saturated zone, or aquifer, in which all the pores are occupied by water. The level that separates these two zones is called a phreatic level. An aquifer is formed by rocks or sediments that can store water and allow groundwater flow (Massone and Grondona 2018).

16.3 Study Area

Mar del Plata is the main city of the General Pueyrredon district, located on the coast of the South Atlantic Ocean (Buenos Aires province, Argentina, Fig. 16.4). According to INDEC, the district has a population of 618,989, in an area of 1460 km², while the urban area is approximately 205 km².

As mentioned previously, in General Pueyrredon groundwater is the only water resource with sufficient availability to supply human consumption, irrigation, industrial use

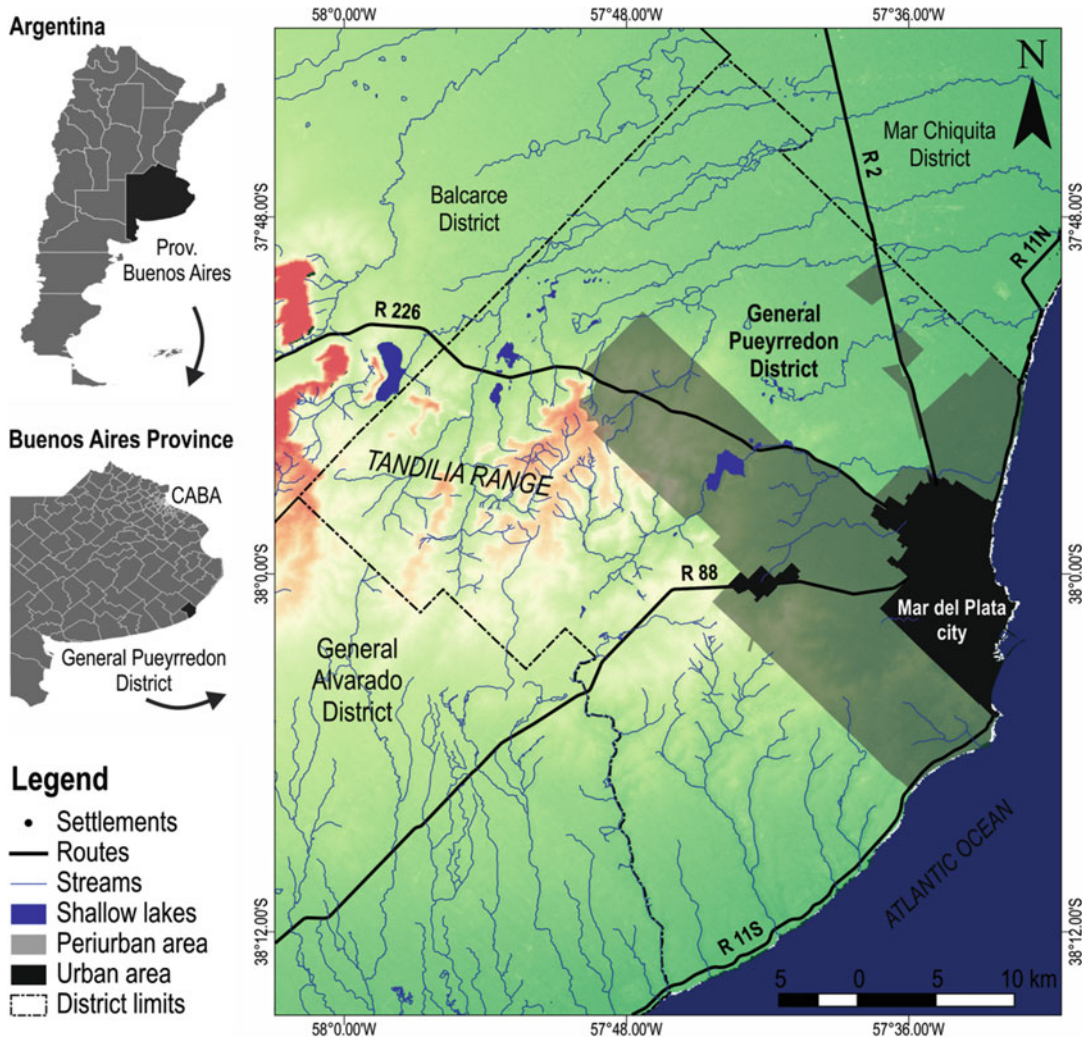


Fig. 16.4 Study area (Source: Own elaboration)

and other purposes. Obras Sanitarias Mar del Plata (OSSE) is responsible for the provision of drinking water service in the city (Fig. 16.5a).

Mar del Plata presents an important urban-rural interface with multiple land uses, of about 340 km², characterized by the advancement of urban development in areas that were traditionally agricultural.

According to information from the 2010 National Population, Households, and Dwellings Census (National Institute of Statistic and Censuses [INDEC] 2012), the peri-urban area of Mar del Plata possesses 125,143 inhabitants;

hence, it groups 20.2% of the whole population registered in the General Pueyrredon district (Zulaica and Celemin 2014). Most of this population has no network water or sanitation coverage (Fig. 16.5a, b) and therefore, are considered to be a population exposed to risk of water contamination.

16.4 Methods

The methodology used in this chapter is based on a qualitative approach. The applied methods

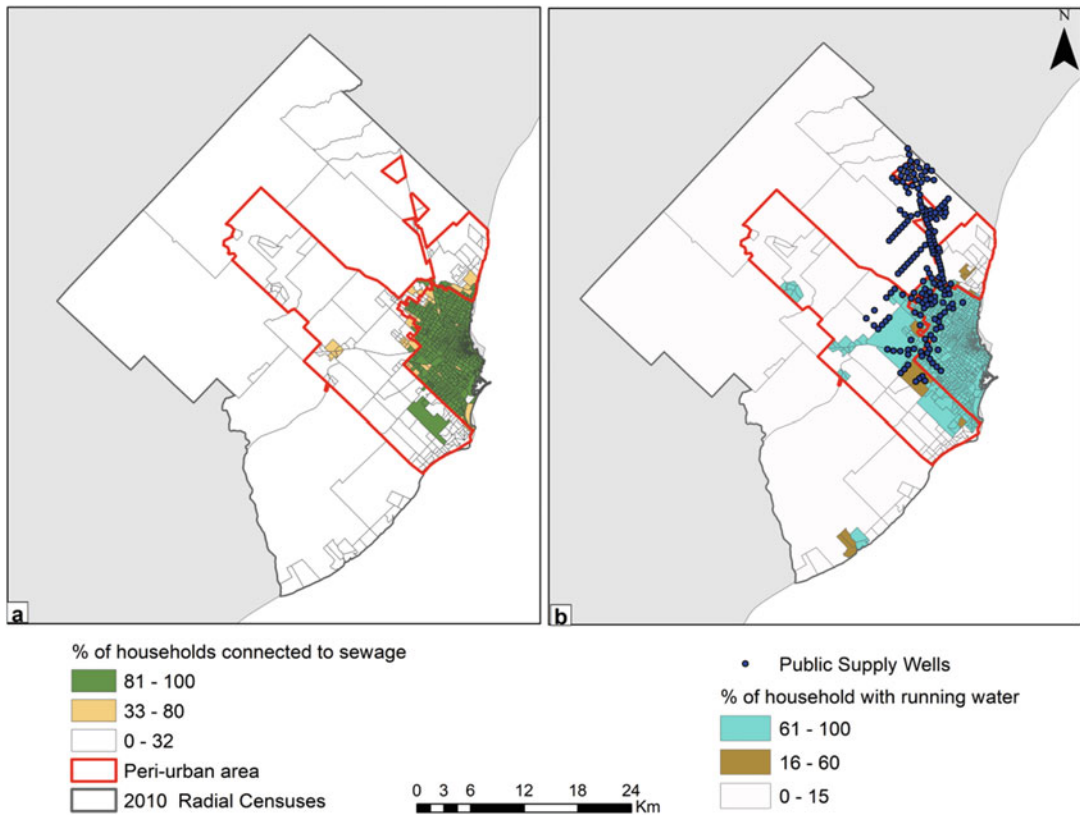


Fig. 16.5 Network water and sewage coverage; (a) % of households with running water; (b) % of households connected to sewage

include a literature review, document analysis (considering international and local institutional documents and national, provincial and local legislation) and semi-structured interviews.

To analyze the gaps between policy and practice, the “what it should be” aspect was reviewed from national and international guidelines (in this chapter, the term “guidelines” is considered in its broader sense, including both recommendations and regulations), while “what it really is” was obtained from previous experiences in Mar del Plata and interview results.

Five stages were developed to achieve the aim of this paper:

Stage 1

Literature review based on:

- (a) Quality of life, sustainability and access to safe water

- (b) Groundwater pollution risk management

Stage 2

Document analysis; the identification, revision and selection of guidelines, which were classified in two groups:

- (a) International agreements related to “ethical” aspects, including the United Nations Declarations and the Argentina National Constitution.
- (b) “Technical” guidelines; these guidelines review the selection of aspects most closely linked to the four stages of pollution risk management chosen for this chapter.

Stage 3

- (a) Design of the interview script was based on the results of the previous stages to detect the

gaps between “what it should be” and “what it really is” in the study area. Several interviews were conducted, including those with the Water Resources Manager and the former President of the local water agency OSSE, the local Director of General Pueyrredon Environmental Management Agency, the President of the Association of Vegetables and Fruit Producers, as well as two senior researchers from the National University of Mar del Plata.

Stage 4

- (a) Qualitative assessment; based on a traffic light code to identify gaps between “what it should be” (policies) and “what it really is” (practice).
- (b) Practical interpretation of Stage (4a) to identify reasons given for emerging gaps using the “representative indicators to measure multi-level governance gaps in water policies” (OECD 2011, p. 79).

Stage 5

- (a) Identification of actions aimed at minimizing the gaps from (4a).

16.5 Quality of Life, Sustainability, Access to Safe Water and Groundwater Risk Management

Quality of life is a complex concept, which embraces multiple facets or dimensions. According to Somarriba Arechavala:

Quality of life is the result of complex interactions of a set of objective and subjective factors: objective factors refer to external conditions of an economic, socio-political, environmental, and cultural nature, while subjective factors refer to individuals’ perception of their own life and the satisfaction reached in its various dimensions (2008, p. 15).

In this sense, quality of life is a multidimensional concept that should be measured

considering different domains or components, such as education, health, employment, dwelling, natural and built environment, gender, income and wealth, community relations, politics and institutions, happiness or satisfaction with life, among others (Tonon and Rodríguez de la Vega 2016; Somarriba Arechavala and Zarazosa Espina 2016).

Throughout history, societies have been transforming nature. However, during the last decades of the twentieth Century, a growing concern about the problems that arise from the disarticulation between society and nature began to take shape.

In 1987, the UN World Commission on Environment and Development published its conclusions in a document entitled “Our Common Future”, also known as the Brundtland Report. This document defined sustainable development as the “development that meets the needs of the present without compromising the ability of future generations to meet their own needs” (World Commission on Environment and Development 1987, p. 16). According to Guimarães (2006, p. 129), this new paradigm revealed “the disappointment against the still dominant model in regards to the distribution of wealth, the reduction of poverty and income inequalities, as well as the environment protection”.

As part of this process, awareness of the environmental aspects of development gradually penetrated the public and political spheres (Guimarães 2003), while a political strategy for the ecological sustainability of the globalization process began (Leff 1998). In 2015, the 2030 Agenda was approved, which contains 17 objectives known as “Sustainable Development Goals” (SDGs). These SDGs replaced the Millennium Development Goals (MDGs) that were adopted in the Millennium Declaration in 2000.

From a Global South perspective, Guimarães (2003) states that to achieve sustainable development, qualitative changes in the quality of life and happiness of people are necessary more than the simple accumulation of goods and services. According to the author, this development style must be: environmentally sustainable in the

access and use of natural resources and in the preservation of biodiversity; socially sustainable in the reduction of poverty and inequality and in promoting social justice; culturally sustainable in the conservation of the system of values, practices and symbols of identity; politically sustainable by deepening democracy and guaranteeing access and participation of all sectors in public decision making; and guided by a new development ethics, one in which the economic objectives of growth are subordinated both to the laws governing the operation of natural systems and to the criteria of respect for human dignity and the improvement of quality of life for current and future generations (Guimaraes 2003). In this sense, the concept of quality of life is directly related to sustainability in its different dimensions.

Access to safe water is, directly or indirectly, part of the components that define quality of life, such as health, dwelling or environment. Contaminated water and poor sanitation can be linked to the transmission of diseases, such as cholera, diarrhea, dysentery, hepatitis A, typhoid or polio, while absent, inadequate or inappropriately managed water and sanitation services expose individuals to preventable health risks (WHO 2019).

Water and sanitation are at the very core of sustainable development, as well as being critical to the survival of people and ecosystems. Moreover, water is intrinsically linked to other sustainable development issues, such as poverty, hunger, health, education, gender inequality, ecosystem integrity, climate change and disasters. In this sense, SDG No 6 seeks to “ensure availability and sustainable management of water and sanitation for all” (UN 2015, p. 21). However, although water occupies a central role in all dimensions of sustainable development, the management of water resources and the provision of water-related services remains far too low on the scales of public perception and of governmental priorities (WWAP 2015), particularly in Global South countries.

Additionally, in recent years, international law has recognized access to safe drinking water and sanitation as a new human right based on the principle of human dignity and water being a

fundamental and indispensable public good for life and the well-being of people (Darcy 2010; Martínez and Defelippe 2013). In this way, the UN Committee on Economic, Social and Cultural Rights, through General Comment No. 15, stated on January 2003, that “an adequate amount of safe water is necessary to prevent death from dehydration, to reduce the risk of water-related disease and to provide for consumption, cooking, personal and domestic hygienic requirements” (2003, p. 1). Later, on July 2010, the UN General Assembly, through Resolution 64/292, formally acknowledged the human right to water and sanitation, declaring that “the right to safe drinking water and sanitation is an essential human right to the full enjoyment of life and other human rights” (2010, p. 9). This recognition is essential because it also incorporates sanitation as an inherent part of this right.

Human activities (Fig. 16.6) have used, from the beginning of organized societies, water as an essential resource for life as well as a waste disposal site. Groundwater contamination is defined according to the WHO as “the introduction into water of any substance in undesirable concentration not normally present in water, e.g. microorganisms, chemicals, waste or sewage, which renders the water unfit for its intended use” (United Nations Educational, Scientific and Cultural Organization [UNESCO] 1992, p. 65). Thus, any activity whereby chemicals or wastes may be released to the environment, either intentionally or accidentally, has the potential to contaminate groundwater. The sources of groundwater contamination are many and varied because, in addition to natural processes, practically every type of facility or structure installed by man and each and every human physical activity may eventually cause ground water quality problems (Zaporozec 2002).

This interaction between nature and society is well represented by the concept of risk, which is evaluated as the interaction between a hazard (the probability that a potential pollutant load is generated and capable of contaminating groundwater) and damage (of the potentially affected population or natural system). Hazard comprises the combination of aquifer vulnerability and

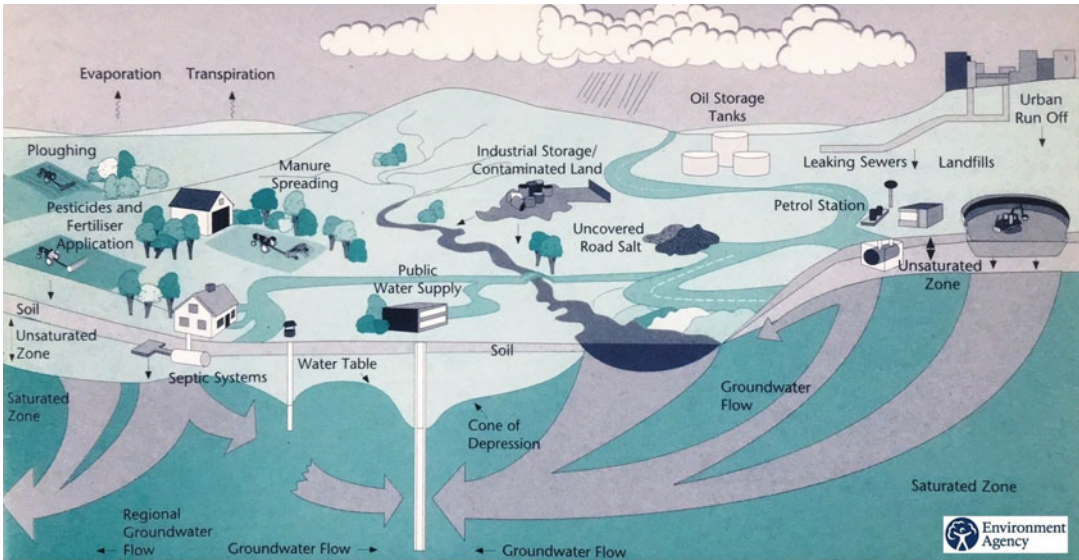


Fig. 16.6 Sources of groundwater pollution. Source: <https://twitter.com/geoscienceea/status/1060826754133188608>

potential pollutant load, while aquifer vulnerability is evaluated from geomorphological variables, potential pollutant load is evaluated from the land use through different ways of establishing rankings (Zaporozec 2002; Foster et al. 2002). Evaluating damage—in economic terms—is always a difficult task when it cannot be quantified in a practical way. In this sense, the assessment of social vulnerability is a way of evaluating how susceptible the population is when exposed to groundwater pollution (Massone and Sagua 2005). Thus, to talk about risk, it is necessary to take into account damage, or indirectly, the vulnerability of the population exposed to the hazard.

Literature on risk management process, in general, present three large groups of actions or stages: previous, during and after the event actions (Burby 1998; Smith 2001; Blaikie et al. 2001). Previous actions involve assessment, prediction and prevention; actions during the event form a warning system, in which one of its essential components is the alarm; and finally, those after the event include aid, rehabilitation, reconstruction or mitigation (Smith 2001).

In this chapter, the first four stages are addressed:

- Assessment

The risk assessment begins by defining which of the natural processes need to be analyzed, assessing its hazard, damage/vulnerability of the exposed population, and finally, combining them to carry out the risk assessment. The aim of the risk assessment is to discriminate territories in the study area, each with a different magnitude of risk, and usually expressed in qualitative labels into high, moderate and low.

- Prediction

Predictions identify what, when and where an event can occur. To perform a predictive pollution analysis, first, it is necessary to develop a conceptual model, which is defined as an intellectual construction that includes the characteristics, processes and elements that are supposed to determine the functioning of a system. This model includes elements related to groundwater flow direction, the geometric characteristics of the aquifer, its relation to surface water and other components of the hydrological cycle, etc. In addition to these attributes, a key element to develop the conceptual model is the source of

the pollution's characteristics, related to: (1) the type of contaminant being considered (conservative or not, etc.) and the environment's physico-chemical characteristics (pH, temperature, redox state); (2) discharge mode (spot, dispersed or linear); (3) position concerning groundwater: if it is on the surface, in an unsaturated zone or in a saturated zone; and (4) the duration of the pollutants' emission (Foster et al. 2002).

- Prevention

Among prevention strategies, there are structural measures and non-structural measures widely used in different activities. The first group contains the correct drilling of the water supply well, while the second includes spatial planning, general guidelines for the well's location, control of the pollutant load, driller's official registration, citizen awareness and effective legislation enforcement. Finally, it is necessary to mention that an essential component of pollution prevention programs is monitoring water quality.

- Warning System

The warning system, particularly the so-called "early warning system", includes four essential elements, including process knowledge, a monitoring and alarm system, communication, dissemination and response capacity. To be effective, an early warning system must be able to stimulate an appropriate response before the event occurs.

To comply with each one of the stages of groundwater pollution risk management (i.e. assessment, prediction, prevention and warning system), it is essential to guarantee access to safe water. In this sense, the authors' point of view on this subject can be summarized into three premises that have addressed the research presented in this chapter:

1. Access to safe water is essential to guarantee an improvement to quality of life and to serve the different dimensions of sustainability (environmental, social and political).
2. All actions aimed at improving the management of groundwater pollution risk have a direct or indirect impact on quality of life and

contribute to reaching sustainable development.

3. The loss of water quality can cause diseases, which means not having access to safe water infringes upon quality of life.

16.6 Identifying the Gaps Between Policy and Practice in the Groundwater Pollution Risk Management Process

To identify the gaps between policy and practice, guidelines proposed by international agencies as well as national, provincial, and local legislation were analyzed. Accordingly, Table 16.1 presents the main technical instruments associated with the stages of groundwater pollution risk management.

Furthermore, international agreements such as the Human Right to Water and Sanitation (2002 and 2010) and the 2030 Agenda (particularly SDG no 6), were taken into account (as was mentioned before) as the broadest framework.

16.6.1 WWAP Water for a Sustainable World

This report illustrates the complex linkages between water and critical areas such as human health, food, and energy security, urbanization, industrial growth, and climate change. It also describes the status of the world's water resources, including an overview of the impacts of unsustainable growth on freshwater resources and suggests possible responses to these challenges (WWAP 2015).

16.6.2 GWP Integrated Water Resources Management Guidelines

Integrated Water Resources Management (IWRM) is a process that promotes the coordinated development and management of water,

Table 16.1 “What it should be”

	Assessment	Prediction	Prevention	Warning system
International	WWAP Water for a Sustainable World (2015)			
	GWP Integrated Water Resources Management Guidelines—Instrument C2.01 Risk Assessment (2016)			
	WHO guidelines for drinking-water quality (items 4.1–4.6) (2017)			
National	Water Policy Guiding Principle no 42 (2003)			
	Law no 27275 “Right To Access Public Information” (2016)			
	Law no 27287 “National Risk Management Law” (2016). Manual for the elaboration of risk maps (2017)			
	Law no 18284 “Argentine Food Code”—Chapter 12: Water-based Beverages, Drinking Water and Carbonated Water (1969)	–	Guiding Principle of Water Policy no 3 (2003)	Water Policy Guiding Principle no 7 (2003)
	Water Policy Guiding Principle no 3 (2003)		Law no 25675 “General Environmental Law”—Article no 2 items g and k + polluter pays principle (2002)	
Provincial	Law no 15063 “Risk” (2018)			
	Law no 12257 “Water Code”—Article no 5 (1999)	–	Law no 11459 “Industrial Establishment Law” (1993)	–
			Law no 11723 “Environment and Natural Resources Protection Law”—Article no 39–44 (1995)	
Law no 12257 “Water Code”—Article no 84 (1999)				
Municipal	–	–	Ordinance no 13231/20000 “Spatial Planning Code”—Chapter 8 (2000)	–
	–	–	Ordinance no 24119 “General regulation of General Pueyrredon’s Sanitary Service” (2019)	–

Source: Own elaboration

land, and related resources to maximize the resultant economic and social welfare equitably without compromising the sustainability of vital ecosystems. The GWP IWRM Toolbox contains knowledge and learning about integrated water resources management (Fábrega et al. 2016). The Assessment item (C2) included in the management instruments (C) helps to understand the connections between water resources and their users, as well as to calculate the impact of uncertain events or policy measures on water and its users. Hence, one of the aspects considered is risk assessment (C2.01).

16.6.3 WHO Guidelines for Drinking-Water Quality

This guideline presents a section dedicated to Water Safety Plans (WSP). The most effective means of consistently ensuring the safety of a drinking-water supply is through the use of a comprehensive risk assessment and risk management approach that encompasses all steps in the water supply, from catchment to consumer. Such approaches are termed “water safety plans.” A WSP has three key components that are guided by health-based targets and are overseen through drinking-water supply surveillance: a system assessment to identify risks; control measures in a drinking-water system that collectively control

identified risks; and management and communication plans (WHO 2017).

16.6.4 National Law No 18284/1969 “Argentine Food Code”: Chapter 12 Water-Based Beverages, Drinking Water and Carbonated Water

The Argentine Food Code is a national law that has established four water categories suitable for human consumption and stipulates the quality standards that each of them must meet. This law not only regulates a series of chemical and bacteriological parameters that these waters must fulfill according to its classification, but also defines and expressly differentiates each one of them.

16.6.5 National Law No 25675/2002 “General Environmental Law”

Furthermore, it establishes appropriate procedures and mechanisms to minimize environmental risks, prevent and mitigate environmental emergencies and recompose damage caused by environmental pollution. It mentions, as an important topic, the prevention of harmful or dangerous effects that anthropic activities generate on the environment to enable the development of ecological, economic and social sustainability. Additionally, a reference to the “polluter pays principle” is made in this law.

Article 2. The national environmental policy must meet the following objectives:

(g) Prevent the harmful or hazardous effects that anthropic activities generate on the environment to enable ecological sustainability, as well as economic and social development.

(k) Establish appropriate procedures and mechanisms to minimize environmental risks, to prevent and mitigate environmental emergencies, and to recompose damage caused by environmental pollution.

16.6.6 Water Policy Guiding Principles

This document provides guidelines that allow for the integration of technical, social, economic, legal, institutional, and environmental aspects of water in modern water resource management (Consejo Hídrico Federal 2003).

No 3: The incorporation of the environmental dimension in water resource management is achieved through the establishment of environmental quality guidelines, development of Strategic Environmental Assessments (SEA) for plans and programs, the implementation of risk and impact assessments, as well as environmental audits for specific projects. Thus, by analyzing environmental vulnerability, it is sought to reduce risk factors and strike a balance between resource use and protection.

No 7: Pollution of water resources requires taking on a comprehensive strategy that involves the definition of differentiated pollutant monitoring and control programs for every basin. These programs must be provided with fixed premises of design and implementation according to the pollutant characteristics that originate from the point and diffuse sources and to the characteristics of the receiving bodies.

No 42: It is essential for better water management to count on financial funding to implement non-structural measures, such as systematic monitoring, spatial planning rules, risk zoning, organizational mechanisms and institutional participation of the involved actors, as well as other additional ways to ensure the management of projects on time.

16.6.7 National Law No 27275/2016 “Right to Access Public Information Law”

This law aims to ensure the effective exercise of the right to access public information, promoting citizen participation and transparency in public management.

Article 2: The right to access public information includes the possibility to search, access,

request, receive, copy, analyze, reprocess, reuse and redistribute the information freely, with only limitations and exceptions outlined in this law.

16.6.8 National Law No 27287/2016 “National Risk Management Law”. Manual for the Elaboration of Risk Maps

This regulation aims to integrate and coordinate actions between various national bodies, provincial and non-governmental organizations, municipalities, and citizens in a situation of risk and catastrophe. The manual for the elaboration of risk maps presents a methodology that responds to basic planning needs and that respects the spirit of this law (Renda et al. 2017).

16.6.9 Provincial Law No 11459/1993 “Industrial Establishment Law”

This law states that industries in the Buenos Aires province must have an Environmental Aptitude Certificate (CAA) as a mandatory requirement for municipal authorities to grant corresponding industrial habilitation.

16.6.10 Provincial Law No 11723/1995 “Environment and Natural Resources Protection Law”

This law aims to protect, conserve, improve, and restore natural resources and the environment in the Buenos Aires province to preserve life in its broadest sense, ensuring present and future generations of the conservation of environmental quality and biological diversity. Chapter I of Title III refers to water, establishes the principles that govern the implementation of policies for the protection and improvement of water resources, as well as the tasks of the application authority. It also refers to the Environmental Information

System, where studies related to the quality and evolution of the resources should be published.

16.6.11 Provincial Law No 12257/1999 “Water Code”

Article 5: The Water Authority must conduct hydrological planning that satisfy water demands, balancing and juggling regional and sectorial development. Moreover, this plan will be developed and implemented for the comprehensive improvement of flooded areas, the defense against floods and droughts, and the prevention of soil degradation.

Article 84: Soil or subsoil perforations and any groundwater catch-work should not contaminate aquifers directly or indirectly, nor should pollution harm third parties. The Water Authority may recommend or limit the diameters, depths, volumes and flows, as well as the installation of suitable devices that allow for the measurement of water levels and low rates extracted, the systems of development of new wells and the distances between other wells and water bodies.

16.6.12 Provincial Law No 15063/2018

This is a provincial law that adheres to the National Risk Management Law (27287/2016).

16.6.13 Ordinance No 13231/2000 “Spatial Planning Code of General Pueyrredon”

This is the main spatial planning instrument in General Pueyrredon, which physically organizes the territory and structures it into areas, sub-areas, zones and districts. Chapter 9 refers to environmental conditions and includes liquid and gaseous effluents, solid and semi-solid waste, and annoying vibrations and noise from residential, commercial, industrial, and service activities.

16.6.14 Ordinance No 24119/2019 “General Regulation of General Pueyrredon’s Sanitary Service”

This establishes the norms that govern the water, sewerage and drainage public services in charge of OSSE, as well as other services that are its competition.

16.7 Identifying Gaps

As explained in the Methods Section, an assessment of the guidelines was made, considering the reality of the study area, which emerged from the interviews performed by qualified informants. Furthermore, a traffic light code was used to show this assessment (Table 16.2). The red color implies the most critical gaps (the implementation of “what it should be” is not satisfactory), while the green color implies that there are no gaps or that they are not identifiable because of the scale of this research. The yellow color implies that the existence of gaps is clear but of less magnitude than the red category.

Based on this evaluation, it is possible to identify eight guidelines with a red category (significant gaps), six with a yellow category and five with a green category, where gaps have not been identified because of the scale of this research.

16.8 Discussion and Conclusions

While it is usual to find gaps between policy and practice in any type of public policy, with the social, economic, and political context of Global South countries, and particularly in intermediate cities, this problem is magnified. This chapter systematized, identified and valued the gap between policy and practice in an intermediate city of the Global South in the management of groundwater pollution risk. It also aids in thinking of the management process as an essential component of local, sustainable development and as a means to contribute to the population’s quality of life from access to a safe water perspective.

This chapter primarily addressed the political dimension of sustainable development and its relationship to quality of life through the analysis of 19 international, national and local guidelines and laws. Most of these refer to the pollution prevention stage, while 50% of them present gaps in their implementation in the city of Mar del Plata. The prediction stage is the least mentioned in the analyzed guidelines.

The causes that explain the gaps identified are attributed to deficiencies in the governance of water, which is understood as the social capacity to mobilize energies and to achieve the sustainable development of water resources. This definition includes the ability to design public policies that are socially accepted, geared to the sustainable development of water resources, and to enforce their implementation by the different actors involved (Peña and Solanes 2002). To systematize the reasons for the identified gaps, representative indicators were used to measure multi-level governance gaps in water policies (OECD 2011). The identified gaps were generally multi-causal and within these causes, it was possible to identify the following categories:

Political reasons: unclear allocation of roles and responsibilities. In the study case, water authorities included the Provincial Water Authority (ADA), OSSE and the Municipality of General Pueyrredon; outdated normative (the Spatial Planning Code does not cover any of the risk assessment stages, it only includes a reference to effluents discharge); incomplete normative (National Law No 27287 and No 15063 do not contemplate the risk of groundwater pollution; instead, it is targeted to emergency procedures. Similarly, risk map methodologies do not include the groundwater risk of pollution); and absent normative (SEA is not regulated by any law in Argentina).

Administrative reasons: mismatch between hydrological and administrative boundaries. No integrated strategy for basin monitoring, which includes aspects related to the physical and social environment (water-related diseases).

Information reasons: asymmetries of information. A standardized and accessible groundwater data platform is not available at any level (national, provincial, or local).

Table 16.2 “What it really is”

	Assessment	Prediction	Prevention	Warning System	
International	GWP Integrated Water Resources Management Guidelines - Instrument C2.01 Risk Assessment (2016) + WWAP WATER FOR A SUSTAINABLE WORLD (2015)				
	Guidelines for drinking-water quality (items 4.1 to 4.6) OMS (2011)				
National	Law N° 27287 "National Risk Law" (2016). Manual for the development of risk maps (2017).				
	Law N° 27275 “Right To Access Public Information”(2016)				
	Guiding Principle of Water Policy N°3 (2003)			Guiding Principle of Water Policy N°3 (2003)	Guiding Principle of Water Policy N°7 (2003)
				Law N° 25675 "General Environmental Law" - article n°2 item k (2002)	
				Law N° 25675 "General Environmental Law" - article n°2 item g (2002)	
Law N° 18284 "Argentinean Food Code" - Chapter XII WATER DRINKS, WATER AND CARBONATED WATER (1969)			Law N° 25675 "General Environmental Law" - polluter pays' principle (2002)		
Guiding Principle of Water Policy N°42 (2003)					
Provincial	Law N° 12257 "Water Code" - article n°5 (1999)		Law N° 11723 - article 39 to 44 (1995)		
			Law N° 12257 "Water Code" - article n°84 (1999)		
			Law N° 11459 "Industrial Establishment Law. "Certificate of Environmental Aptitude (1993-modified by Law N° 15107/19)		
Law N° 15063 "Risk" (2018)					
Municipal			Land-use Planning Code - Chapter 8 (1988)		
			Ordinance N° 24119 "General regulation of General Puerredon's Sanitary Service" (2019)		

(Source: Own elaboration)

Table 16.3 Adjustment actions

Assessment	Prediction	Prevention	Warning system
Establish municipal regulations to promote groundwater management from cross-sectoral working groups ^a			
Implement protocol for the generation of risk maps (National Law No 27287), adapting them to the case of groundwater pollution ^b			
Strengthen monitoring from an integrated point of view and implement a public information system ^b			
Generate an environmental and hydrologic information system that is properly updated, publicly accessible and serves to optimize the provincial hydrological information system ^b			
Reconcile productive activities with groundwater availability and quality proposed by integrated groundwater management ^a	Improve knowledge of the local hydrological system functioning to optimize the existing conceptual model ^b	Implement SEA for programs and projects ^a	Implement a communication strategy between technicians and citizens to identify problematic situations regarding the quality of consumption water ^b
		Standardize the assessment of water pollution risks and increase awareness activities ^a	
Implement SEA for programs and projects ^a	Deepen the bond between stakeholders and local universities to generate groundwater flow models and the transport of potential contaminants ^b	Strengthen control capacity by local authorities. Encourage producers to certify products and/or processes as environmentally sustainable ^a	
		Contemplate, in the territorial planning code update, groundwater management and territorial planning based on risk of pollution assessment ^b	
		Implement home micro-metering of water consumption ^a	

^aSecond priority

^bFirst priority

Capacity reasons: lack of technical capacity, staff, time, knowledge and infrastructure. Poor capacity of control in both provincial and local levels. No standardized application of the contaminant transport models, as well as no household consumption micro-metering in a large part of the General Pueyrredon district. Furthermore, there is no groundwater contamination risk map for the General Pueyrredon District.

Funding reasons: water policies are implemented in a typical Global South economic environment of resource shortages, cyclical economic and social crises, and a large number of social deficiencies that need to be resolved.

Accountability reasons: citizen organization and participation exists only on the initiative of the potentially affected population (except for the

EIA, public hearing mechanisms are regulated and mandatory).

Based on this research, adjustment actions that would allow reducing the gaps between “what it should be” and “what it really is” were proposed for the study area (Table 16.3).

Actions were graded based on its implementation priority, even though all of these actions are essential, they were divided into two groups to assist stakeholders in the decision-making process:

Actions identified as first priority were those that are more feasible to develop (from both technical requirements and human resources). Besides, they are more directly linked to the connection between quality of life and groundwater pollution risk management.

Actions identified as second priority were more complex to implement (from both technical requirements and human resources), require an adjustment process and a medium-long-term vision of the state agencies responsible for implementing them.

The social, economic, and political reality of the Global South countries, coupled with the complexity of the peri-urban areas of intermediate cities, make the water management processes and, consequently, the desire to improve quality of life, confront a situation that makes decision-making difficult: the existence of abundant regulations or policies, but of difficult implementation, in the territory.

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Exploring the Association Between Health Disparities and Neighborhood Characteristics: The Case of Diabetes Mortality in DeKalb and Fulton Counties, Georgia

17

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17.1 Introduction

Globally, non-communicable diseases (NCDs), also known as chronic diseases, are on the rise. These diseases are generally characterized by long duration and are associated with a combination of genetic, physiological, environmental, and behavioral factors. Among the primary types of NCDs are cardiovascular diseases, cancers, chronic respiratory diseases, and diabetes. NCDs disproportionately affect residents of low- and middle-income countries with 32 million or more than three quarters of global NCDs occurring therein (WHO 2018a).

The third of the United Nations Sustainable Development Goals (SDGs) focuses on good health and well-being. Ensuring healthy lives and well-being across the life course is critical to achieving sustainable development. The rise in prevalence of NCDs such as diabetes can impede progress toward the United Nations' 2030 Agenda for Sustainable Development. Targets associated with SDG 3 include a goal of reducing pre-mature mortality from non-communicable

diseases by one-third by the year 2030 through prevention, treatment, and the promotion of mental health and well-being (United Nations 2015). Another key strategy includes increasing the capacity of all countries, particularly developing nations, for early warning, reduction of risk and management of national and global health risks (United Nations 2015).

The rise in NCDs is associated with rapid, unplanned urbanization as well as aging and the globalization of unhealthy lifestyles. Unhealthy diets and lack of physical activity contribute to unhealthy lifestyles and have been associated with the conditions in which people are born, live, and grow up in. Income level, and specifically, poverty is highly associated with NCDs. The rapid increase in prevalence of NCDs is expected to threaten poverty reduction and eradication efforts in low-income countries because of rising costs associated with household health care expenditures. In the context of NCDs, socially and economically disadvantaged populations get sicker and die sooner than less vulnerable groups and have less access to health services. Individuals' quality of life and years of healthy life lived are thereby greatly impacted in affected groups. In addition, the often lengthy and expensive treatment required to combat NCDs can result in loss of household income earners and force millions of individuals into poverty on an annual basis and stagnate development (WHO 2018b).

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Although the United States is not a low- or middle-income country, health disparities also impact vulnerable populations therein. They lead to poor health that can result in increased medical expenditures and perpetuate the cycle of poverty. Disparities exist for many health outcomes including cancer, diabetes, and cardiovascular disease (Gee and Payne-Sturges 2004). Minority and disadvantaged neighborhoods in the United States tend to have higher rates of mortality and morbidity for many health outcomes. Racialized residential segregation is believed to play an important role in producing and maintaining health disparities (Sexton et al. 1993; Thomas and Quinn 2008).

Health disparities refer to preventable, unfair and unjust differences in health outcomes and health determinants of different subpopulations often defined by race, ethnicity, gender, socioeconomic status and location of residence (Braveman and Gruskin 2003; Mensah et al. 2005; Meyer et al. 2013). Despite gains in medical technology and improved access to medical care, health disparities are growing between advantaged and disadvantaged groups (Corburn 2005). According to the National Institutes of Health (NIH), residents of minority neighborhoods continue to have lower socioeconomic status, greater barriers to health care access and greater risks for diseases than the general population (Meyer et al. 2013).

By 1980, average life expectancy in the U.S. had reached 74 years, but minorities who represented 25% of the U.S. population experienced health disparities including higher rates of diabetes (NIH 2015).

In the United States (U.S.), these disparities were first identified in published literature by the U.S. Department of Health and Human Services (1985). As is the case with other chronic diseases, minorities bear a disproportionate burden of the diabetes epidemic. They have higher prevalence rates, higher rates of complications and worse diabetes control (Peek et al. 2007).

In terms of diabetes-related complications, Blacks, specifically, have two to four times the rate of renal disease, blindness, amputations, and amputation-related mortality of Whites (Lanting

et al. 2005; Peek et al. 2007). In addition, Blacks are more likely to have co-morbid hypertension (Miller et al. 2004). In 2010, Blacks in the United States had a higher diabetes death rate at 28.8 in comparison to 22.1 in Whites (Murphy et al. 2013). In 2013, Blacks still experienced higher death rates from diabetes at 30.6 in comparison to 23.6 for Whites (CDC 2015).

Poor health status, disease risk factors and limited access to healthcare have been reported among minorities. The conditions in which persons live can also explain why certain populations are less healthy than others (Meyer et al. 2013). Neighborhoods with the worst health problems and premature death also experience a number of social inequalities including lack of basic services, high poverty rates, residential segregation and high air pollution rates (Corburn 2005).

Place-related inequities including residential segregation, community unemployment, crime, urban disinvestment and environmental injustice act as social determinants of health that explain health disparities (Corburn 2005; Diez Roux and Mair 2010; Fitzpatrick and LaGory 2000). Furthermore, the mapping of the human genome has confirmed that genetics does not explain health differences among any ethnic group (Goodman 2000).

This chapter analyzes diabetes mortality by race and identifies socioeconomic factors of neighborhoods associated with the distribution of diabetes mortality in DeKalb and Fulton Counties in the state of Georgia. With diabetes mortality data from the years 2013 to 2017, obtained from the Georgia Division of Public Health, Office of Health Information and Policy, we mapped the diabetes mortality by geographic census tracts and identified different concentration patterns of diabetes mortality between Whites and Blacks. Results from this study may assist local and state government officials as well as non-profit service providers in identifying populations at risk, allocating limited resources efficiently, and implementing preventive measures in geographic areas of need.

17.2 Health Disparities in Diabetes

Diabetes mellitus (diabetes) is a chronic disease and global health concern. Its prevalence has been rising rapidly in middle- and low-income countries for decades. The number of people with diabetes worldwide increased from 108 million in 1980 to 422 million in 2014 (WHO 2018c). Furthermore, the global prevalence of diabetes among adults aged 18 years old and older rose from 4.7% to 8.5% in this same time period. The World Health Organization estimates that diabetes was the seventh leading causes of death globally in 2016 with an estimated 1.6 million deaths caused directly by diabetes. While not associated directly with diabetes, in 2012, 2.2 million deaths were attributed to high blood glucose levels. Nearly half of all deaths, worldwide, attributed to high blood glucose levels occur before the age of 70 years old (WHO 2018c).

Diabetes affected an estimated 30.3 million people of all ages, or 9.4% of the U.S. population in 2015. It affects the ability of the pancreas to produce insulin, the hormone that is vital to the function of the human body due to its role in it helping to regulate glucose levels in the blood. The flow of insulin enables the body to get the energy it needs to carry out daily activities (GA DPH 2018). If left untreated, having diabetes can result in serious, costly, life-threatening illnesses including heart disease, renal failure, stroke, and peripheral vascular disease (PVD), as well as lower extremity amputations, nerve damage, skin infections and disorders, and vision damage (ADA 2019; GA DPH 2012). Key modifiable risk factors for Pre-diabetes and Type 2 diabetes, the preventable forms of the disease, include lack of physical activity, hypertension, high or abnormal cholesterol, being overweight or obese, and eating high fat, high sugar diets (CDC 2019a, b; GA DPH 2012).

Diabetes was the seventh leading cause of death in the U.S. in 2013 based on the 75,578 death certificates in which diabetes was listed as the underlying cause of death. In 2010, diabetes was also the seventh leading cause of death with a

lower number of death certificates (69,071) listing the disease as a cause of death. The direct cost of medical care attributed to diabetes management and treatment is approximately \$176 billion annually (CDC 2014). Diabetes may be underreported since many studies found that only about 40% of people with diabetes who died had diabetes listed anywhere on the death certificate (CDC 2014). CDC reports also indicate that among those with diabetes, many are undiagnosed (CDC 2017).

Among people in the United States aged 20 years or older with diagnosed diabetes in 2010–2012, American Indians had the highest prevalence at 15.9%, followed by non-Hispanic Blacks at 13.2% and Hispanics at 12.8% (CDC 2014). The SEARCH for Diabetes in Youth Study (SEARCH Study) reported that non-Hispanic Blacks had the highest incidence rate of new cases of diabetes among people younger than 20 years old in 2008–2009 (CDC 2014). Other published findings from the SEARCH Study also indicated that 60–70% of African American and American Indian Youth with type 2 diabetes come from low-resourced homes (Hamman et al. 2014).

Nelson (2002) reported that racial and ethnic disparities in health care existed even when insurance status, income, age, and severity of conditions are comparable. The racial and ethnic disparities in health care cause disparities in health outcomes including diabetes. A low quality of care received by minorities is also an important contributing factor to diabetes disparities (Betancourt et al. 2012; Peek et al. 2007). Furthermore, racial and ethnic disparities in the treatment and management of diabetes contribute to diabetes disparities (Betancourt et al. 2012; Correa-de-Araujo et al. 2006).

Some studies also found other contributing factors to diabetes disparities including family history of diabetes and biological factors (Elbein 2009; O’Rahilly et al. 2005) as well as differences in health behavior (Knecht et al. 1999; Schultz et al. 2005). Socioeconomic factors such as lower levels of education and lower socioeconomic status also have impacts on diabetes disparities (Betancourt et al. 2012; Gaskin et al. 2014).

The minority population in the U.S. will grow to become more than half of the U.S. population by 2060, compared with only 38% in 2014 (Colby and Ortman 2015). The U.S. Census Bureau reported that of the more than 20 million children under age five (5) living in the U.S in 2014, 50.2% of the, were minorities (Wazwaz 2015). The NIH has an established research agenda to address the increasing health needs of minority populations. Eliminating health disparities, including in diabetes prevalence, is a priority for the agency (NIH 2015).

According to the Behavioral Risk Factor Surveillance System (BRFSS), the prevalence of diabetes in adults in the state of Georgia (9.7%) was slightly higher than the national average (9.2%) in 2010 (CDC 2011; DPH 2012). From 2000 to 2010 there was a 43% increase in diabetes prevalence among Georgia adults from 6.8%, affecting 395,808 adults to affecting 712,203 adults at 9.7%. From 2008 to 2010, the prevalence of diabetes in non-Hispanic Blacks was significantly greater (12.8%) than that of non-Hispanic Whites (8.4%) (DPH 2012). From this same time period, diabetes prevalence was significantly greater in Georgia adults who did not complete high school when compared to Georgia adults with higher levels of education. In fact, Georgia adults who did not graduate from high school had a diabetes prevalence that was 2.4 times higher than that of college graduates in the state. The prevalence of diabetes also increased as household income levels decreased (DPH 2012).

17.3 Neighborhood Risk Factors for Diabetes

Characteristics of places such as income distribution, population or absence of public facilities can be pathogenic exposures that contribute to cumulative disadvantage for some social groups who experience chronic discrimination by gender or race/ethnicity (Krieger 2001; LaVeist et al. 2011). Individual socioeconomic factors and physical characteristics of places are closely related and affect health disparities (Corburn 2004).

Neighborhoods with high exposure to unhealthy foods, fewer opportunities for physical activity, and heightened risk of becoming obese are likely to develop diabetes (Swinburn et al. 2011). Residents in areas that are more walkable are less likely to be obese (Berke et al. 2007; Feng et al. 2010; Frank et al. 2004). Obesity is one of the modifiable risk factors of diabetes. Areas with low walkability are more likely to be characterized by high obesity and diabetes prevalence rates than areas with high walkability.

Booth et al. (2013) found residents living in less walkable areas have an accelerated risk of developing diabetes compared with those living in more walkable areas. The built environment poses barriers to residents, particularly those who are low-income, to engage in diabetes preventive measures such as physical activity, healthy eating, and weight loss.

A growing body of literature suggests that neighborhood features that discourage physical activity as well as risk factors for diabetes such as physical inactivity, insulin resistance and obesity are highly associated with each other (Auchincloss et al. 2008; Berke et al. 2007; Feng et al. 2010; Frank et al. 2004; Papas et al. 2007). Auchincloss et al. (2008) found that neighborhoods with poor resources for physical activity and healthy nutrition are associated with higher diabetes rates.

Gaskin et al. (2014) investigated the role of neighborhood poverty and racial composition on disparities in diabetes. They found that living in a poor neighborhood increased the odds of having diabetes for Blacks and poor Whites. They argued that place matters for Blacks and poor Whites. Poor Black neighborhoods are likely to have higher diabetes rates because of limited access to a supermarket or large grocery store and limited walkability (Gaskin et al. 2014).

La Veist et al. (2008) and (2011) compared disparities in diabetes in urban low-income neighborhoods and found that racial disparities in diabetes disappeared when Whites and Blacks resided in the same low-income neighborhoods. Disparities in diabetes stem from differences in the health risk environment. They argue that policies must aim to address the differing

resources of neighborhoods and improve the underlying conditions of health for all. Ludwig et al. (2011) investigated the prevalence of diabetes among residents who moved from low-income neighborhoods to neighborhoods with a lower level of poverty. They found that the opportunity to move to a better neighborhood was associated with modest reductions in the prevalence of diabetes.

Chen et al. (2013) conducted a population-based cohort study in Ontario, Canada that investigated the association between long-term exposure to ambient PM_{2.5} and the incidence of diabetes. They attempted to confirm laboratory findings that fine particulate matter can activate pathophysiological responses and induce insulin resistance and type 2 diabetes (Hotamisligil 2006; Sun et al. 2009). Chen et al. (2013) found that long-term exposure to PM_{2.5} was associated with an increased risk of incidence of diabetes after controlling for various individual and neighborhood covariates. Their study also found that being overweight or obese did not increase susceptibility to the effects of air pollution on diabetes.

17.4 Study Methods

17.4.1 Study Area

The study area is defined by Fulton and DeKalb Counties in Georgia. While DeKalb County is primarily a suburban county, a significant portion of Fulton County represents Metropolitan Atlanta's urban core. Fulton County is the state of Georgia's most populous county with over 1 million residents, 44.1% of them whom were Black in 2013–2017 (Neighborhood Nexus 2019b). The City of Atlanta is the county seat for Fulton County. Approximately 90% of the City of Atlanta is located in Fulton County, and the other 10% is in neighboring DeKalb County. In addition to the City of Atlanta, 14 other municipalities are located in Fulton County. Fulton County has an overall 14.2% poverty rate. Furthermore, based on a 6-year average from 2012–2016, 25.8% of its Black population lived below the poverty level (Neighborhood

Nexus 2019b). The City of Atlanta, Fulton County's biggest city, ranks as the worst city in income inequality in the United States (Foster and Lu 2018).

DeKalb County is Georgia's fourth highest populated and most diverse county. In 2013–2017 the county had 736,066 residents, 55.6% of whom were Black (Neighborhood Nexus 2019a). It is comprised of 13 cities, including the City of Atlanta and its county seat, Decatur. DeKalb is largely a suburban county, but it is a part of the Atlanta-Sandy Springs-Roswell Metropolitan Statistical Area (MSA). DeKalb County's overall poverty rate from 2013–2017 was 17.6% which included 20.3% of the County's Black residents (Fig. 17.1).

17.4.2 Data Sources

The geographical unit of analysis for this study is the census tract. There are 347 census tracts in the study area including 144 census tracts in DeKalb County and 203 in Fulton County. The data used in this study includes diabetes incidence and mortality as well as demographic and socioeconomic data for neighborhoods in DeKalb and Fulton Counties, from 2013–2017. The diabetes mortality data used in this study was obtained from the Georgia Division of Public Health, Office of Health Information and Policy. Demographic and socioeconomic data for neighborhoods in DeKalb and Fulton Counties were retrieved from the United States Census Bureau website (2018a, b).

The data were collected at the geographical unit of the census tracts from the American Community Survey 5-year data set (2013–2017). The demographic and socioeconomic data including the proportion of African Americans or Blacks (Table B02001), the proportion of people living at or below poverty level (S1702), the proportion of people without high school diplomas, the proportion of unemployed people, the proportion of people working at night, the proportion of people walking and biking to work (S0801), the proportion of households lacking a kitchen, the proportion of overcrowded households, the proportion

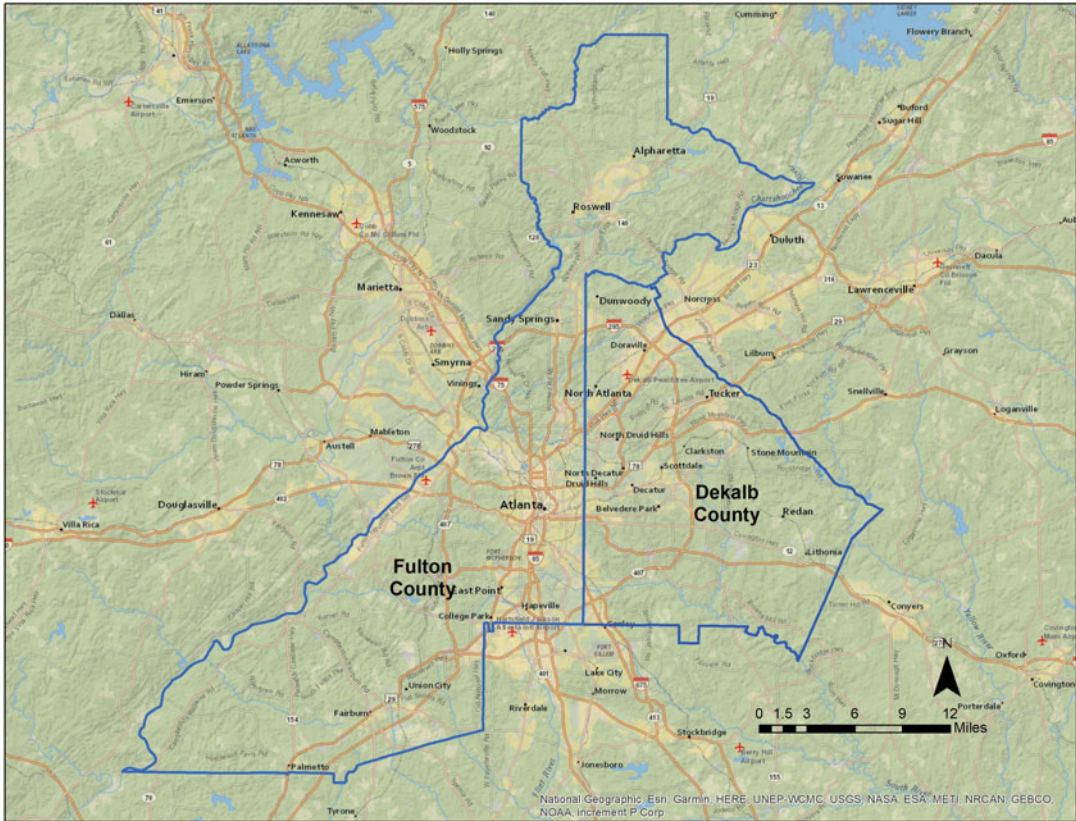


Fig. 17.1 Orientation map of DeKalb and Fulton Counties, GA (Source: ESRI (2019) and U.S. Census Bureau (2019a))

of people speaking English at a less than proficient level, and the proportion of people without health insurance (B27001).

17.4.3 Procedures

This study investigates health disparities of diabetes by race, particularly Whites and Blacks, from 2013 to 2017 in Georgia's DeKalb and Fulton Counties by mapping the incidence of diabetes mortality to geographic census tracts and by relating to demographic and socioeconomic factors. We used ArcMap 10.6, a Geographic Information Systems software product created and developed by the Environmental Systems Research Institute (ESRI). Diabetes mortality data for DeKalb and Fulton Counties, Georgia reported by the Georgia Division of Public Health, Office of Health Information and

Policy was used to construct an index for the rate of diabetes mortality for Whites and Blacks by census tract, and identify census tract variables that correspond to the diabetes mortality rates by race.

We developed nine (9) exploratory variables that we hypothesized to be associated with diabetes mortality rates. The correlation matrix of the variables shows that the variables are highly correlated with diabetes mortality. In order to deal with the high correlations among these variables, we used principal components analysis with quartimax rotation and Kaiser normalization to determine a fewer number of factors that are then used in the analysis.

The number of diabetes mortality by census tracts are then divided by the total number of diabetes mortality in DeKalb and Fulton Counties. The proportion of the diabetes mortality of Whites and that of blacks are the dependent

variables in this study. This study hypothesizes that different concentration patterns of diabetes mortality between Whites and Blacks are associated with spatial factors which may explain the persistence of health disparities between Whites and Blacks.

17.5 Results

17.5.1 Diabetes Mortality Rates by Census Tracts

The diabetes mortality data from the Georgia Division of Public Health, Office of Health Information and Policy show that the total number of diabetes deaths in DeKalb and Fulton Counties was 1497 during the period from 2013 to 2017. Blacks had the highest diabetes mortality rates (1125) followed by Whites (338) and other races (34). According to the 2017 American Community Survey, Blacks accounted for 54.0% and 44.1% of the total population of DeKalb and Fulton Counties respectively.

The census tract that has the most diabetes mortality incidence is census tract 105.10 of Fulton county (19). The census tracts with the second highest number of diabetes mortality are census tracts 81.02 and 82.01 of Fulton county (18). Census tract 105.10 in Fulton county is located South of Union City in the southwestern part of Fulton County. This area was characterized by a very high proportion of Black residents, unemployed people, and a very low median household income. The 19 diabetes mortality incidences in this census tract include 16 Blacks and three (3) Whites.

Census tract 81.02 and 82.01 of Fulton county are two neighboring census tracts located West of the Fulton County Airport, in the central part of Fulton County. Census tract 81.02 was characterized by a very high proportion of Black residents, people living below the poverty level, people without health insurance, people working at night, unemployed people, people without a high-school diploma, and a very low median household income. Similarly, census tract 82.01 was characterized by a very high proportion of

Black residents, unemployed people, and a very low median household income. All of the diabetes mortality incidences in both census tracts were in Black residents.

Meanwhile, the census tracts in DeKalb County that had the highest diabetes mortality incidence were census tracts 234.18, 233.10 and 235.06. Each of these three census tracts had 16 diabetes mortality cases. Diabetes mortality incidence in census tract 234.18 included 15 Black residents and one White resident. Diabetes mortality incidences in both census tracts 233.10 and 235.06, however, were in Black residents solely.

Census tracts 234.18 and 235.06 are two neighboring census tracts in or near the southeastern part of DeKalb County. Census tract 234.18 is located in the intersection of I-20 and I-285 in the central part of DeKalb county. These three census tracts were characterized by a very high proportion of Blacks, people living below poverty level, people without health insurance, people working at night, unemployed people, people without a high-school diploma, and a very low median household income.

The diabetes mortality data from the Georgia Division of Public Health, Office of Health Information and Policy shows that census tracts 78 and 44 in DeKalb County did not report any diabetes mortality for Whites and Blacks respectively. Meanwhile, no diabetes deaths were reported in census tracts 121 and 80 in Fulton County for Whites and Blacks respectively. The diabetes mortality rates by census tracts range from 0 to 8 for Whites and 0 to 18 for Blacks. The geographical distribution of diabetes mortality for Whites and Blacks in DeKalb and Fulton Counties are presented in Figs. 17.2 and 17.3 respectively.

The T-test analysis shows that diabetes mortality rates by census tracts in DeKalb and Fulton counties during the period from 2013 to 2017 between Blacks and Whites are significantly different with a p value ≤ 0.001 . The spatial statistical tests reveal that the locations of mean center and standard deviational ellipses of the diabetes mortality rates of Whites and Blacks are different as presented in Fig. 17.4.

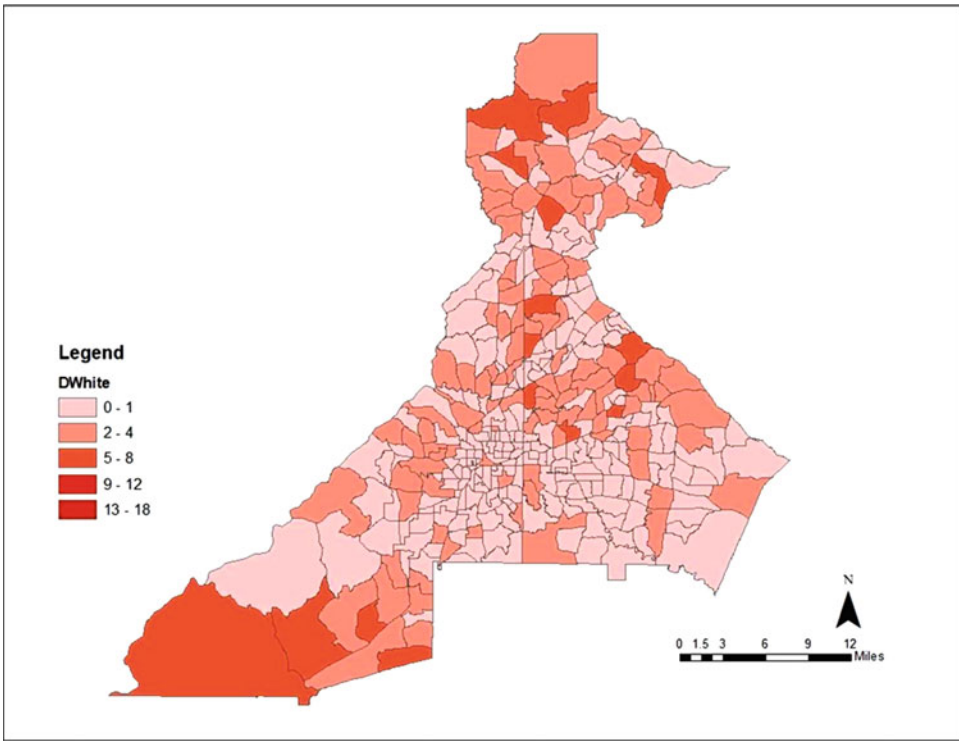


Fig. 17.2 Diabetes mortality of whites in 2013–2017 (Source: Georgia Division of Public Health, Office of Health Information and Policy (2019) and U.S. Census Bureau (2019a))

17.5.2 Neighborhood Factors Associated with Diabetes Mortality

Table 17.1 shows the results of principal components analysis. The results suggest that two factors adequately summarize the data and explain 60.6% of the variance of the original set of independent variables. The first factor, which explains the largest proportion of variance (46.2%), is labeled for ease of reference ‘deprivation’. There are seven (7) variables that are loaded on this factor. Census tracts with a high score on this factor represent areas with a high concentration of Blacks, people below poverty level, people without health insurance, people working at night, unemployed people, and people without high school diploma. These census tracts are also characterized by a low median household income.

The second factor, which is named ‘physical activity’, explains 14.4% of the variance in the

model. Census tracts with a high score on this factor are characterized by a high concentration of people walking and biking to work. These two factors were then used as the independent variables for further analysis in the study.

Ordinary least squares regressions were used to identify factors associated with the diabetes mortality rates of Whites and Blacks in DeKalb and Fulton Counties. Table 17.2 shows the result of the regression analysis for diabetes mortality of Whites. Physical activity is the strongest predictor of the rate of diabetes mortality for Whites. The areas with high rates of people walking and biking to work are significantly related to producing less diabetes mortality among Whites. The regression analysis reveals that the rate of diabetes mortality for Whites is not significantly associated with deprivation.

Table 17.3 presents the result of the regression analysis for diabetes mortality among Blacks. All two factors including deprivation and physical activity are significantly associated with the rate

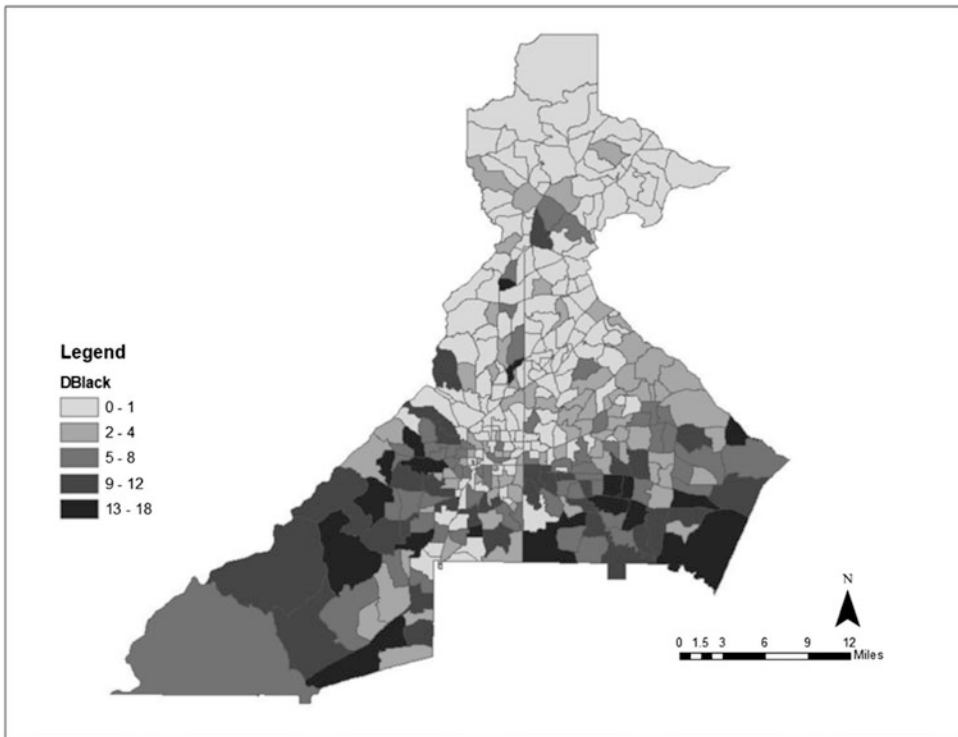


Fig. 17.3 Diabetes mortality of blacks in 2013–2017 (Source: Georgia Division of Public Health, Office of Health Information and Policy (2019) and U.S. Census Bureau (2019a))

of diabetes mortality among Blacks. As expected, the factor of deprivation also indicates the low socioeconomic status is the strongest predictor of the diabetes mortality rate for Blacks. The rate of diabetes mortality for Blacks is significantly and positively associated with deprivation and negatively associated with physical activity.

17.6 Discussion

The T-test and spatial statistical tests conducted reveal significant differences along racial lines for diabetes mortality in the study area. The mean of diabetes mortality for Blacks (4.03) was more than two times higher than that of Whites (1.66). The hot-spot analyses also revealed differences in the concentration and density of diabetes mortality between Blacks and Whites as presented in Fig. 17.5. In this figure the orange and red colored census tracts represent hotspots or clusters of statistically significant high values. The grey and

blue colored census tracts represent cold spots or clusters of statistically significant low values. The darker the color of the census tract, the greater the confidence level (ranging from 90 to 99%). White colored census tracts represent those for which the results were not statistically significant.

Hot spot spatial analysis is a tool used to detect statistically significant hazard clusters using the Getis-Ord GI^* statistic. Using this methodology, a z-score is returned for each feature in the dataset. The p-values and z-scores that result from this type of analysis help to identify locations in which high or low values are spatially clustered. When considering statistically significant positive z-scores, the larger z-scores correspond to more intense clustering of high values (hotspots). Cold spots are identified when considering statistically significant negative z-scores. In this context, the smaller the z-score, the more intense the clustering of low values.

In the study area, high values for diabetes mortality in Black residents are clustered in the

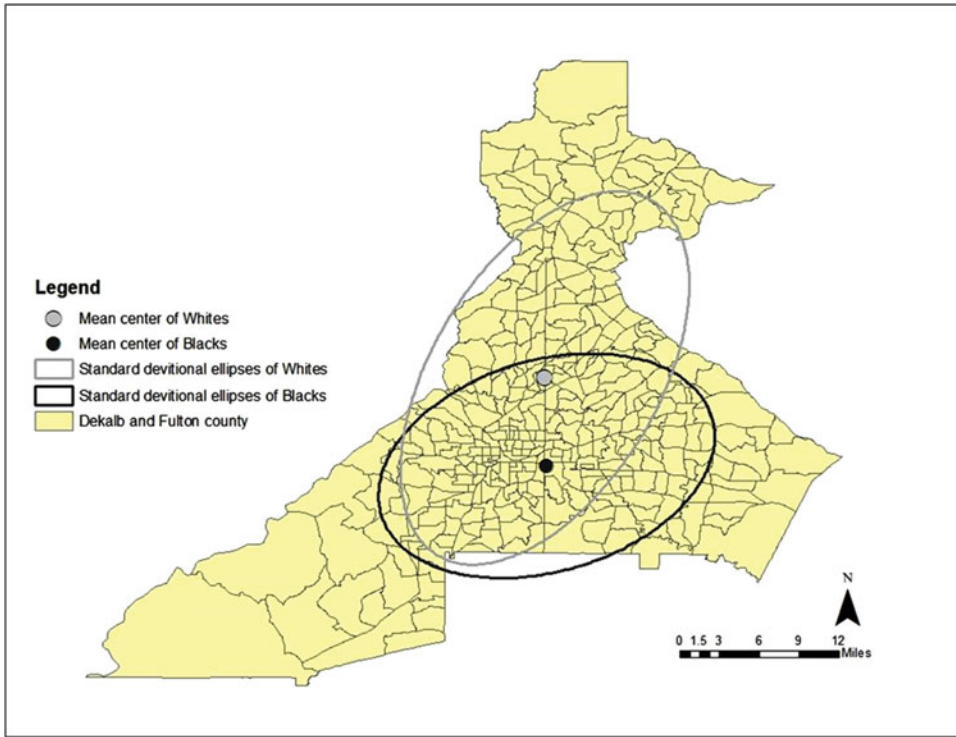


Fig. 17.4 Mean centers and standard deviational ellipses of diabetes mortality of whites and blacks (Source: Georgia Division of Public Health, Office of Health Information and Policy (2019) and Authors’ analysis)

Table 17.1 The results of principal components analysis

No. variables	Descriptive statistics		Loadings on resulting factors	
	Mean	Standard deviation	Deprivation	Physical activity
1. Proportion of African Americans	48.66	36.49	0.809	-0.062
2. Proportion of persons below poverty level	14.86	13.45	0.828	0.002
3. Proportion of persons without health insurance	14.32	9.46	0.731	-0.254
4. Proportion of people working night	24.09	10.04	0.709	0.149
5. Proportion of unemployed people	9.27	5.64	0.657	0.077
6. Proportion of people without high school diploma	10.88	9.81	0.754	-0.200
7. Median household income	65,602.42	38,308.51	-0.867	-0.101
8. Proportion of people walking to work	2.54	5.44	0.069	0.826
9. Proportion of people biking to work	0.44	0.99	-0.166	0.683

Note: N census tracts = 347; percent variance explained: 60.6% (Source: U.S. Census Bureau (2019b) and Authors’ analysis)

Southeastern parts of DeKalb County and the Southwestern parts of Fulton County. In both counties, neighborhoods contained in these census tracts are characterized by high levels of deprivation as well as high percentages of Black residents. Recent studies have demonstrated that

parts of Fulton County that overlap with City of Atlanta boundaries represent sizable differences in life expectancy based on zip code level when compared to each other, even when only a few miles separate them. These differences have been attributed to the social determinants of health,

Table 17.2 OLS regression results for diabetes mortality of whites

Factor	Beta	Significance
Deprivation	-0.093	
Physical activity	-0.149	**

Note: N census tracts = 347
 ** $p < 0.05$.
 (Source: Authors' analysis)

Table 17.3 OLS regression results for diabetes mortality of blacks

Factor	Beta	Significance
Deprivation	0.405	***
Physical activity	-0.130	**

Note: N census tracts = 347
 ** $p < 0.05$, *** $p < 0.01$
 (Source: Authors' analysis)

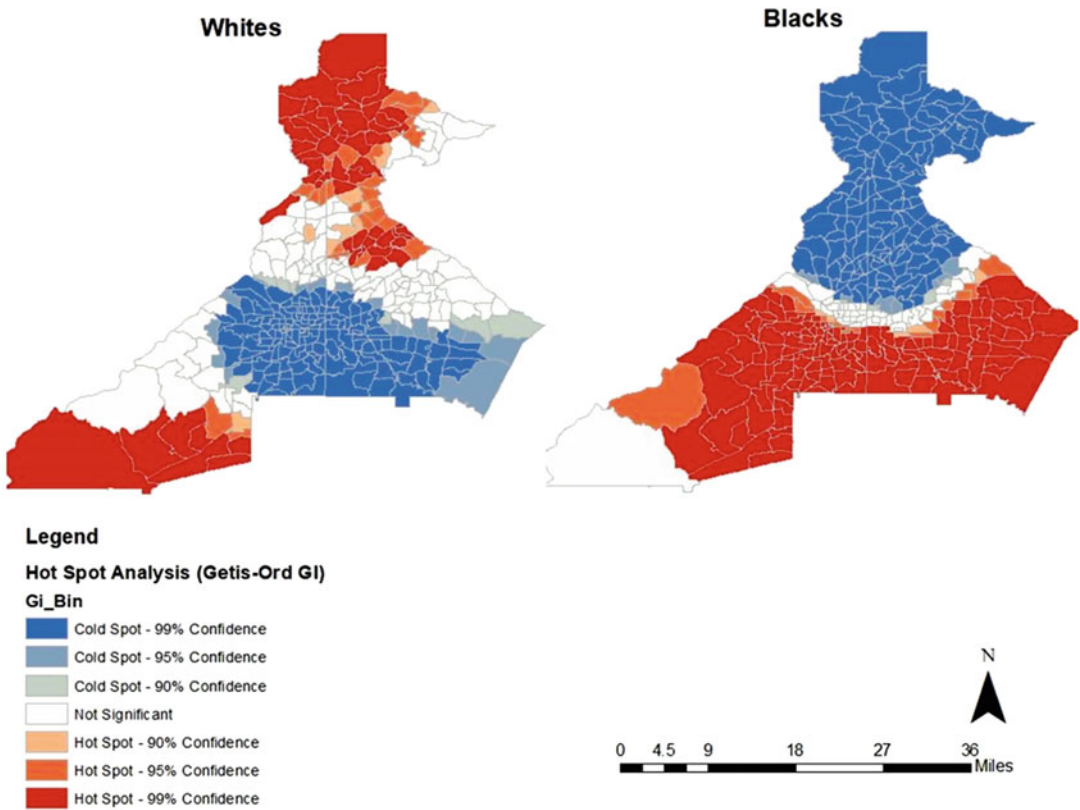


Fig. 17.5 Hot spot analysis of diabetes mortality rates of whites and blacks (Source: Georgia Division of Public Health, Office of Health Information (2019) and Policy and Authors' analysis)

with income inequality across Atlanta neighborhoods as a major contributing factor (VCU 2015). More affluent Atlanta neighborhoods with a greater population of White residents than Blacks, have a life

expectancy that is up to 13 times more in years than poorer, Black neighborhoods (Source: ?). Some of these same Atlanta neighborhoods, such as Grove Park (Census Tracts: 83.01, 83.02, and 84) have been identified as food

deserts (Reardon 2016). Grove Park and the Fulton Industrial Corridor near the Fulton County Airport (Census Tracts: 81.02 and 82.01), were both identified in the list of the top five environmental justice hotspots in a 14-county Metropolitan Atlanta study, *The Patterns of Pollution: A Report on Demographics and Pollution in Metropolitan Atlanta*. Environmental justice hotspots were identified as areas where the correlation of race, poverty, and pollution are greatest. In this study, a 1.5 stretch of Fulton Industrial Boulevard is located in close proximity to more pollution point sources than any other part of the 14-county study area (Greenlaw 2012).

Parts of Southeastern DeKalb County, such as in the City of Lithonia (Census Tract 233.03) are also located in close proximity to clusters of environmentally undesirable land uses such as landfills (ATSDR 2007) although limited studies have been conducted to explore the association between these hazards and health effects in this specific locale. Another area of the County, such as Census Tract 234.18, near the intersection of I-20 and I-285, represents a portion of unincorporated DeKalb. A high percentage of the residents in this census tract are African American (92%), and 10% of the population herein is living below the poverty level. This census tract, and others with a high number of deaths from diabetes in Black residents, have a low percentage of people who walk and/or bike to work.

High incidence of diabetes mortality for Whites is more concentrated in the Southern and Northern parts of Fulton County and in the Northeastern parts of DeKalb County. These census tracts have high percentages of white residents. Diabetes mortality in these neighborhoods is not associated with factors of deprivation, but it is associated with low percentages of people who bike and walk to work. Exploration of additional neighborhood characteristics has the potential to reveal other factors that may be associated with diabetes mortality hotspots in white residents of these two counties such as walkability scores and access to parks and greenspace in walking distance of homes—factors that can improve health and quality of life and decrease risk factors for

diabetes if taken advantage of by residents for leisure-related activities or active transport.

Overall, regression analyses results are statistically significant for Black residents in both counties. Factors of deprivation are positively correlated to diabetes mortality and negatively associated with the proportion of people who bike and walk to work. High levels of deprivation are associated with higher diabetes mortality. The inverse is true for the association between people biking and walking to work in these census tracts and diabetes mortality. As this percentage of people walking and biking to work increases, diabetes mortality decreases. In White populations, both deprivation and physical activity were negatively correlated to diabetes mortality, however only the association between physical activity and diabetes mortality was statistically significant. While a statistically significant negative correlation exists between diabetes mortality and physical activity in both Black and White residents of Fulton and DeKalb Counties, the variable ‘physical activity’ is limited because it only represents the percent of the population that walks or bikes to work. Other physical activity measures are not included. Furthermore, the presence of quality parks, greenspace, and other built environment infrastructure, that has the potential to promote increased physical health and improved quality of life, were not a part of this study. Acquisition and analysis of more robust physical activity data as well as data on health-promoting built environment features, for these census tracts, might help reveal greater contributing factors to diabetes disparities in Fulton and DeKalb County, Georgia.

17.7 Conclusion

The findings from this study will be important for health institutions from the global to the local levels and can be helpful in addressing the United Nations Sustainable Development Goals with respect to the reduction of non-communicable diseases, especially those that disproportionately affect socially and economically disadvantaged populations worldwide. Specifically, in the study

area, health agencies such as the Boards of Health in both Fulton and DeKalb Counties, the Georgia Department of Public Health, local chapters of the American Diabetes Association, and other collaborating organizations can benefit from our approach as they advance efforts to determine effective prevention measures for diabetes. These measures can include outreach and screening programs for residents in the areas of a high prevalence of diabetes in DeKalb and Fulton Counties. In the context of this study, census tract level analyses help to identify a more fine-grained picture of health disparities than data aggregated at the county level. Using the census tract as the unit of analysis also helped to reveal associations between diabetes mortality and neighborhood characteristics known as the social determinants of health as well as behavioral factors, such as physical activity that can be influenced by the availability of built environment resources that promote physical activity.

The maps generated from the study will allow researchers, policy makers, and practitioners to target scarce resources to areas of highest need for future outreach, screening, and prevention programs. They can also be helpful in facilitating community partners' collaborative efforts to implement effective and sustainable prevention and treatment programs. Furthermore, results from this study may assist local and state government officials as well as non-profit to identify populations most at risk in specific geographic locales, allocate limited resources efficiently, and implement culturally relevant preventive measures.

The analytical approach taken to investigate disparities in diabetes mortality in two United States (Georgia) counties can be adapted to other locales across the world and used to benefit both governmental and nongovernmental organizations and service providers that are working to better identify and reduce health disparities and improve quality of life in vulnerable populations affected by non-communicable diseases including diabetes.

There are limitations to this study that should be noted. First, the study only used the neighborhood data available from the United States Census Bureau. The neighborhood data from the

American Community Survey 5-year data set (2013–2017) are based on the estimation of the demographic and socioeconomic variables with estimation errors. The data were collected at the geographical unit of the census tracts and were limited in their ability to contribute to the development of policies focusing on different issues associated with diabetes prevalence. Second, the causes and the characteristics associated with a high risk of diabetes at the individual level are not discussed here. This study focuses only on the neighborhood-level variables that are associated with the incidence of diabetes.

Future research should use and expand the findings of this study. More research is needed to use other neighborhood variables such as housing conditions, walkability, access to healthy foods and access to physical activity facilities. Future research should investigate the association of these variables with the prevalence of diabetes. More research is also needed to use both neighborhood level variables and individual level variables and develop more comprehensive models of health disparities on the prevalence of diabetes.

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Quality of Life in Relation to Urban Areas and Sustainability. Application Case: City of La Plata, Buenos Aires, Argentina

18

Carlos Discoli, Irene Martini, and Dante Barbero

18.1 Introduction

This chapter deals with theoretical-conceptual and instrumental aspects that relate the fundamental dimensions of the quality of life within the framework of the urban environment and its degree of sustainability. These relationships may be conditioned or be conditions of the urban structure and its inhabitants. Although there is diversity and heterogeneity, these inhabitants have some common factors that crystallize within the framework of urban services, and necessarily require for its analysis a methodology that allows understanding and assessing its main aspects. Although this habitat has evolved in line with the progress of each society, in most cases technology has made significant contributions to well-being although with questioning as to its global and local environmental consequences. Complex interactions are necessarily related to physical support, and their approach must include objective and subjective aspects that relate collective well-being to basic urban services and the environment.

With respect to the concept of quality of life, we consider it as a complex construct involving individual and collective perceptions that interact forming a welfare state. In other words, a person with “well-being”, in the sense of “being well”, influences the collective, and if that collective is

socio-technologically contained in their habitat, it should necessarily contribute positively as a context to the well-being of its individuals. As this work is limited to the urban environment and the sustainability of its surroundings, it is pertinent to focus on the collective dimension of the quality of life, since the city and its structure in general intervene in resolving this situation. This approach requires an understanding of “what” are the variables involved, as well as “how” and “where” they intervene. To this end and to investigate the quality of life in the urban environment, a comprehensive, transparent and open methodology is developed which includes methods of analysis at different scales; and its instrumentation is supported by a geographic information system. Its conceptualization and valuation make it possible to measure in some way “levels of urban quality of life (LUQL)” within the same urban pattern, as well as some of its environmental consequences on the territory. Regarding the aspects of sustainability, although it is understood that in order to achieve it, the basic relationship between the social, the ecological and the economic must be permanently adjusted, it is true that the city according to its scales requires an intensive demand for resources, permanently unbalancing this relationship. Consequently, this aspect does not yet have real alternatives in our cities that optimize and minimize these demands, understanding that in these cases until now can only be evaluated “degrees of improvement” aspiring to a greater “degree of sustainability”.

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The approach of the topic is materialized in a model tending to express and interpret the levels of urban quality of life (LUQL) from relating and evaluating the urban infrastructure providing services in its different expressions, the coverage of each service; as well as some of its environmental consequences and the area of influence of each pathology; and finally the opinion/perception of the inhabitants. As a result, maps were obtained to territorialize and define the situation status through LUQL indices, showing trends based on the identification of homogeneous areas of behavior. These maps show the diversity in terms of the quality of each urban service expressed in the territory. Finally, some methodological and operational considerations are made regarding advantages and limitations that are experienced in the application of the model.

With this logic, convergent instrumental solutions have been proposed that allowed the integration of objective and subjective aspects, as well as qualitative and quantitative aspects of the different urban variables that intervene in the quality of collective life.

According to the regional trend, the main cities of Argentina have evolved in the context of excessive growth, and in our case, such growth has generally not been planned (Rosenfeld 2007; Hardoy and Satterthwaite 1987a, b).

This situation was due in part to its natural growth, but fundamentally to a population migration dynamics consistent with the mostly adverse socio-economic processes. This dynamic channeled the migratory flow from the interior of the territory to the urban centers, strongly increasing the urbanization rates of our country reaching rates of 91.44% (National Census of population, households and housing of the R.A. of 2010). Among the causes we can mention the search for better life expectations; improvements in the economic-labor relationship; and access to urban services, almost non-existent in their places of origin; all situations that have generated imbalances in the consolidation of the main urban centers. Among them we can mention the unplanned and spontaneous densifications; the collapse of some existing services; the

formation of semi-precarious and precarious settlements with different degrees of marginality; in most cases with situations of strong inequality and poor habitability. This logic ended up forming heterogeneous cities with compact sectors of high consolidation; and diffuses sectors with different levels of dispersion with medium and low consolidations (Hardoy and Satterthwaite 1987a, 1987b; Discoli 2009). Thus, the main cities of Argentina, although it is characterized what is called the compact city and the diffuse or dispersed city, we should really consider that these are cities with at least confusing urban structures. This is due to the coexistence and diversity of socio-economic structures within the same urban space in which they are observed, adjacent levels of bonanza or precariousness, and heterogeneity in the quality of the same basic services. This has already been noted in the Joint Program UNDP/World Bank/UNCHS, Dowall and Clark (1996) where it is stated that the local deterioration is produced by the lack of resources and insufficient investment in infrastructure and by the conditioning of local governments in their ability to plan, coordinate and manage the city growth operation.

This problem although it is partly related to the development models of these last decades in the region; it is also exacerbated by the dispersion and fragmentation of information managed by administrations, a situation that prevents the systematization of data for the development of accurate diagnoses and their consequent approaches.

Given the complexity of the problem it is necessary for its approach to establish in the first place a methodological body that allows to include conceptual aspects and the variables that make the quality of life, taking into account those most important for the citizen. Secondly, to propose a model that allows evaluating the relevant aspects of the quality of life in the urban context, based on the analysis of the interactions between the physical components of the city, the demands of the users, their opinion/perception, as well as its location in the territory. Thirdly, to propose an instrumentation that allows integrating aspects related to qualification, quantification, location

and opinion on the disaggregation of demand into levels of urban quality of life (LUQL). Fourth, integrate dimensions and evaluate urban areas with inequities, areas with disaggregated needs and areas with different levels of vulnerability. This would help to formulate more precise actions to overcome imbalances and inequalities, and thus allow support for decision-making that leads to a better quality of life for all inhabitants.

18.2 Quality of Life and Quality of Urban Life

The concept of quality of life, although it is related in general to the well-being of individuals, in this work it focuses on its collective context based on the satisfaction of its basic needs provided by the urban space. There are different opinions in terms of defining these needs, but whatever they may be, there is a certain consensus regarding the fundamentals. Although this consensus may evolve over time, it generally remains independent of the socio-cultural context in which the individual is inserted. As for the ways to meet these needs, these vary in relation to the time and space of belonging of each community. The satisfactions from the population, involve actions on the natural environment and on the artificial environment at its different scales: local, regional and global. At present, the hegemonic socio-economic model is immersed in the framework of a development sustained by intensive production and mass consumption, focusing on concentrated economies; what strongly affects with respect to:

- The disarticulation with the natural environment from a logic of sustained growth, with concentration and waste, considering some natural resources as infinite as it has been the case with fossil fuels;
- and a consequent local and global environmental degradation mainly promoted by the citizen concentration located in artificial energy-intensive means such as the current cities, a situation that deepens with

underdevelopment, poverty, and the fragmentation of peri-urban settlements.

This logic of sustained growth had its emergence fundamentally in the post-war culture from the 1950s, where technology gained a massive participation in daily life, both in the US and in the Nordic countries. It was incorporated as a very significant dimension associated with “well-being” immersed in an economic and utilitarian context. During the 1960s, this well-being brought about the need to measure it through objective methods to establish and quantitatively assess the quality of life. Then the social sciences began to introduce the subjective variable in order to complement their assessment. In the 1970s and 1980s, framed in the energy crisis, mainly in the US and Europe, the concept of quality of life was evolving, and where the challenge was to sustain the well-being achieved through improvements in current technology. This situation also led to changes in behaviors in the use of basic inputs and in some cases to the application of joint restrictions aimed at mitigating situations that did not always have equitable criteria between countries and communities. In recent decades, “well-being” has been assimilated into expressions such as “standard of living”, “lifestyle” and “equity”; expressions that are associated in the first two cases to people as individuals, oriented to their own well-being in a framework of similarity of preferences with different socio-economic strata. The third case includes different types of preferences and a set of consumptions associated with the productivity of the economy, mainly in industrialized societies; and the last expression, can be associated to the existence or absence of opportunities that from the collective, would make reference to a distributive justice, conception related to the universe of analysis and field of application of this work (Nussbaum and Sen 1996; Discoli et al. 2016).

Within the framework of this conceptual evolution, it is clear that the city as an artificial medium incorporates and combines dimensions that complexity the concept of quality of life,

affecting the planning and management of the city. The actions to be undertaken in the city must necessarily aim to raise the quality of life of the population from the collective, through the provision of equitable basic services of infrastructure, sanitation, etc., and from the improvement of physical-environmental aspects.

In summary, and taking into account the dimensional complexity of the concept, we consider appropriate to define that *the Quality of Urban Life, being related to the well-being of the population and its artificial-natural environment in a reciprocal process of scalar, spatial and temporal interactions, is a relative and sensitive construction that can be approached through the interpretation of a set of relatable dimensions, which can be replaceable according to the context, and therefore need to be updated, analyzed and interpreted systematically* (Discoli et al. 2016).

Consequently, addressing the issue of quality of life in cities implies considering three significant dimensions:

- the needs of the population expressed through the demands, which are represented by the objective and subjective requirements of the citizens;
- what the city offers as an offer of services and their benefits, provided in and by the built space, which is integrated by the material and immaterial resources;
- and finally, the articulation between these needs and benefits with their environmental consequences.

Each of these dimensions is a complex system of interrelated components with specific requirements and basic needs channeled by different satisfiers. These are channeled through use goods and consumption that allow to satisfy the objective needs, and that also trigger and enrich the subjective aspects. In our region, these satisfiers are not evenly distributed in society or in urban spaces. That is why to analyze the quality of urban life, it is necessary to develop a theoretical-methodological approach that combines a large part of the dimensions at stake,

involving the factors in terms of benefits and needs (supply and demand); to social actors through their opinion/perception; and to the geographical-territorial-environmental component, through its specific location.

Once the framework and the terms of reference that describe the quality of urban life have been defined, a methodology and instrumentation is designed to assess the well-being of the inhabitants and provide elements for urban-regional management that tend to improve the observed situation.

18.3 Methodological Aspects

The complexity of the subject requires a flexible methodology with an interdisciplinary approach, which can be adapted to diverse contexts with an open structure that includes a great diversity of variables and dimensions. For the purpose of ordering and classifying such complexity, the structure was organized taking into account transversely the different urban components: urban services and equipment and environmental aspects, as well as their levels of integration. The urban components considered correspond to the Basic Services of Infrastructure, Sanitation, Health, Education, Administration, Commerce, Transportation; and environmental aspects are those that respond consistent with the dynamics of each of the mentioned components. This methodological proposal includes the disaggregation of territorial scales and the possibility of carrying out different analyzes in each of them. With regard to the territorial scales in this work, it refers specifically to the urban space and its immediate environment, analyzing its interactions between components and aspects mentioned above.

This methodological conception makes it possible to integrate the analysis of the territory as a scale containing smaller scales and to determine standardized quality levels for each urban system and environmental aspect. In this way, qualified information is synthesized, without losing the original one, thus making it possible to give

more accurate answers to different interventions at their different scales.

Based on the approach described, in this work an analytical-descriptive instrumentation is formulated that includes the use of a wide variety of variables and the obtaining of quality indices expressed through mathematical formulas and their behavioral maps. It worked on the concentration and systematization of information using standard databases and spreadsheets compatible with the Geographic Information System (GIS). Descriptive and analytical statistics techniques were implemented to determine the relationships between the variables determine their dimensions and calculate the weight of each component, thus identifying the dependent, independent, structural and critical variables of each subsystem.

With the formulation of the indices which describe the state of each urban aspect, behavioral maps were built, allowing the systematization of common variables and dimensions, and the integration of its behaviors in the different sectors of the city (neighborhoods, apples, etc.). The grouping and study of urban components and the integration of results by juxtaposition of layers, allow obtaining partial or total territorial maps and inferring the status of urban space and/or region, as well as their quality levels. These maps are part of a body of basic and unpublished information for each sector and urban area, which can be used in the formulation of models that express the state of situation.

Objective and subjective information is obtained from various sources (Rosenfeld 2000, 2002; Discoli 2011; Discoli et al. 2016) for which different collection instruments have been adopted and/or developed. Examples are the socio-urban-environmental surveys, whose objective was to gather information at the urban level and on smaller scales of urban services through consultation with the inhabitants-users. These surveys were built as semi-structured instruments aimed at collecting information with the characteristics of urban services, and their opinion taking into account the specific qualities of each of them. They were carried out in the residential sector considering the urban and the periphery area of the city of La Plata, taking a

total universe of analysis of 1320 dwellings from different research projects. Disaggregated areas of the city were considered in three levels of consolidation taking into account the number of dwellings and the amount of services covering the entire urbanized territory. The ranges considered for each level are: low (from 0 to 20 dwelling/Ha), medium (from 21 to 72 dwelling/Ha) and high (more than 72 dwelling/Ha).

The information processing was carried out with complementary statistical programs such as SPSS and SIMSTAT, establishing a wide variety of outputs. Different maps were generated as outputs showing the status of social, infrastructure, coverage and opinion variables. In relation to the opinion/perception, the locations of the surveys were georeferenced so that the different variables were assigned, each one, to a specific point in the territory. Those places which we did not have data, Thiessen polygons (for each variable) were used, to expand the results to the rest of the territory. The other layers were also spatialized by linking the databases with their corresponding location through a Geographical Information System (ArcGIS 9), in order to visualize in the territory the quality levels of each analyzed urban service.

Processing through SPSS and GIS allowed:

- Manage information with an important degree of detail and integrate it through the development of indexes and maps that describe the complexity of each urban component in relation to its context.
- Manage disaggregated, qualified and truthful information located geographically in the territory, which makes it possible to identify and highlight urban contrasts in terms of quality and equity, to assess demands, to determine overlays and to define inefficiencies, infer potential vulnerabilities, visualize areas of greatest concentration of contaminants, dimension mitigation scenarios, etc.

Both instrumentations were included in a common structure forming a model of levels of urban quality of life (LUQL) that includes urban services (infrastructure and sanitation),

equipment (communication and social); and urban-environmental aspects (noise, air pollution, etc.). This structure allows the incorporation and qualification of urban infrastructure by evaluating its qualities; quantify the coverage areas thereof; detect the areas affected by the different consequential disturbances (waste, pollution, etc.), and systematize the opinion of the inhabitants-users. Figure 18.1 shows the simplified structure of the model differentiating both analyzes with their corresponding levels of integration addressed.

In synthesis, the methodology and the proposed conceptual model allow to evaluate situations on the territory, as well as to determine maps guided to define and locate the parameters of the city in terms of quality. Interactions between Urban Services and Equipment ($LUQL_{USE}$), whether public or private; and the consequent Urban-Environmental Aspects ($LUQL_{UEA}$), directly influence the levels of quality of life of the inhabitants. In all cases, the dimensions of each aspect analyzed are assessed, their degree of coverage, opinion/perception, impacts at the urban level and the area of involvement, thus forming maps that characterize and locate the urban situation in the territory.

From this process, $LUQL$ can be assessed and spatialized with a consolidated model instrumentation, and define homogeneous quality areas with different levels of integration within a given urban space.

18.4 Universe of Analysis and Territorial Units of Application

The universe of analysis considered corresponds to the city of La Plata, Province of Buenos Aires, Argentina, representing intermediate urban centers,¹ with different scales and consolidations.

¹ When we refer to intermediate cities, we understand them as an interaction of qualitative phenomena, where their morphological expression is characteristic of each civilization and admits quantitative expressions (Santos 1996). In these terms it is clear that the intermediate city cannot be defined only by the size of its population. As much or more important is the role and function that the city plays in its

It has a consolidated foundation town and surrounding areas of medium and low housing density. La Plata has a total population of 799,523² inhabitants, of whom most of them live in urban area. The territorial unit considered for this study is the urban block (blk). The block was used for the purpose to formulate different urban consolidation sectors, identifying three areas well defined regarding the built density and existing services. The ranges calculated of built density vary from: A = >72 dwellings/blk and with all basic services (electricity, gas, drinking water and sewer services), B = 21–72 dwellings/blk and with more than two basic services, and C = <20 dwellings/blk and with two or fewer basic services. For the study area, a total of 4144 blk were computed, of which 1260 blk correspond to high consolidation areas, and 2884 blk correspond to medium and low consolidation areas.

Intermediate cities, although its definition in part depend on the amount of population, they also depend on a significant level of qualitative interactions, and as Santos (1996) expresses, their morphological expression is characteristic of each civilization and admits quantitative expression. This expression depends on the socio-economic and cultural context in which the city is inserted. On the other hand, the intermediate city cannot be defined only by the size of its population (Ajuntament de Lleida 2002). Likewise or more important is the role and function that the city plays in its more or less immediate territory, the influence and relationship it applies and maintains in it; as well as the dynamics of flows and relationships generated abroad. The intermediate cities articulate the territory and function as reference centers for a more or less immediate territory.

more or less immediate territory, the influence and relationship that it performs and maintains in this and the flows and relationships that it generates abroad. The intermediate cities articulate the territory and function as reference centers for a more or less immediate territory (Llop Torné and Usón 2012).

² Buenos Aires, La Plata. Total population by sex and masculinity index, according to age. 2010. INDEC. February 13th 2020.

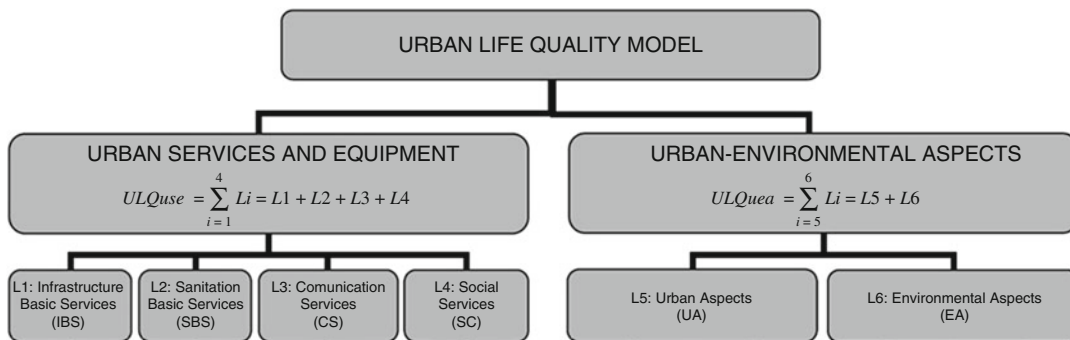


Fig. 18.1 Simplified structure of levels of urban life quality model (Source: Own elaboration)

Regarding their morphology, mixed situations coexist between the areas of less consolidation (where some services and different segments of the residential and productive sectors coexist), and the areas of greater consolidation in which basically all of the urban components converge (services, residential and tertiary sector). In this sense, the degree of consolidation is defined as a comprehensive concept that would include the urban diversity characteristic of the region. Therefore, our universe of analysis is characterized by the heterogeneity of variables, among which the structural ones related to: services in general (energy, water, sanitation, health, education, etc.) were identified with their corresponding qualities, coverage and subjective opinions; and most of the critical environmental problems, according to the urban scale considered.

For a better visualization and interpretation of consolidation trends, maps are displayed in a disaggregated or integrated way using higher territorial units (Fraction and/or Radio Census)³. Figure 18.2 shows the maps that identify in a disaggregated way three levels of consolidation, obtaining a percentage by occupancy and type of services of each block in relation to the total blocks, and a map that integrates the three levels

³ They are census units, which are part of the census survey structure, defined by a territorial space with geographical boundaries and a certain number of housing units to be relieved. Each political-administrative unit is disaggregated into fractions and each of them is also disaggregated into radios with population grouped by block and/or sectors belonging to the same area.

in a higher territorial unit (urban fractions), including the localization of the surveyed households to assess their opinions. Defined the territorial units, the following step is to develop the methodology for assessing Levels of Urban Quality of Life (LUQL).

18.5 Methodology for Assessing Levels of Urban Quality of Life (LUQL)

The Urban Quality of Life (LUQL) is strongly influenced by satisfaction levels that reach the collective needs and demands of different groups of population. Much of the satisfactions are related to urban supply, which are considered from the interactions of material and immaterial resources based on objective needs. Unlike other conventional models (Velázquez 2001), among the urban infrastructure and services variables have been incorporated energy and environmental variables involved in the functioning of the city, the evaluation and assessment of the urban-regional services, the opinion/perception of the users understanding them as the demand, as well as the geographical localization of each dimension. The systematization of the information has allowed studying the behavior of each variable from the interaction of a number of indicators that enable an integral evaluation. The results define differences and quality levels through georeferenced maps related to tables with numeric and alphanumeric information. The

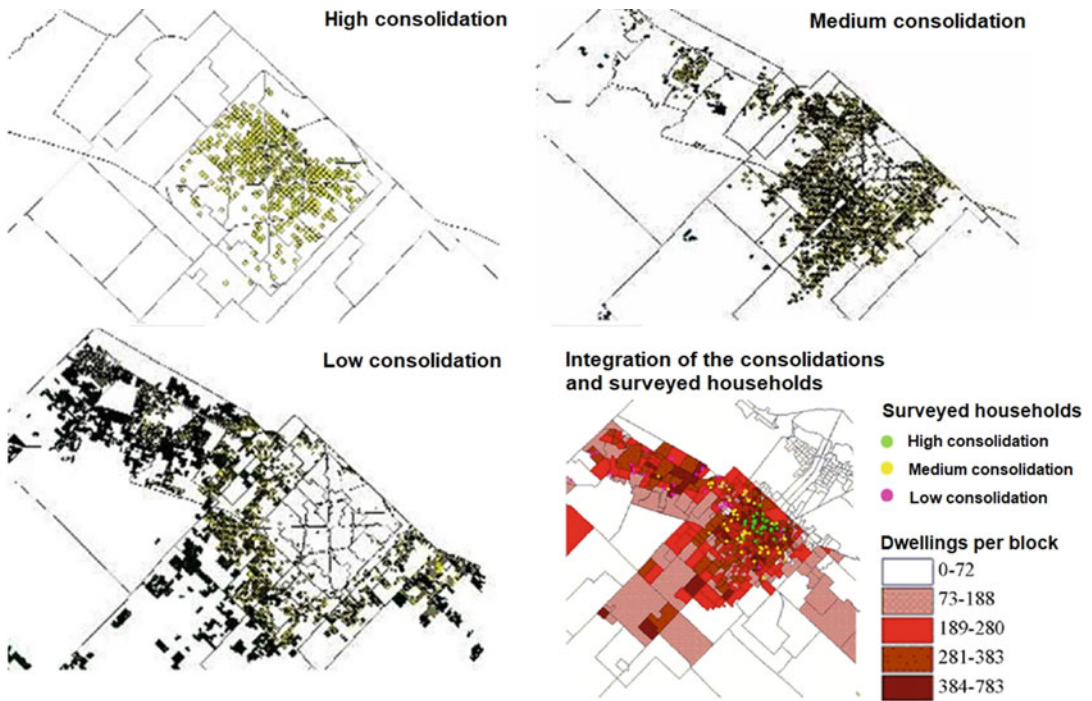


Fig. 18.2 Urban consolidation levels and localization of the surveyed households (Source: Own elaboration)

urban services and environmental aspects considered can be grouped into:

- Urban Services and Equipment (LUQLuse) constitute the offer, and are evaluated based on their qualities (attributes valuation), use factor (only in the case of basic infrastructure and sanitation services), and territorial coverage and the users' opinion (as a correction factor for the demand side). With the normalization of the results and the interaction of the dimensions considered, disaggregated profiles on quality levels were obtained (homogeneous areas of LUQLuse). The services considered can be grouped and summarized in the following levels of integration (Li): L1 infrastructure basic services (electricity network, natural gas network, and alternative services: electricity by generator, bottled gas, liquid fuels, firewood); L2 sanitation basic service (sewage sanitation by network, drinking water network, and alternative resources, such as soak away, ditch effluent, water by electric pump, water

by manual pump) L3 communication services (transportation, railways, main roads, telephony, public telephony, and satellite TV) and L4 social services (health, education, security, firemen, garbage collection, additional resources: pluvial, lighting, green spaces, sidewalks, wooded).

- Urban Environmental Aspects (LUQLuea): For their analysis, equivalent criteria of valuation were considered (qualification of the impact, area of influence and perception) and are grouped into the following levels of integration: L5 Urban Aspects (existence of dumps, existence of precarious settlements, existence of dangerous places, flooded areas, industries or inactive residences, incompatible activities with residential use, dangerous and pathogens waste, spatial barriers, advertisements on public roads, transit risk points) and L6 Environmental Aspects (noise pollution, air pollution, soil contamination and water pollution).

As it was mentioned previously, in all cases, “L” hierarchical integration levels are adopted. Figure 18.3 summarizes the structure of the Levels of Urban Quality of Life (LUQL) model.

The result of each expression will depend on the components valuation of each formula and of the interaction of different integration levels (L). One or more services can participate according to the urban area analyzed as well as one or more environmental aspects. The achievable degree of satisfaction of the residents significantly influences the rate of LUQL. In it, objective aspects are included related to the technical, subjective and scientific evaluation of the intangible urban systems, which belong to the social constructions of socio-cultural nature.

Thus the model allows: (i) evaluating and qualify each of the involved services, (ii) including its influenced geographic area, and (iii) evaluating the quality perception by the inhabitants (opinion/perception factor) in a space-time framework.

- (i) To evaluate and qualify urban services and environmental aspects a set of qualities or attributes of valuation are proposed in order to establish a mechanism of relative weights between services and/or aspects. For its weighting, optimal levels (acceptable) are defined (in the case of services), and of low impact (in the case of the environmental ones) within existing urban systems. This is those urban/environmental systems which count with safe, reliable and regular skills and do not necessarily represent the most efficient. These are the ones that in a social, urban and technology context provide the best answers to the context needs. This is those systems whose qualities cover almost all expectations. Consequently, those that meet with these requirements are used as a reference system weighting other systems within a numerical ranking between 0 and 10. The results were verified by alternative evaluation mechanisms such as fuzzy logic (by fuzzy inference system). In environmental aspects, weighting includes

environmental impact assessment and variables are qualified based on the impact intensity, the sign, its significance and temporality (Discoli 2005; Viegas et al. 2006).

- (ii) Regarding the coverage degree of the services, such as infrastructure, its coverage is considered in the territory (supply or distribution networks), and in the case of other urban services such as health or education, its existence and distribution in the territory is considered. Regarding environmental aspects, an influence area is defined from the affected area by the pathology.
- (iii) In relation to the users’ opinion and the inhabitants’ perception, the results are systematized from the declaration, identification and/or disturbance degree that they express. This information can be obtained from different tools of data collection: structured surveys, news media under different supports (written, online), citizen advocacy organizations, etc. The use of different sources or recollection tool will depend of the availability of information in each case, since each of them can be applied independently or complementary. With the obtained results maps were generated from the coverage/influence area, opinion/perception and quality of each service defining homogeneous areas.

The others components of each expression (service qualification, coverage/influence area and opinion/perception) are included, and the results are evaluated and normalized in databases with numeric and alphanumeric information (SPSS 13) and georeferenced in GIS (ArcGIS 9). The resulting maps allow identifying in the territory life quality levels for the urban components analyzed. These show different trends in relation to their urban consolidation and to the integration levels of different systems, network services, and environmental aspects. The next step is to show the resulting maps for urban services and equipment as well as urban-environmental aspects disaggregated into some significant integration levels Li.

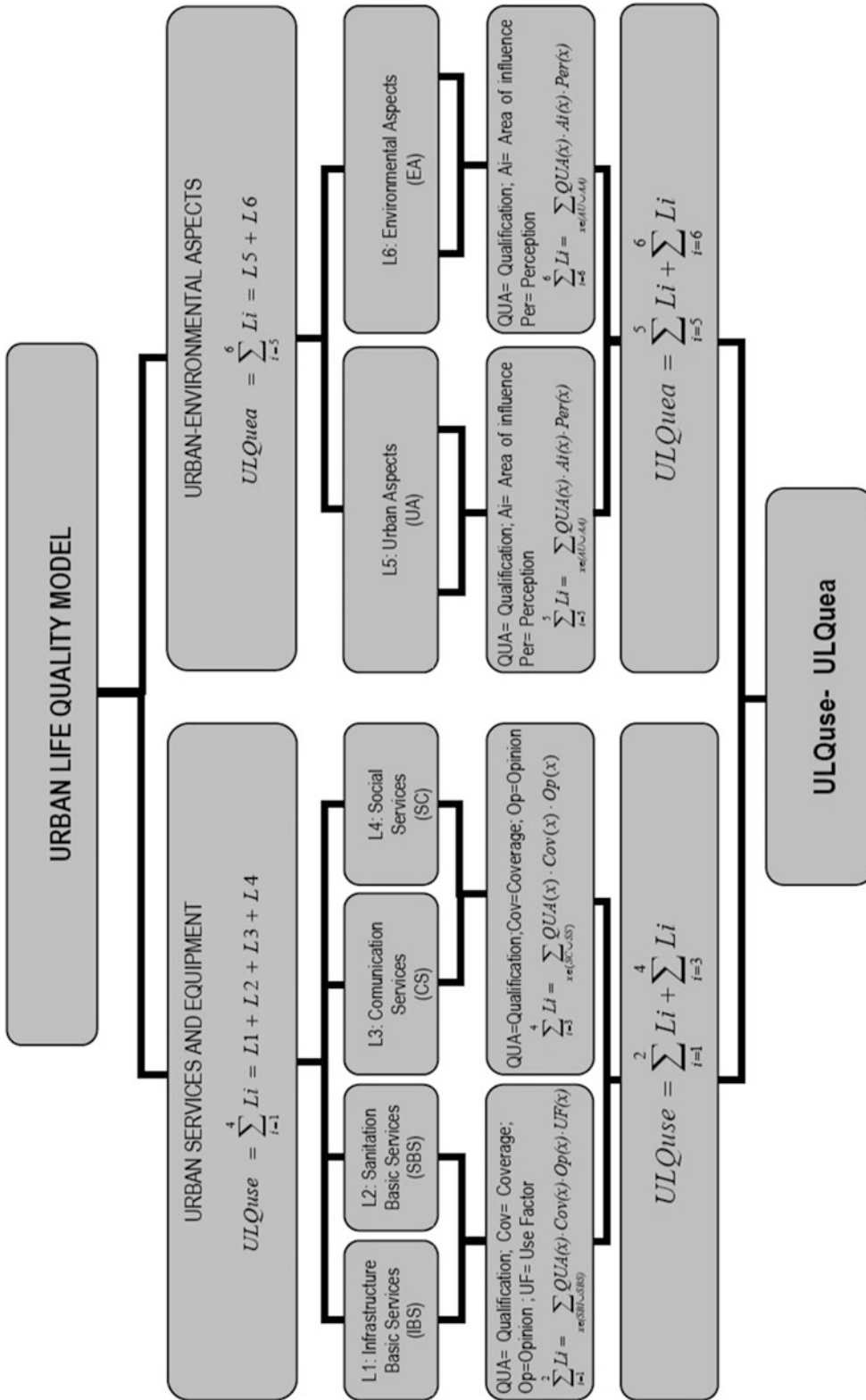


Fig. 18.3 Model structure (Source: Own elaboration)

18.6 Obtained Results

Once developed the methodology, some results of the model for different integration levels are presented.

18.6.1 Urban Services and Equipment: Analysis of the Opinion, Coverage and Levels of Urban Quality of Life (LUQL)

The results obtained in the application of the LUQL model in La Plata city, Argentina, are synthesized in maps where the reached levels for urban components for L1 (infrastructure) and L2 (sanitation) and its integration are registered.

Under the urban consolidations described, disaggregated outputs are obtained from the model, for each service where the users' opinion, their coverage and the quality of each urban service are shown in a detailed and standardized way. The latter can identify on one hand, the degree of unmet needs in those maps registered with UQL lower levels, and on the other hand, through the components of the model (qualification, coverage and opinion) if the dissatisfaction is due to the lack of service (coverage), or to problems of each quality, evidenced both in the qualification as in the users opinion. In both cases the model can generate and view maps with specific data. Figure 18.4 shows an example of LUQL trends for basic infrastructure services (L1). Users opinion maps, coverage maps and LUQL maps for electricity services (EE) and natural gas network (NG) were calculated in a disaggregated way.

It is observed that LUQL of EE present some differences mainly justified by the opinion component of the model since the coverage of this service is practically 100% of the territory. The differences expressed by the opinion arise primarily from problems related to the divestment, cut off frequencies, voltage quality, etc.; mainly in those areas where distribution networks are obsolete or are in an over consumption situation. As for the natural gas (NG) services, low levels of LUQL, are observed, coinciding with smaller

consolidation areas, in particular the more peripheral locations. This service verifies areas without coverage (gray areas), in which energy substitutes vectors are used (bottled gas, solid fuel, etc.). In these cases, although the maps are not exposed in this work, LUQL become substantially worse, mainly due to the discontinuity of the services (bottled gas distribution) and because of their higher costs. For areas of higher consolidation, homogeneous areas with higher LUQL exist, although with some variations in their results, adjudging in these cases low pressure problems caused by the high population density, and problems in the offices customer service.

In the same way, other basic sanitation services (L2) were studied, such as drinking water, sewer, and social services related to health and education. Figure 18.5 shows the characteristics of each service. Less coverage is verified in drinking water with respect to sewers. In the case of drinking water, LUQL show dispersed homogeneous areas, with significant inequalities in different consolidations. In the center of the city (high and middle consolidation), despite of registering a better service, significant fragmentation are identified with significant areas of very low LUQL. This map advertises the critical situation of the drinking water service in the region, mainly caused by the obsolescence of the supply networks. The sewer service presents fewer difficulties than the drinking water service in the intermediate and high consolidations, since it is a service, which its qualities or valuation attributes register lower difficulties. As for the opinion, it expresses less conflict (except in cases of obstruction). It should be noted that it presents major inequities in urban peripheral consolidations as the lack of networks rise environmental conflicts. In a similarly way, all services are studied, respecting in each case, hierarchical levels (n) and its peculiarities (qualification, qualities, coverage and users opinions).

Using the same methodology and criteria of analysis, social services (L4) were calculated, where, in this instance, health and educational network were considered. In these cases each service has also been evaluated according to their qualities or attributes of valuation (accessibility, continuity, professionals' availability,

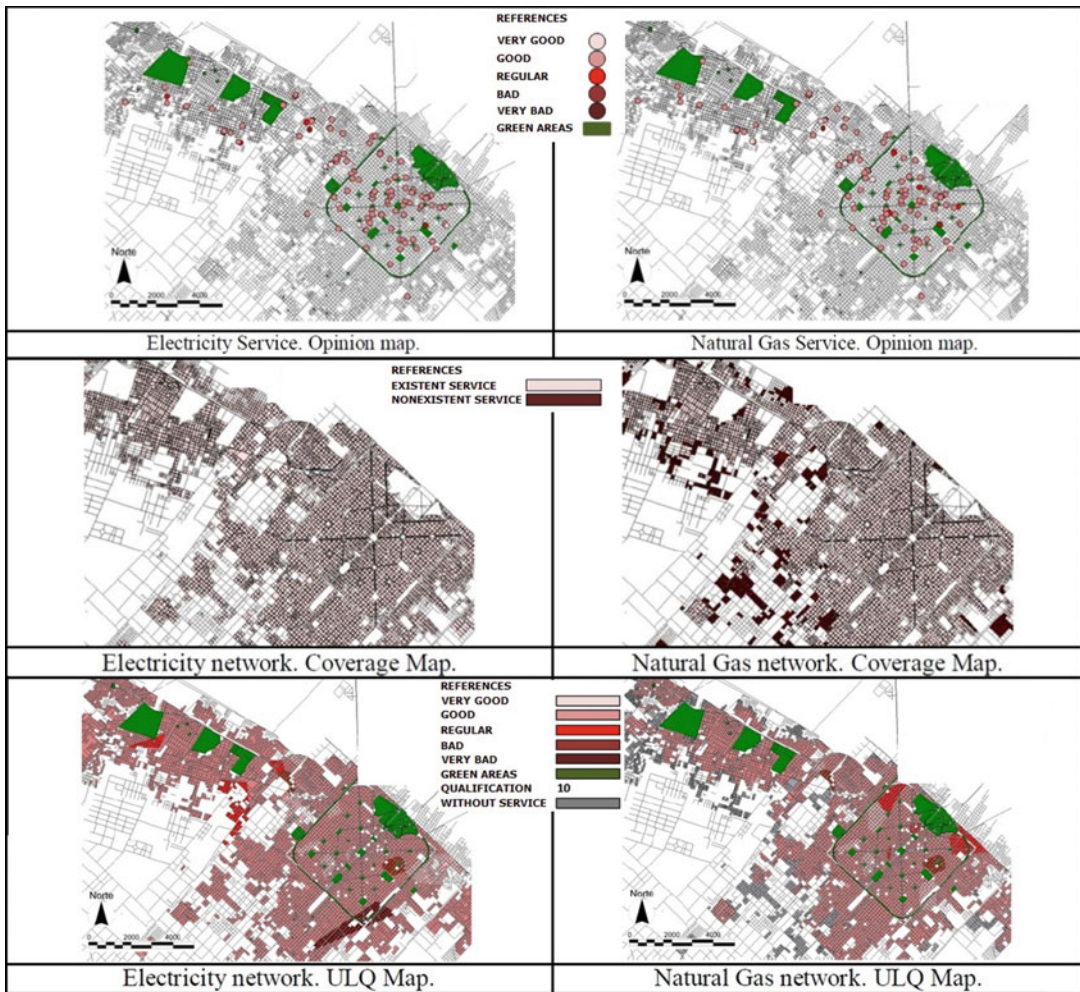


Fig. 18.4 Trends maps for LUQL of EE and NG services, discriminated by coverage and opinion (L1) (Source: Own elaboration)

availability levels and availability of infrastructure, among others). Coverage is analyzed in terms of the following criteria: for hospitals, clinics and nursing a radius of coverage of 2000 m was adopted, and for medical units, 500 m. These distances were defined by the Ministry of Health considering the accessibility by different means. In the case of the education network, an influence radius of 300 m was considered in relation to school Criteria and Basic Architecture Standards.⁴ As for the opinion,

maps are obtained with its location in the territory. With such information maps are defined with the LUQL results for each mentioned service, which are shown in Fig. 18.6. Some differences are observed in the territory on both networks. In the health network, weakness is attributed to the coverage, mainly on the preventive services (first aid), located primarily in areas of medium and low consolidation. And in the education network failures have been observed mainly in the opinion, admitting that despite they count with the coverage, there is some disagreement as to the quality of the service, awarded to problems of access, infrastructure, etc. in certain areas of the city.

⁴ Criterios y normativas básicas de arquitectura escolar. Dirección Provincial de Infraestructura Escolar. Provincia de Buenos Aires, Argentina.

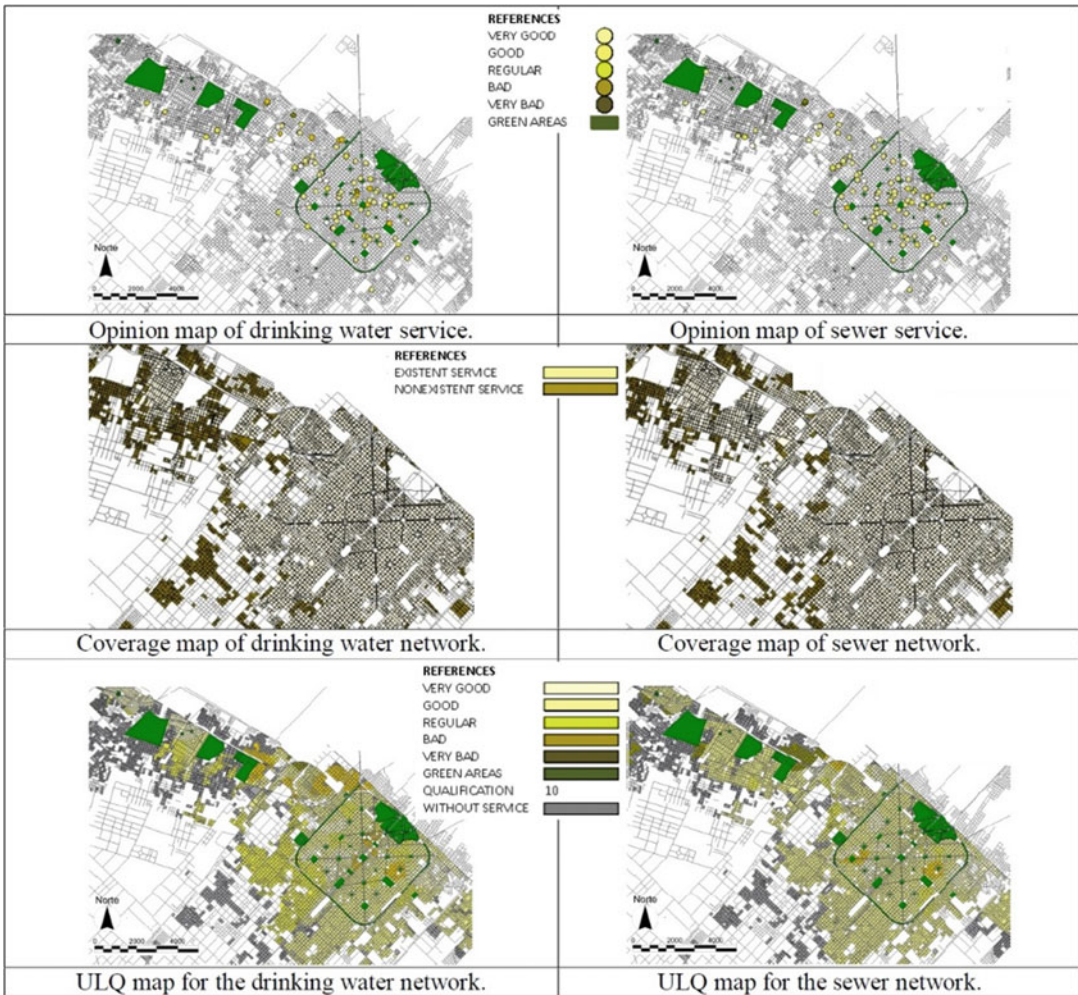


Fig. 18.5 LUQL trend maps for drinking water and sewer discriminated by coverage and opinion (L2) (Source: Own elaboration)

With the partial results of LUQL of the urban services and equipment, L1 levels were integrated, taking into account the different basic infrastructure services (EE, NG), and sanitation (drinking water and sewer), obtaining partial maps of LUQL for L1 and L2. It is observed that LUQL are enhanced or minimized depending on the matches or dissent of each component of the model (qualification, coverage and opinion). Figure 18.6 also shows the integrations for L1 and L2 highlighting areas which have changed the LUQL based on the juxtaposition in each level and results. Areas with improvement trends and others that maintain their situation are observed.

In a new integration, the basic infrastructure services and of sanitation calculated were grouped in a single map, making juxtaposition between levels, and providing LUQL maps for L1 + L2. Figure 18.7 shows the output map of the model, in which large areas with good LUQL are identified, specific sectors with regular and bad levels, and those sectors that do not count with the coverage. As we have already mentioned, the service's overlay allow visualizing those areas in which good performances or problems are juxtaposed, generally evidenced by the general opinion of users. The irregularities in areas of highest consolidation have to do with the obsolescence of some services, while in the peripheral

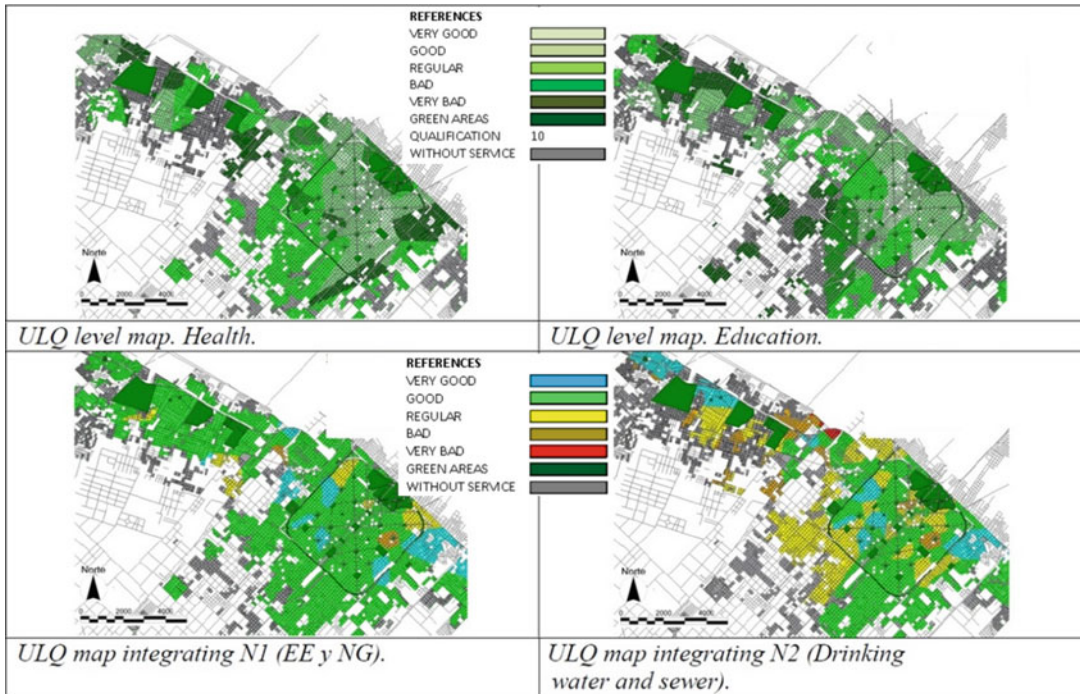


Fig. 18.6 LUQL. Health map; LUQL. Education map; LUQL integrating L1 (EE y NG) map; LUQL integrating L2 (drinking water and sewer) map (Source: Own elaboration)

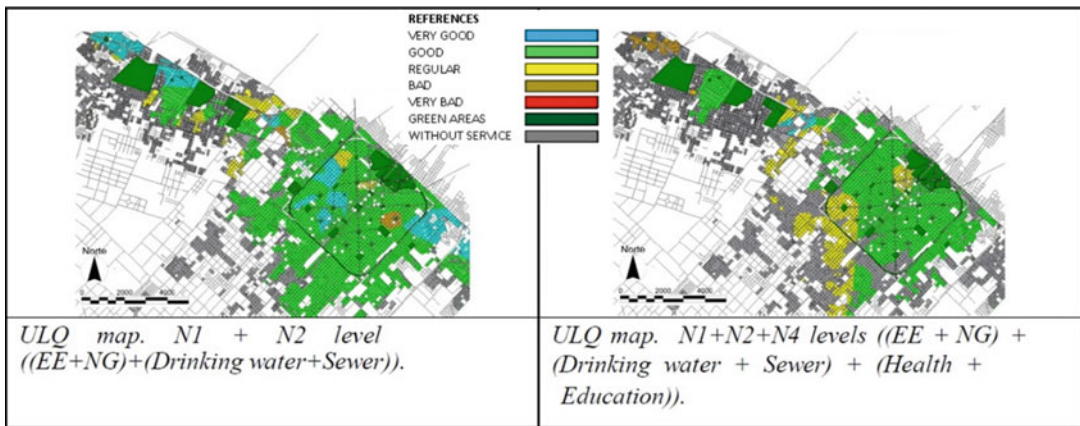


Fig. 18.7 (a) LUQL map. L1 + L2 ((EE + NG) + (drinking water + sewer)). (b) LUQL map. L1 + L2 + L4 ((EE + NG) + (drinking water + sewer) + (health + education)) (Source: Own elaboration)

sectors we can find unforeseen growth with problems related to divestments (generally, exceeded coverage demand).

Continuing with the integration process and under the same criteria, social services (L4) were considered, in which health and education network were included. Figure 18.7 shows

social services integration representing in the map the LUQL results for L1 + L2 + L4; LUQL map. L1 + L2 ((EE + NG) + (drinking water + sewer)).

It is noted that in the integration process some urban areas modify its results in relation to the LUQL incorporated. They can improve or worsen, but quality displacements are observed in the urban

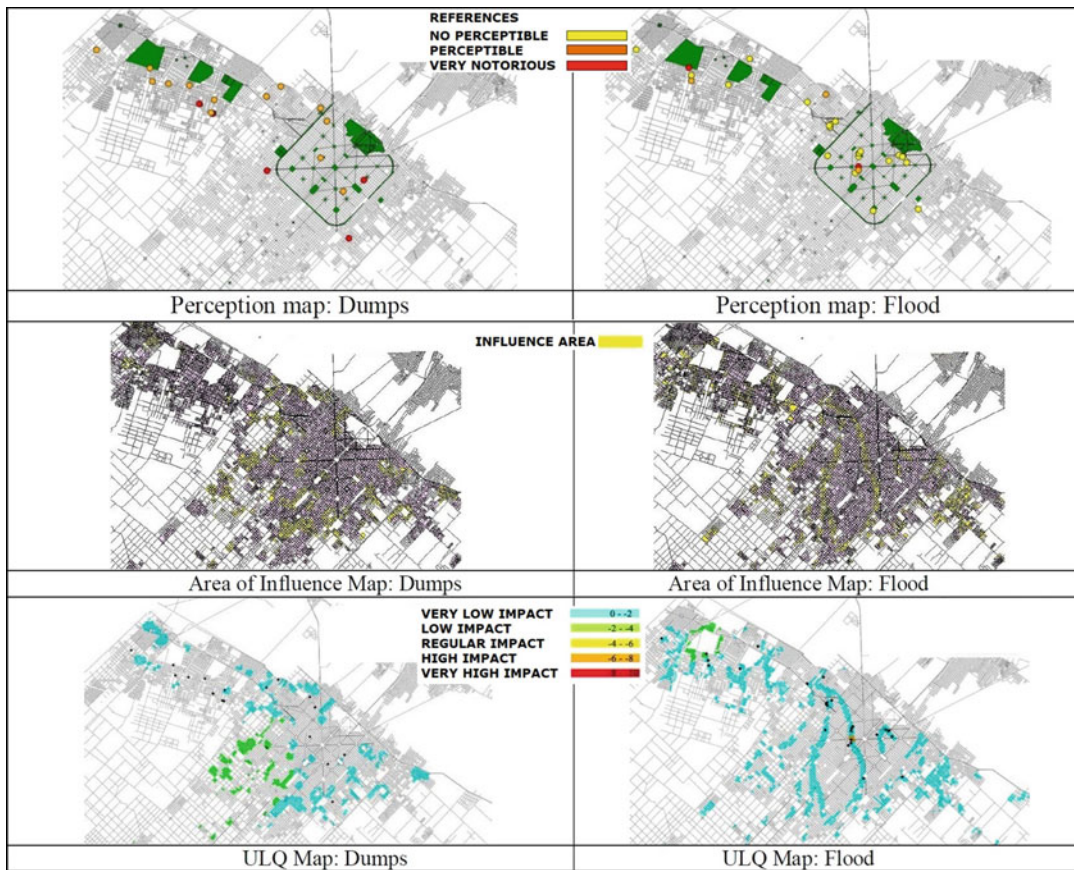


Fig. 18.8 Trend maps of LUQL for dumps and flood, disaggregated by perception and area of influence (Source: Own elaboration)

area and greater inequities in the periphery. This shows that the incorporated sectors (health and education) are strengthened in terms of good quality in higher consolidations and failures occur in remote areas, defining more precisely the areas with unmet needs. We also have to keep in mind that different LUQL areas are indicative, whose boundaries depend on the precision level and location of the base information.

18.6.2 Urban-Environmental Aspects: Analysis of the Perception, Area of Influence and Levels of Urban Quality of Life

To study Urban-Environmental Aspects and to quantify the quality index (LUQL_{Luea}), various pathologies are evaluated and the evaluation

criteria are applied stated in the general methodology (impact qualification, area of influence and perception, see Fig. 18.2). In this case, integration levels correspond to L5 which include Urban Aspects (dumps, among others already mentioned) and L6 covering environmental aspects (noise pollution, air pollution, soil contamination and water pollution). Just as in urban services and equipment, the participation of one or more of them will determine the characteristics of the urban area under study.

To obtain LUQL_{Luea} index, each pathology is affected by the following indicators:

- (i) Qualification (QUA): it is evaluated from the study of decision matrices. For each pathology, the impact intensity, the sign, its significance and temporality was analyzed (Viegas et al. 2006; Discoli 2005). Figure 18.8 shows

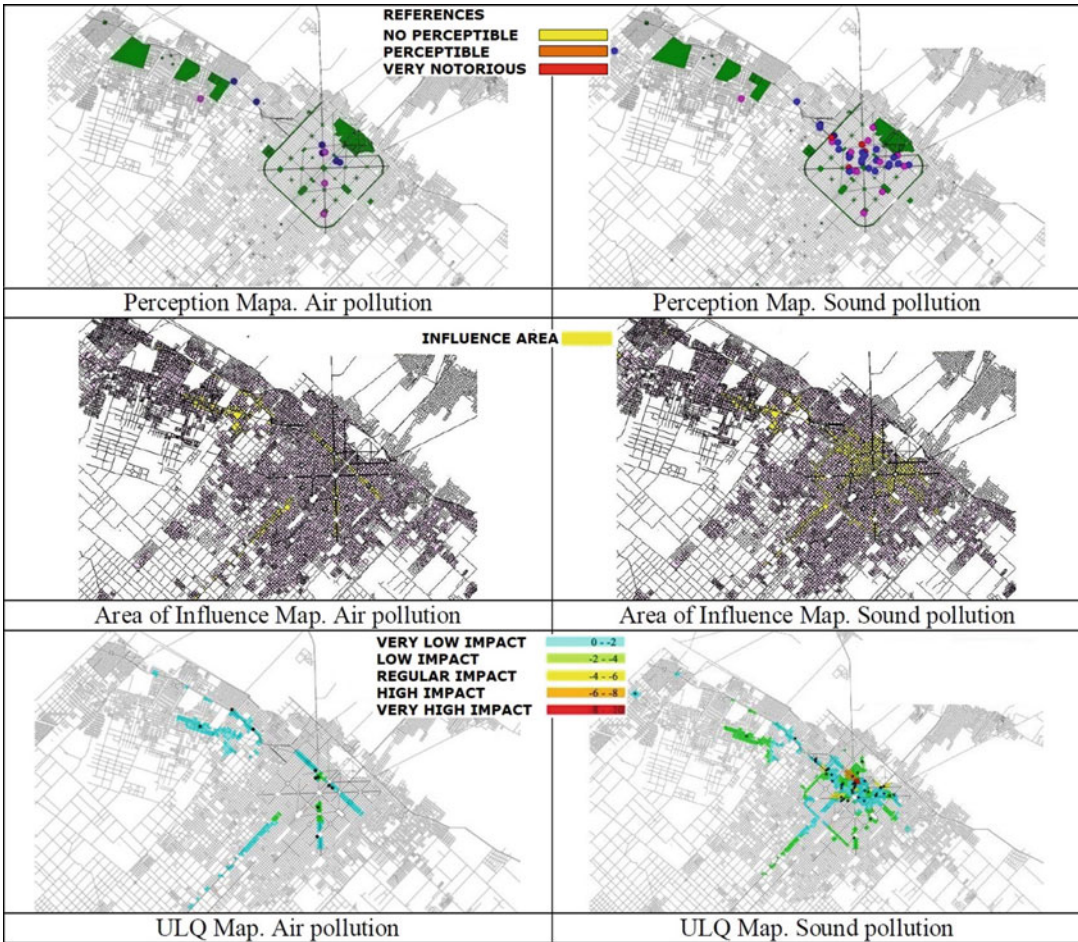


Fig. 18.9 Trend maps of LUQL. Air and sound pollution, disaggregated by area of influence (L6) (Source: Own elaboration)

trend maps of LUQL for dumps and flood, disaggregated by perception and area of influence (L5).

- (ii) Area of Influence (Ai): it is dimensioned from the affected area of each pathology.
- (iii) Perception (Perc): it is evaluated from the identification degree and/or disturbance of each pathology expressed by the inhabitants. Figure 18.8 shows an example of the results obtained in terms of qualification, perception, and area of influence and LUQL for urban aspects (L5). They were calculated in a disaggregated way for Dumps and Flood.

In relation to the obtained LUQL, the maps identify the balance of the environmental aspects

in the territory. Different responses are identified in relation to the origin and type of pathology, and of different sensitivities of the habitants regarding their perception. In this case, for example in Dumps, the origin and type of waste respond to low impact urban waste (organic and inorganic), with a low level of perception. In this particular case the methodology considers it necessary to count with an opinion against test or contrast (qualified person) as it is verified in the inhabitants certain level of adaptation to the pathology, situation that leads to reduce its perception.

In the case of flood areas, watersheds and natural drainage of the region are analyzed, noting that some of them are piped mainly in the

urban area. To assess the affected areas, a risk map, determined by the CISAUA (2006), was considered which is overlaid on the urban map with differentiated urban sectors (residential, education, health, etc.) delimiting for its assessment the risk areas according to hydric height, affected habitants and perception in relation to the sector (Discoli et al. 2007, 2008).

With regard to the environmental aspects (L6), noise pollution problems and air quality affected by the emissions from the public and private transportation system have been evaluated. For its assessment, gases concentrations were analyzed those that are emitted in transport corridors and distributed in residential areas. Regarding to its perception, habitants are surveyed in different areas of the city.

Figure 18.9 shows that Air Pollution is observed throughout the region, but the morphological and hygienic characteristics of La Plata significantly reduce its impact. Which shows a greater diversity of responses is Noise pollution, since they are very present in the most affected areas. These results justify the need for deepening in the aspects related to the perception, since there is a significant interest in the calculation method and in the sensitivity of the results.

It is also observed in this case, that the LUQL are enhanced or reduced depending on the matches or dissent of each component of the model (Qualification, Area of Influence and Perception).

18.7 Conclusions

The Urban Quality of Life Model integrates a wide set of aspects and variables, and allows assessing quality in terms of the different sectors of the city. This will allow identifying homogeneous areas with satisfactions and dissatisfactions regarding basic needs in infrastructure, services and environmental quality.

Assessing the quality of urban services and equipment and of the urban-environmental aspects with the Urban Quality of Life Model, has allowed us to qualify and quantify the results with an acceptable approximation to the reality. This methodology provides necessary

information for the evaluation of actions in each urban intervention, thus establishing the basis for defining Levels of Urban Quality of Life. Areas with inequalities provide relevant information required to establish new mitigation scenarios in each vulnerable area.

The results obtained show significant sensitivity to the conformation of homogeneous areas descriptive of each situation. These can be analyzed in a disaggregated way, considering the detailed information of the different components of the model (qualification, coverage/area of influence and opinion/perception), in order to establish the causes of each situation.

In summary, the results obtained show a significant sensitivity from the diversity of the evaluated variables. The values warn, in relative terms, significant differences, demonstrating the reality of each situation.

To count with indexes of Levels of Urban Quality of Life (LUQL) and its geographic location, allows evaluating qualitatively and quantitatively the basic needs of the habitants. Incorporating a set of dimensions to the LUQL model, that constitute important components of everyday and future life of a city, allows analyzing and evaluating the current situation in order to consider the possible actions for situation problems and future planning.

It is clear that LUQL show significant sensitivity to the peculiarities of each urban service and to its consequent environmental aspects. It is also clear that from the territorial aspects, strong contrasts are identified, very permeable to the type of offer localized in each sector (referring to the technological and coverage circumstances of urban services in general), to the expectations of demand expressed through the opinion/perception, and to the environmental consequences caused by this interaction.

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Social Sustainability, Neighbourhood Cohesion and Quality of Life: A Tale of Two Suburbs in Calgary

19

Sasha Tsenkova and Karim Youssef

19.1 Introduction: Approaches to Sustainable Community Planning

Low-density development has transformed Canada into a ‘suburban nation’ with sprawling suburbs, home to nearly two thirds of the urban residents. Sprawl has become a common term that is generally used to describe new growth on the edges of cities with low density segregated land uses leading to traffic congestion, higher infrastructure costs, pollution, and a lack of environmental protection (Bourne 2001; Downs 2005). A sprawling suburb typically contains clusters of residential developments with schools, places of worship, libraries, and other cultural destinations on separate sections of land, usually off major collector roads, and rarely within walking distance for a majority of their users (Duany et al. 2000). Shopping centers and business parks may be located nearby, usually separated by a large road, and surrounded by large parking lots. Such descriptions of sprawl refer not only to patterns of land use, but also to the process of land development, its root causes, and consequences (Galster et al. 2001).

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A common critique of urban sprawl is that its widespread implementation has created segregated, automobile-oriented and unsustainable development on the edge of most Canadian cities (Fischler 2004). Developers are comfortable with this mode of development due to the marketability of the suburban ideal of single-family homes on larger lots accessible by the independence-granting automobile (Lewinberg and Gabor 1997). Suburbs also have a great appeal and a vast number of Canadians choose to live in the suburbs (Grant 2006). Growth management assumes that growth is inevitable, and develops plans and programs designed to influence the rate, type, location, and the cost of suburban growth. Within that context, sustainable planning and design in the suburbs has focused on a number of physical attributes to influence the places where people live, work, and shop, so that different community identities can evolve. The outcome of such planning practices is rarely evaluated and in most of the cases research has identified significant implementation gaps (see Tsenkova and Damiani 2009 for detailed review). One of the fundamental challenges in the planning of new suburban communities still remains centered on questions of diversity, quality of life and social cohesion. The experiences of residents are related to physical/structural characteristics, amenities, diversity of housing types, street patterns and distinctive features. Yet, social processes, relationships and perceptions of neighbourhood cohesion may

contribute to the attractiveness of the suburban model in a significant manner but are not necessarily explored in the planning literature.

The new communities provide places for people to live, work, and shop and engage residents in more sustainable community practices—energy saving and composting, community gardening, green initiatives, etc. Recent movements such as smart growth, livable communities and eco-cities aim at improved equity and quality of life in metropolitan areas and have strong implications for urban planning and design. Two current responses to sprawl—Smart Growth and New Urbanism—have influenced urban planning since the mid-1990s (Farr 2007). Smart Growth has been adopted by cities and municipalities across Canada with a fair degree of flexibility and adjustment of the original ten principles. In Canada the implementation gap is attributed to the lack of political will, little interest from the development community to embrace changes in design, and consumer preference for low density residential suburbs (Grant 2003). New Urbanism adopts many of the principles but emphasizes the importance of urban form and structure. *The Charter of New Urbanism* (1996) advocates high quality urban design, pedestrian friendly environments, attractive streets, parks, and squares. It promotes the mix of uses, fine grain design, connectivity, order, coherence and visual understanding and sense of place (Grant 2006). Urban plans and policies in Canada developed during the last 15 years reflect some of these principles such as mixed use, transit-oriented, high-density development, quality design and flexible zoning (Gordon 2003), but the practical implementation has been limited demonstrating the ‘say-do-gap’ in sustainable community planning.

Calgary today is at crossroads with processes like ‘*ImagineCalgary*’ and ‘*Plan-It*’ setting a vision for a sustainable city for the next 70 years. Smart Growth is at the core of this vision with inner city intensification and smart suburban communities being fundamental strategies of implementation. Over the past several years, the planning for Calgary’s suburban communities has made significant strides in this direction. The City of Calgary is committed to

efficient growth management guided by sustainability principles adopted in 2007. Box 19.1 documents a high-level commitment on behalf of city politicians, planners and policy makers in that regard. There is a considerable overlap with the ten principles of smart growth.

Box 19.1 Sustainability Principles of The City of Calgary

- Create a range of housing opportunities
- Create walkable environments
- Foster distinctive, attractive communities with a strong sense of place
- Provide a variety of transportation options
- Preserve open space, agricultural land, natural beauty and critical environmental areas
- Mix land uses
- Strategically direct and manage redevelopment opportunities in existing areas
- Support compact development
- Connect people to goods and services locally, regionally and globally
- Provide transportation services in a safe, effective, affordable and efficient manner that ensures reasonable accessibility to all areas of the city for all citizens
- Utilize green infrastructure and buildings.

Several high-level policy reviews and strategic plans place an explicit emphasis on new approaches to the planning of sustainable communities such as the *Sustainable Suburbs Review*, *Smart Growth Rating System and Environmental Footprint Project*. Ultimately the City is promoting sustainable development with an emphasis on fiscal, environmental and social sustainability. How does it work? What is the impact of such policies on physical patterns as well as social processes?

19.2 Research Objectives

The research explores the outcome of such visions and the implementation of sustainable communities in practice using two case study

suburban neighbourhoods in Calgary. Our approach is based on the premise that a comprehensive analysis needs to link the physical, functional and social dimensions of a neighbourhood to allow a multidimensional interpretation of similarities and differences in suburban neighbourhood planning and everyday life. The objective of our research is to explore an important aspect of social sustainability—neighbourhood cohesion—in a suburban context by comparing performance across three dimensions—sense of place attachment, sense of community, and social interaction of residents. We hypothesize that neighbourhood cohesion might be high, but there might be some physical and functional characteristics that define important differences. While the implementation of suburban community plans might be relatively similar in terms of development models and marketing strategies, the resulting social processes and neighbourhood cohesion may demonstrate significant differences. In particular, we focus our empirical work on two similar suburban neighbourhoods in Calgary, planned and built under the same planning policy and development type, with similar physical and functional attributes, as well as similar location with respect to the city. Each of the two neighbourhoods has a single access point and an internal non-permeable curvilinear street pattern. Given such physical configuration, reinforced by natural buffers—ravine, forest, river we consider these spatial entities as semi-gated communities with a relatively high degree of spatial isolation from the rest of the city, not necessarily behind physical walls. We suggest that high neighbourhood cohesion might be one of the possible reasons for the long-term success of the suburban neighbourhood planning model and its attractiveness to residents, but that semi-gatedness, single access, and physical form might be important predictors of differences in dimensions of neighbourhood cohesion. Urban planners and scholars who are working at improving existing suburban residential environments could acknowledge and appreciate these nuanced differences in physical form and function which impacted the sense of cohesion. Given the continuous growth of the suburbs

in Canada, and the importance of neighbourhood planning in this context, we expect that such insights are important for Canadian planners.

19.3 Social Sustainability and Quality of Life

The “suburban question” explores the environmental and social sustainability of suburban neighbourhoods (Kirby and Modarres 2010) with an emphasis on social cohesion and social capital of residents (Walks 2013). Suburbs have been associated with urban sprawl, lack of diversity of land uses, functions, housing types and social isolation. Many would agree that the suburbs have a sustainability problem yet the growth of many cities especially in North America continues to be suburban. Diversity refers to the opportunities for people of different lifestyles to live and be active in the community. It recognizes that the community needs to be accessible to people of different economic backgrounds and that the daily service, retail and educational needs of various residents must be met by the community’s facilities and amenities. This is reflected in planning policies promoting housing choice and local amenities (commercial, educational, open spaces) that cater to many household types and lifestyles.

Social sustainability in the planning literature is described as a “life-enhancing condition” (Greaney 2015). Some factors which contribute to socially sustainable communities are safety, community cohesion, decent housing, accessibility to services, employment, and social justice (Dempsey et al. 2011). These dimensions of social sustainability closely align with mixed-income development, socially inclusive housing that would meet basic needs such as safety and affordability and provide opportunities for social interaction. Studies of suburban communities identify uniform patterns of development and fiscal zoning as a way of encouraging socio-spatial exclusion, creating enclaves of people with similar socio-economic status that leads to less community integration and engagement (Gideon et al. 2010). Overall, there is a general consensus in the

planning literature about the limited effectiveness of city-wide sustainability objectives and policies and their implementation in local community plans in the suburbs, particularly when it comes to social sustainability (Conroy and Berke 2004; Tsenkova and Damiani 2009). Notwithstanding these considerations, another important aspect of social sustainability is associated with quality of life, neighbourhood attachment, satisfaction and sense of belonging.

The familiar negative trope for the term suburban is “anti-urban” (Kotkin 2005). Anecdotal evidence points to perceptions of good quality of life in the suburban environment enhanced by affordability and access to generous open space and high housing standards. The Canadian suburban experience is often portrayed as a desirable option for families that seek upward mobility. In the context of social sustainability, social life in suburban communities often provides opportunities for social interaction at the neighbourhood scale, spaces for play, spaces for recreation and reconnection with nature. While the definitions of socially sustainable development are ambitious, at the neighbourhood level it can be defined as a type of:

development (and/or growth) that is compatible with harmonious evolution of civil society, fostering an environment conducive to the compatible cohabitation of culturally and socially diverse groups while at the same time encouraging social integration, with improvements in the quality of life for all segments of the population (Polèse and Stren 2000, p. 15).

Socially sustainable communities are places where people thrive to enjoy good health and high quality of life. An integral component to social sustainability of a community is social cohesion within a neighbourhood, which refers to harmonious interactions and mutual support among residents, and results in residents’ satisfaction with life (Cheung and Leung 2011). Social sustainability blends traditional social policy principles, such as equity and diversity, with emerging issues concerning social cohesion, social capital, and more recently with the notions of happiness, wellbeing and quality of life (Woodcraft et al. 2012). Social sustainability

should be seen as a process for creating successful places that combines the design of the physical realm with the social realm. Physical factors include accessibility and diversity of local services, local environmental quality and amenity, sustainable and walkable neighbourhoods, etc. Social factors emphasized in our research include sense of safety, social interaction, residential stability (vs. turnover), sense of community and belonging, sense of place, and place identity. We argue that these aspects are associated with quality of life for people leading a suburban lifestyle.

Social sustainability is about long-term success of a community that causes a place to last. At this point, it may be instructive to differentiate between three types/phases of social sustainability: development, bridge, and maintenance (Vallance et al. 2011). Higher-order needs such as social capital and social cohesion are subsumed under development social sustainability. Bridge social sustainability builds connections between people and the bio-physical environment by promoting eco-friendly behavior. Finally, maintenance social sustainability concerns the way social and cultural preferences are maintained over time and refers to people’s practices and preferences for low-density suburban living and the use of the private car, practices which underpin people’s quality of life, social networks, and leisure opportunities. Based on that typology, our study examines the relation between development and maintenance social sustainability through the lens of neighbourhood cohesion. This adds a significant and important dimension to quality of life and indeed creates a different and more nuanced interpretation of such social processes in the suburban environment.

19.4 Neighbourhood Cohesion: A Conceptual Departure

Callies et al. (2003, p. 183) observe that the term ‘sense of community’ is borrowed from the field of community psychology and is defined as: “the feeling an individual has about belonging to a

group and involves the strength of the attachment people feel for their communities or neighbourhoods.” Buckner (1988) conceptualizes neighbourhood cohesion as a collective-level attribute, equivalent to ‘sense of community’. He defines three dimensions of neighbourhood cohesion: psychological sense of community (PSOC), place-attachment, and social interaction/ neighboring. Other authors conceptualize neighbourhood cohesion in a different manner. Talen (2000) focuses on two fundamental aspects: (1) affective forms of community (that encompass Buckner’s dimensions of PSOC and place attachment); and (2) interactive forms of community, that encompass Buckner’s third dimension, i.e. social interaction (social networks and emotional support).

While there seems to be a consensus that sense of community and neighbourhood cohesion are desirable outcomes that contribute to better neighbourhoods (Rogers and Sukolratanamete 2009), such outcomes are not necessarily associated with suburban master planned communities but must be consciously produced and maintained (Callies et al. 2003). Gated communities have emerged as a strategy to address the increasingly absent sense of community and sense of belonging in the suburbs (Wilson-Doenges 2000). This rests on the observation that gating of a residential development defines a common territory imbued with shared values and identities that creates a sense of community for the residents (Le Goix 2004). Blandy and Lister (2005) demonstrate that expectation of neighborliness within gated communities is high, the presence of leisure facilities is a contributing factor, as is self-management and social control attributed to the functioning of a homeowners’ association of these privatized developments. In addition, uniformity of physical appearance of the neighbourhood and conformity of the residents with common rules and norms allow for regaining a sense of belonging (Genis 2007).

Since 1990s, the marketing of suburban communities centers on commodification of a lifestyle, images of prestige and security, as well as nostalgia, in the case of neo-traditional urbanism (Grant 2006, p. 46). The ‘social quality’ and

‘purchasing power’ of those who buy into such communities are prime commercial targets, in addition to people’s sensitivity to ‘aesthetics’ (Raposo 2006, p. 51). Gated communities seek to create a sense of community through the homogeneity and commonality of their residents, while New Urbanism emphasizes the importance of architectural character, walkability, streetscapes and housing diversity with the assumption that neo-traditional planning strategies might have a positive effect on neighbourhood cohesion (Grant 2007, p. 493).

The premise underlying these concepts is that of a physical determinism in shaping ‘community’ (Talen 2000). The physical emphasis of lifestyle communities is on golf courses and leisure amenities. The physical emphasis of prestige communities is on aesthetics of the built environment and landscape. The physical emphasis of security communities are the walls and gates, i.e. controlled access. Talen (2000, p. 178) argues against physical determinism as a way to create and sustain community; she argues that planning such physically contingent communities promotes social homogeneity and exclusion. Even if the physical environment enables and encourages social interaction, such effects do not necessarily extend deep to forming a sense of community, in the sense of long-term social networks. Rosenblatt (2005) argues that gated communities and neo-traditional neighbourhoods have succeeded in commodifying and selling community as a ‘product’ not as a ‘process’ What are the implications of commodification on neighbourhood cohesion within such neighbourhoods? Distilling product from process, to quote Rosenblatt (2005, p. 7), “engenders a particular ‘commodified world view’ which impacts on the way we interact with and consider others.”

This paradox of commodification of buying into a community while not authentically interacting within it is resolved by Bauman’s (2003, p. 11) explanation that seeking a ‘community of similarity’ not only signifies withdrawal from ‘the otherness outside’ but also from the ‘turbulent’ interaction inside. Bauman’s (1998, p. 20) notion of ‘non-neighbourhood’ condition,

i.e. ‘immunity from local interference’, explains why sense of community and social interaction within commodified communities are reduced to an encounter between ‘surfaces’ (Bauman 2001, p. 147), i.e. an encounter not deep enough to create an interactive form of community. Rosenblatt et al. (2009) in their empirical work in a master-planned community in Australia confirm that it is the affective dimensions of sense of community, rather than interactive dimensions, that are fostered by commodification. This claim corroborates the results of research by Pufe (2009) on the loss of place-making function due to the mass production of privatized residential communities in Miami and their lack of possibilities for outdoor activities and social interaction.

19.5 Neighbourhood Cohesion in the Suburbs

In our empirical study we explore neighbourhood cohesion in two master-planned communities in Calgary—Discovery Ridge and Valley Ridge. These neighborhoods are typical suburban residential developments (built in the early 2000s) that are located in a relatively similar position to the city, about 17 km from downtown in the western periphery of the city. These are conceptually appropriate case studies that illustrate the typical pattern of suburban development where the process is commodified and the marketing emphasizes a suburban lifestyle of prestige, quality amenities, proximity to natural features (river, woods), a sense of seclusion and gated-ness. The process of development is usually controlled by one major private developer with a responsibility to acquire planning approval (Area Structure Plan), service the land, maintain compliance with planning objectives, targets, and design guidelines, while selling different plots of land to private builders in different phases/increments of the development process (Communities 2014; Tsenkova and Damiani 2009). The physical planning of these master-planned communities utilizes single access and

cul-de-sac approach to shape enclaves within the neighbourhood with similar housing types, forms of ownership and aesthetics.

The assumption underlying these developments is that this planning strategy will lead to some degree of neighbourhood cohesion that enables and encourages social interaction but may not extend deep to forming a sense of community. Our research explores three aspects of gated-ness in the neighbourhood defined by: (1) Sense of spatial enclosure (one access point to the neighbourhood, non-permeable streets, culs-de-sac); (2) Limited dimensions of functionality (predominantly low-density residential land uses, high share of single-family homes, serviced with basic amenities; and (3) Presence of unique elements of the natural landscape that reinforce a sense of enclosure in the neighbourhood (natural forest, an artificial lake, or an artificial golf course). These physical attributes prevent internal and external connectivity, reinforce a degree of control over the suburban neighbourhood, ensure predictable planning outcome (single-family home on a large lot), provide opportunities for commodification and reinforce perception of similarity to others (Colombo et al. 2001; Tsenkova and French 2011). Such similarity, in return, might facilitate greater social interaction within suburban neighbourhoods that include activities such as asking for help and informal visiting (Talen 2000). The experience of gated-ness in the neighbourhood and sense of enclosure, reinforced by unique features of the natural landscape, could enhance the attachment of suburban residents with the place. This in turn is manifested through affective, cognitive, and behavioural psychological processes (Scannell and Gifford 2010) that collectively define degrees of neighbourhood cohesion.

This research seeks to contribute to the literature on neighborhood cohesion by exploring issues that have not attracted the attention of planning scholars. We explore the physical planning aspects of newly built suburban neighbourhoods, focusing on key characteristics such as single-access, connectivity, built form, housing typologies and layout of land uses.

These physical characteristics of the neighbourhood have a critical impact upon the social aspects of the community—psychological sense of community, place attachment, and social interaction of residents. The empirical research contributes to the literature on semi-gated communities by claiming that degrees of neighbourhood cohesion can differ significantly from one community to the other based on residents' sense of uniqueness of their neighborhood and their sense of enclosure. The larger contribution of the paper is bringing back the conversation to the table between the physical dimension of the neighborhood and the social dimension. We also systematically explore the impact of factors affecting neighborhood cohesion that have been identified in the literature, such as length of residence in the neighborhood, household income, tenure and gender (Dekker and Bolt 2005; Hipp and Perrin 2006; Lewicka 2010; Wilson-Doenges 2000).

The concept of neighbourhood cohesion is operationalized by measuring it in three dimensions articulated by Buckner (1988):

- Psychological sense of community (*affective dimension*)
- Place attachment (*affective dimension*)
- Neighborliness or social interaction (*interactive dimension*)

While Buckner acknowledged that his index for measuring neighborhood cohesion needs to account for other systemic variables that impact neighborhoods, he focused predominantly on social processes without necessarily accounting for physical form and other functional attributes. We have considered these salient characteristics in our analysis taking into account extrinsic factors such as physical properties that may directly or indirectly impact on the sense of cohesion of residents, e.g. the size, location, topography, amenities and architecture (building types and style) in the neighbourhood. We explored another important dimension that relates to residents' perceptions of the uniqueness of their neighbourhood, mostly in relation to their sense of spatial isolation (semi-gatedness), seclusion,

relationship with the natural environment, but also specific social practices.¹ The sense of uniqueness of the neighbourhood, as perceived by residents, was also measured quantitatively through a survey questionnaire and qualitatively through semi-structured interviews. A neighbourhood cohesion index (NCI) was calculated that accounts for the three aspects of cohesion (PSOC, place attachment, and neighborliness). Drawing on Buckner (1988), we used a set of questions with a 5-point Likert scale to measure neighbourhood cohesion. The survey questionnaire included additional questions to probe for sense of gated-ness/seclusion, uniqueness of activities, social practices, and perceptions of the landscape as a way to capture extrinsic factors that Buckner hypothesized. Several studies have confirmed the robustness of using the NCI index to measure cohesion, such as the work of Robinson and Wilkinson (1995), Townshend (2002), and Townshend et al. (2015). It proved to be a simple measure for differentiating between neighbourhoods, and one that may explain the attractiveness of the suburban model. Buckner (1988), in his original study of suburban neighbourhoods in Maryland, set a range for the values of NCI—strong (3.5–5), moderate (2.5–3.5) or weak (1–2.5).

19.6 Methodology

The methodology applies methods of literature review, planning policy and community plan

¹For instance, explicit items of the survey questionnaire probe for sense of uniqueness; e.g. "I consider my neighbourhood to be unique", "There are certain dress codes, social practices, or events that characterize my neighbourhood", "Having a well-maintained landscape is important to me" and "It is easy to distinguish residents from non-residents who are walking in the neighbourhood". In the semi-structured interviews, more explicit questions were asked. For instance, "Do you think you neighbourhood has particular features not found in other neighbourhoods?" and "Do you consider your neighbourhood affordable to people of different income categories or do you consider it an exclusive neighbourhood?"

content analysis, case study analysis, field observations and empirical work—interviews of residents and key informants. For further details on the methodology adopted, please refer to Youssef (2015).

19.6.1 Choice of Case Studies

For the selection of the two neighbourhoods, three queries were carried out using GIS software to filter census tracts within Calgary metropolitan area. The queries identified census tracts whose housing inventory has been built since the year 2000, and census tracts that have above average dwelling value and above average household income in order to ensure similar socio-economic status. The total number of census tracts amounted to 17 corresponding to nine neighbourhoods. They are Royal Oak, Tuscany, Valley Ridge, Crestmont, Cougar Ridge, West Springs, Aspen Woods, Springbank, and Discovery Ridge. The neighbourhoods of Valley Ridge and Discovery Ridge were identified as comparable, meeting the criteria for this research in terms of being representative of similar planning policies, development model, location in the city, physical form, single-access and key socio-economic characteristics of neighbourhood residents.

19.6.2 Face-to-Face and Self-administered Surveys

A total of 195 surveys were conducted in both neighbourhoods, 101 participants in Valley Ridge and 94 participants in Discovery Ridge. This equals or exceeds the required sample size of 94 for each neighbourhood for a confidence level of 95% and a confidence interval of 10 using a sample size calculator. All 195 participants answered each of the 23 questions of the survey. Percentage of male to female participants in the survey was 51–48% in Valley Ridge and 45–54% in Discovery Ridge. The first part of the survey collected information on gender, household income and length of residence within the neighbourhood.

Care was taken to target participants from different areas within the neighbourhood (residents along the main boulevard as well as residents within culs-de-sac enclaves) in order to avoid any bias due to particular location within a neighbourhood (see Figs. 19.1 and 19.2). A suitable number of participants from each sub-area within each neighbourhood was targeted, depending on size of the sub-area and the willingness of residents to participate.

19.6.3 Semi-structured Interviews

In addition to the survey questionnaire, semi-structured interviews were conducted with 12 residents from each case study in order to get more in-depth knowledge of survey responses. The semi-structured interview consisted of 10 questions. A few of these questions asked for residents' perception of the neighbourhood, its unique physical features and appeal vis-à-vis other neighbourhoods in the city. Other questions probed for factors that impacted their sense of cohesion such as the feeling of safety enhanced by the single-entry point to the neighbourhood, attachment, social interaction and friendliness of neighbours as well as sense of similarity of residents and common values. Participants included a couple of residents who serve on the board of the homeowner association or community association to discuss their perception of cohesion within their community. All 24 interviews were conducted face-to-face, except for one conducted by phone, and a few that were self-administered during field visits. An interview was also conducted with three municipal planners of the City of Calgary to develop a better understanding of the strategies for the design and approval of new suburban neighbourhoods.

Figures 19.1 and 19.2 show the number of surveys performed in each sub-area of the neighbourhoods. It was assumed that residents in different areas would have a different sense of cohesion due to changing topographical features such as place of residence on a hill or plateau, or fronting a river, etc. However, preliminary



Fig. 19.1 Number of survey participants by area of residence in Valley Ridge. (Source: Overlay by Authors on Google Satellite Map 2015)

analysis in the case of Valley Ridge did not show any significant differences between subareas of the neighbourhood, neither in overall cohesion nor its three dimensions.

19.7 Description of Case Studies

The two suburban neighbourhoods—Valley Ridge and Discovery Ridge—are built since 2001 on the edge of Calgary and overlook the Bow and the Elbow river. The street pattern follows the enclosure model through the use of culs-de-sac, curvilinear pattern of streets and single access. Figure 19.3 shows the location of the neighbourhoods relative to downtown; each are

about 17 km from downtown. The neighbourhoods are bounded by the western limits of the City of Calgary.

According to Census (2011) information, Valley Ridge accommodates a population of 5042 in 1731 dwelling units at a density of 1542 persons/km², while Discovery Ridge has a population of 4398 in 1653 dwelling units at a density of 1200 persons/km². In terms of services, each neighbourhood has a shopping center with basic services for local residents, but no elementary school within the neighbourhood. Both neighbourhoods have ample green space and parks for recreation and community activities. One major difference is that one has a large golf course permeating the neighbourhood, while the

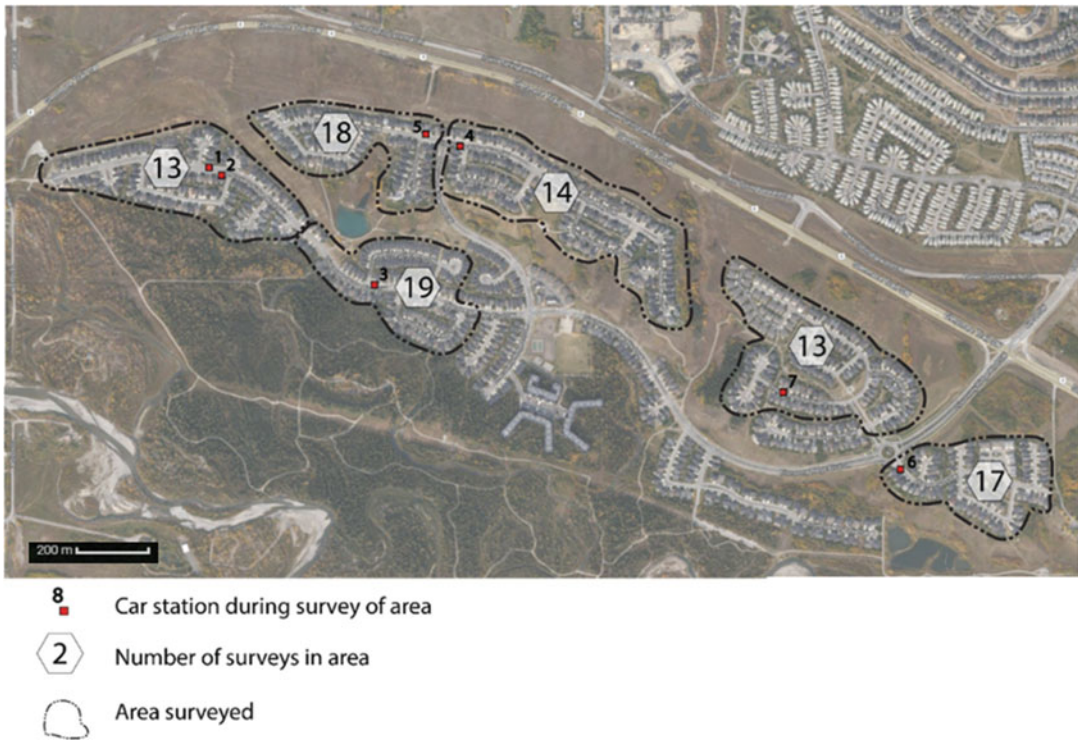


Fig. 19.2 Number of survey participants by area of residence in Discovery Ridge. (Source: Overlay by Authors on Google Satellite Map 2015)

other has a large natural forest, the Griffith Woods, which encloses the residential development of the neighbourhood. The following two Figs. 19.4 and 19.5 show the physical layout with major arterial roads, boulevards and housing clusters within each neighbourhood.

Key attributes defining socio-demographic and physical-economic features of the neighbourhoods are presented in Table 19.1.

Both neighbourhoods have a comparable land area of 268 and 278 ha, respectively, a total population of around 5000 residents, and a residential density of 6 units per acre. In terms of housing characteristics, the neighbourhood of Valley Ridge has a higher percentage of single-family houses (96%) than Discovery Ridge (56%). When we look at the tenure differences between the neighbourhoods. Valley Ridge has a higher share of homeownership (98%) compared to Discovery Ridge (83%).

The following two Figs. 19.6 and 19.7 illustrate single family houses in each neighbourhood to give a sense of architectural design and style. Discovery Ridge has a distinctive group of multi-family housing in the core of the neighbourhood, adjacent to a 'gated community' with high-end single-family homes. The nested gated enclave has restricted access by a gate and an entry code for residents of the long cul-de-sac. These important differences explain the higher share of households experiencing affordability problems (19%) within Discovery Ridge, probably owners and tenants in the higher density enclave, as well as the higher average selling price of over \$700,000 (twice the city average) attributed to the exclusiveness of the single-family homes.

In a commodified suburban neighbourhood model, higher prices will be associated with higher resident income and this is certainly the case in Discovery Ridge.

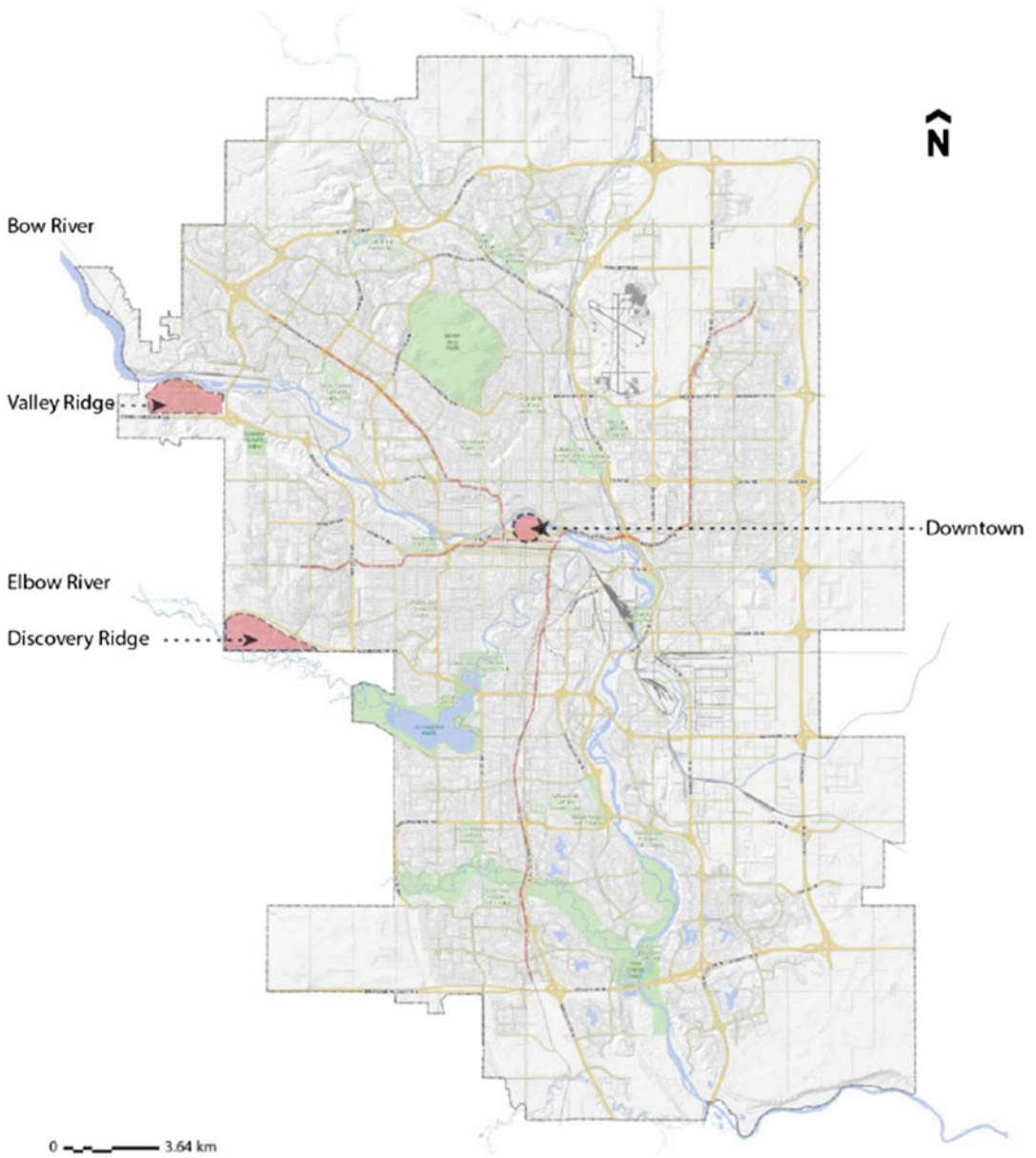


Fig. 19.3 City of Calgary: location of case studies. (Source: Overlay by Authors on City of Calgary Open Data Map 2015)

The neighbourhood core of Discovery Ridge has a joint use site that provides an ice rink, a skating area, and a hockey rink, two tennis courts adjacent to the existing soccer field and basketball court. The recreational amenities, complemented

by a small shopping centre with medical services, communicate a particular lifestyle of active, healthy living and create a focal point of interaction. This is contrary to the case of Valley Ridge where the shopping center is located near the

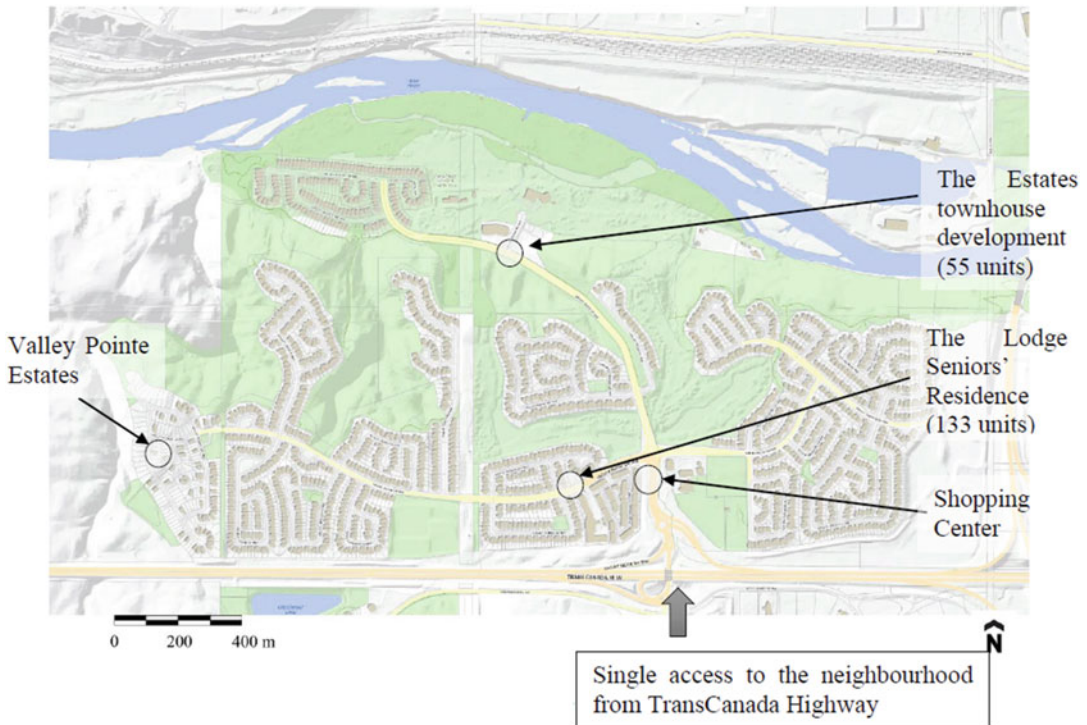


Fig. 19.4 Physical layout of Valley Ridge. (Source: Overlay by Authors on City of Calgary Open Data Map 2015)

entry point to the neighbourhood, adjacent to the soccer field and playground, attracting customers who may not be residents of the neighbourhood.²

Valley Ridge has a ravine overlooking the Bow River. Residents of Valley Ridge living on the plateau are socially differentiated compared to those living on the hill or overlooking the river, as interviewees remarked. Discovery Ridge has a distinctive topography, giving residents on top of the hill higher social status that comes with the enjoyment of a panoramic view of the neighbourhood compared to those living in apartment units down beside the neighbourhood core.

²In Valley Ridge, a regional shopping center, Calgary West Retail Market (with 650,000 ft² of retail, restaurant, entertainment, and amenities) is planned for construction. Interviews with residents indicated that such a project would impact on the serenity of the neighbourhood. Senior residents would prefer medical centers and proximity to hospitals for the external connectivity of their neighbourhood, while younger residents valued the proximity of Canada Olympic Park as a place for winter sports leisure activity.

The natural forest provides a respite for the majority of residents as their houses front onto the greenery of pine trees, providing another visible symbolic marker for social differentiation.

19.8 Results: Differences in Neighbourhood Cohesion

The concept of neighbourhood cohesion was operationalized by measuring it through three dimensions after Buckner (1988): the psychological sense of community (PSOC), place attachment, and neighborliness. A neighbourhood cohesion index (NCI) was calculated for each of the two neighbourhoods as the average along all three cohesion dimensions. Following Buckner's NCI calculation represented by the mean value of the 18-item questionnaire, the NCI for Valley Ridge was 3.74 (SD = 0.54) compared to 3.94 (SD = 0.58) for Discovery Ridge. The neighbourhood cohesion index is considered relatively high, suggesting that Valley Ridge and

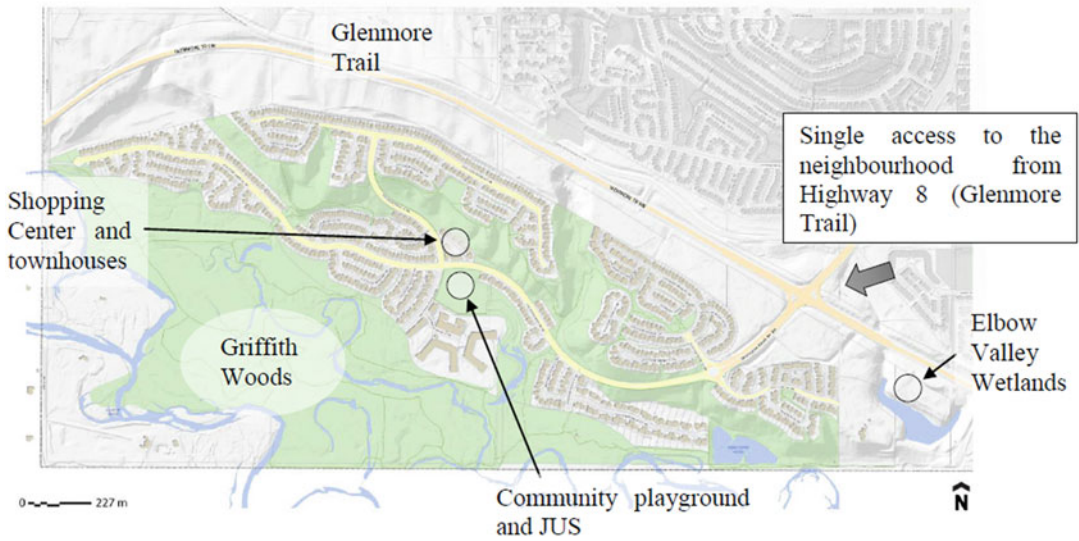


Fig. 19.5 Physical layout of Discovery Ridge. (Source: Overlay by Authors on City of Calgary Open Data Map 2015)

Table 19.1 Summary of socio-economic and physical aspects of the case studies

Case study		Valley ridge	Discovery ridge
Socio-demographic	Population in 2011	5055	4395
	Residential density (upa)	6	6 (10, core)
	% aged 20–60 years	56%	58.9%
	% of persons living alone	3.5%	8.6%
	% of lone-parent families	7.5%	6.3%
	% of immigrant population	21.4%	23.1%
	% of low income households	2.8%	2.8%
	Turnover (% of non-movers over 5 years)	66.4%	50.1%
	Average household income	\$167,992	\$193,091
Physical and economic	Land area (ha)	268	278
	No. of access points	1	1
	% of owned dwellings	98%	83%
	Avg. size of houses (sq. ft.)	2342	2518
	% of single-family houses	96%	56%
	% of semi-detached houses	0%	6.5%
	% of townhouses	4%	3%
	Average value of dwelling	\$546,847	\$712,974
	Average selling price/sq. ft.	\$413	\$396
% of households spending more than 30% of total household income	12%	19%	

Source: Authors' estimates based on Census 2011 data



Fig. 19.6 Single family houses in Valley Ridge (Source: photo by authors)



Fig. 19.7 Single family houses in Discovery Ridge (Source: photo by authors)

Discovery Ridge are neighbourhoods whose residents have a strong sense of place attachment and cohesion. However, residents of Discovery Ridge had a significantly higher sense of place attachment, higher sense of neighborliness, and higher psychological sense of community as well as a higher sense of uniqueness than residents of Valley Ridge.

Three dimensions of the neighbourhood cohesion construct were also calculated for each case study by referring to Buckner's grouping of items for the three components of neighbourhood cohesion (see Table 19.2). Items 19–23 comprised the dimension of Sense of Identity/Uniqueness. Each aspect or dimension was calculated as the mean of the scores on its items, each given a score from 1 (strongly agree) to 5 (strongly disagree). The

Table 19.2 Corresponding survey items for aspects of cohesion

Source	Dimension	Total items	Survey item
Buckner's study	PSOC	9	2,4,6,8,10,12,14,16,18
	Place attachment	3	1,5,13
	Neighbourliness	5	3,7,9,11,17

Source: Author Analysis

Table 19.3 Mean and SD for each component by neighbourhood

Component	Neighbourhood	Mean	Standard deviation
PSOC	Valley ridge	3.67	0.49
	Discovery ridge	3.93	0.52
Place attachment	Valley ridge	4.18	0.66
	Discovery ridge	4.39	0.50
Neighborliness	Valley ridge	3.61	0.72
	Discovery ridge	3.88	0.69
Identity and uniqueness	Valley ridge	3.21	0.58
	Discovery ridge	3.52	0.55

Source: Author Analysis

Table 19.4 Multivariate results for the effect of neighbourhood

Source	Dependent variable	F	Df	Sig./Prob.	Effect size	Observed power
Neighbourhood	PSOC	12.970	1, 190	0.000	0.064	0.948
	Place attachment	6.017	1, 190	0.015	0.031	0.685
	Neighborliness	7.237	1, 190	0.008	0.037	0.763
	Uniqueness	14.435	1, 190	0.000	0.071	0.966

Source: Author Analysis

following table illustrates each dimension with its corresponding items from the survey questionnaire (Survey questions are provided in the Annex).

Multivariate tests showed that the two neighbourhoods differed significantly with respect to each of the four dimensions [Wilk's $\lambda = 0.898$, $F(4, 187) = 5.313$, $p < 0.001$, effect size = 0.102, and power to detect effect was 0.970]. The following two tables show the differences between the mean values over the four dimensions as well as the results of the multivariate tests. The two tables also show results for the dimension of the perceived uniqueness of the neighbourhood. The results show that the sense of uniqueness was strong for Discovery Ridge and moderate for Valley Ridge. Multivariate analysis in Table 19.4 showed statistical significance for the effect of neighbourhood on all three aspects of cohesion as well as on the sense of uniqueness (Tables 19.3, 19.5 and 19.6).

As seen in the above table, in the case of Valley Ridge, sense of enclosure was significantly and positively correlated to overall Cohesion ($r = 0.316$, $p = 0.001$) as well as significantly and positively correlated to two subscales: PSOC ($r = 0.370$, $p < 0.001$) and Place Attachment ($r = 0.213$, $p < 0.05$). However, no significant correlation was found with the subscale of Neighbourliness.

As the results in the above table demonstrate, in Discovery Ridge the sense of enclosure was significantly and positively correlated to overall Cohesion ($r = 0.314$, $p < 0.01$) as well as significantly and positively correlated to two subscales: PSOC ($r = 0.368$, $p < 0.001$) and Neighborliness ($r = 0.267$, $p < 0.01$). However, no significant correlation was found with the subscale of Place Attachment.

There is a noticeable variety in architectural styles of individual houses in Discovery Ridge compared to Valley Ridge. Such characteristics

Table 19.5 Bivariate correlation between cohesion and sense of uniqueness for Valley Ridge

Buckner's scale	Pearson test	Sense of identity and uniqueness
PSOC	Pearson correlation	0.370 ^a
	Sig. (2-tailed)	0.000
	N	101
Place attachment	Pearson correlation	0.216 ^b
	Sig. (2-tailed)	0.032
	N	101
Neighborliness	Pearson correlation	0.186
	Sig. (2-tailed)	0.063
	N	101
Overall cohesion	Pearson correlation	0.316 ^a
	Sig. (2-tailed)	0.001
	N	101

^aCorrelation is significant at the 0.01 level (2-tailed)

^bCorrelation is significant at the 0.05 level (2-tailed)

Source: Author Analysis

Table 19.6 Bivariate correlation between cohesion and sense of uniqueness for discovery ridge

Buckner's scale	Pearson test	Sense of identity and uniqueness
PSOC	Pearson correlation	0.368 ^a
	Sig. (2-tailed)	0.000
	N	93
Place attachment	Pearson correlation	0.065
	Sig. (2-tailed)	0.531
	N	94
Neighborliness	Pearson correlation	0.267 ^a
	Sig. (2-tailed)	0.009
	N	94
Overall cohesion	Pearson correlation	0.314 ^a
	Sig. (2-tailed)	0.002
	N	93

^aCorrelation is significant at the 0.01 level (2-tailed)

Source: Author Analysis

translate into a higher perception of neighbourhood uniqueness with more than three-quarters of survey responses (78.7%) compared to less than half (49.5%) in Valley Ridge confirming this. In addition, those who strongly agreed that the neighbourhood was unique were more than a quarter (26.6%) in Discovery Ridge compared to less than 9% in Valley Ridge.

Concerning results of information collected from the survey questionnaire such as gender, length of residence, and household income and their correlation with sense of cohesion in the neighbourhood, results were contradictory to the literature. Results showed that neither gender, nor length of residence, nor household income had any significant correlation with sense of cohesion. There was a weak association between gender

and cohesion ($\eta = 0.104$). There was a weak association between length of residence and cohesion (Spearman's rho: $r_s = 0.077$, not significant, $p > 0.05$). There was also a weak association between household income and cohesion (Spearman's rho: $r_s = 0.101$, not significant, $p > 0.05$).

19.9 Dimensions of Neighbourhood Cohesion: Insights from Interviews

Many resident responses confirmed findings in the literature about the attractiveness of suburban location vis-à-vis the city in terms of getting the best of both worlds, having easy access to the city

services and its amenities (e.g. downtown, hospital, parks, shopping malls, etc.), and the advantage of a peripheral location with access to the natural environment, the river and the mountains, away from “the hustle and bustle of the city”. The single access point was referred to more often by residents of Discovery Ridge than those of Valley Ridge. It contributed to a higher sense of safety and familiarity within the neighbourhood, as well as a higher sense of neighbourliness. As expressed by interviewee no. 4: “I like the forest. I like my neighbors. It’s safe”. Interviewees no. 5, 9 and 10 remarked that the single access to the neighbourhood was an unique feature that ensured that only residents had a reason to be there. Interviewee no. 9, a resident of Discovery Ridge for 6 years, extolled the neighbourhood identity indirectly by stating that neighbourhoods that lack definite boundaries and a sense of enclosure also lack a sense of community. Three of the 12 interviewees (no. 1, 5, and 9) explicitly connected the single access point to their willingness to stop and talk with people in the neighbourhood, arguing that this limits the presence of outsiders and increases the probability of meeting local residents. Finally, the limited access prevented through traffic, while promoting a sense of tranquility.

The perception of ethnic mix within Discovery Ridge was lower compared to Valley Ridge, although census data showed that the percentages are relatively similar (23% and 21%, respectively). As Portes and Vickstrom (2011) mention, it is not the diversity per se but the unequal diversity that makes a difference. Perhaps, the faces of immigration are different and that is why residents in Valley Ridge perceived more diversity in their neighborhood. Other interviewees noted the general cleanliness of the neighbourhood, ample green spaces, and design features such as architectural controls, the presence of walkways that separated the backyards of houses to be unique features. This contrasted with Valley Ridge where one resident expressed the diminished role of the community association in keeping the landscape.

A good bus service was a factor that addressed the relative seclusion of the neighbourhood. The

interviewees alluded to the absence of a neighbourhood school negatively impacting sense of neighbourhood cohesion. Children go to different schools (public, private, denominational), which disrupts the sense of cohesion. This means that children of the same age do not have the opportunity to learn together or collaborate on school projects. Parents also do not have the opportunity to meet at school or class events. In other words, proximity of schools did not function as a catalyst for building community, nor contributed to defining the identity of the neighbourhood.

Concerning the size of the neighbourhood, one interviewee noted that the size of Valley Ridge promoted her sense or ‘feel’ of community. The relatively small size of the neighbourhood compared to other peripheral neighbourhoods in Calgary in the Northwest such as Tuscany would not be a preferred place of residence given its size and larger population (in the order of 18,000). Finally, an aspect that was mentioned in both neighbourhoods impacting on the sense of community was the similar social status of residents. For instance, residents who had children liked the fact that their neighbours also had children of the same age and shared the use of the playground and park. Meanwhile, interviewees who did not share similar social status had a diminished sense of community. This was the case of a resident who remembered growing up as an older teenager, while having neighbours with much younger children. It was also the case of a middle-aged single adult who did not have children and who commented that his sense of community was diminished because the neighbourhood and social events organized by the community association was intended for families with children.

19.10 Discussion

Our results did demonstrate that the two suburbs have high neighbourhood cohesions. Contrary to findings from the literature, our empirical work did not demonstrate that gender, length of residence, and household income had any significant

correlation with sense of cohesion. A higher share of single-family homes and a higher share of homeownership was also not a predictor of higher neighbourhood cohesion. The literature states that owners of single-family homes pay higher prices and would have higher interest in maintaining the status and quality of their neighbourhood. However, as statistical analysis and qualitative data of our study show, Discovery Ridge performed better than Valley Ridge in terms neighbourhood cohesion. Higher homeownership rates in Valley Ridge (98% compared to 83% in Discovery Ridge) did not translate into higher involvement and control conducive to a higher sense of neighbourhood cohesion. Notably, the share of single-family owners in Discovery Ridge (56%) was much lower than Valley Ridge (96%), yet the sense of cohesion was significantly higher.

With respect to physical form, a limited number of access points to a neighbourhood and the lack of permeability of the street pattern reinforced a sense of enclosure, and hence, a sense of identity. This is especially the case where entire neighbourhoods have a single entry. The sense of enclosure is also enhanced by the boundary condition (defined by rivers, natural reserve areas) and peripheral location of the two neighbourhoods. The single-access point caters to an entire population of between 4000 and 5000 persons. A higher sense of seclusion and privacy define everyday life in residential patterns in higher intensity boulevards and shopping areas in the core of the neighbourhood.

This physical layout in Discovery Ridge, though apparently similar, differs from Valley Ridge where very long culs-de-sac serve as organizing elements of smaller enclaves (sub-areas) dominated by single-family homes. The preliminary calculation of a neighbourhood cohesion index by sub-area within the neighbourhood (i.e. at the scale of culs-de-sac or at the larger scale of the three major sections of the neighbourhood, refer to map of Valley Ridge) did not reveal any significant difference in sense of cohesion. The neighbourhood of Discovery Ridge is relatively more secluded than Valley Ridge. Discovery Ridge is bounded by a natural forest, and the Tsuu T'ina Indian Reserve while

the single access entry point of Valley Ridge is on the busy TransCanada Highway. Both neighbourhoods have limited set of land uses and provide access to recreational amenities, parks and shopping/retail. Work opportunities are non-existent, and the schools are located in adjacent communities.

Due to the lack of services within the neighbourhoods, and the predominantly monofunctional character of land uses, the affective aspects of community seem to prevail over the interactive aspects for these peripherally located suburbs. The amenities within the neighbourhood play a more symbolic role in the image of the neighbourhood than a purely functional role. Both neighbourhoods enjoy viewpoints of the Rocky Mountains, providing a highly marketable dimension of uniqueness, especially when compared with suburban neighbourhoods in other parts of the city. Their physical topography, the presence of a hill, a ravine, a plateau, or a river, also serves a symbolic dimension, but in a commodified suburban model such topographical elements divide the neighbourhood into hierarchical units associated with social status, prestige and a different sense of place.

The presence of a formal homeowners' association in Discovery Ridge works towards the aesthetic symbolism of the neighbourhood to maintain the value of real estate.³ Contrary to the findings of Kingston et al. (1999), results of this research indicate that private governance of neighbourhoods may have impacted the aesthetic quality of the neighbourhood and sense of community. It could be argued that Discovery Ridge is more of a semi-gated community than Valley Ridge given that there are covenants attached to land titles for all dwelling units. So, residents are required to pay a homeowner association fee

³ Discovery Ridge has formed a homeowners' association called New Discovery Homeowners Association (NDHA) that collects \$300 per dwelling unit for the upkeep and maintenance of the landscape at higher standards than that of the city. This is contrary to Valley Ridge where one of the interviewees expressed the amateur level of the community association in looking after the landscape and its aesthetic dimension.

every year. Valley Ridge does not have a homeowner association that would enforce the rules and covenants attached to land titles.

Despite the perception of ordinariness of Valley Ridge, residents looked forward to ageing in place and expressed a sense of attachment to the neighbourhood. This suggests that there seems to be a relatively strong cohesion in suburban neighbourhoods that resonates with the personal temperament, lifestyle, and life trajectories of their residents. In other words, just like Kingston et al. (1999), our study suggests that residents of the same neighbourhood identify with neighbourhood-level qualities that in turn resonate with them, which explains the popularity of the suburban model. Research has also corroborated such findings for the impact of neighbourhood stability/mobility on sense of cohesion (e.g. Adams 1992; Kasarda and Janowitz 1974).

The development of low-density housing to accommodate urban growth in Canadian cities resulted in consumption of large tracts of land at the expense of the environment and the increasing economic and social costs. In recent years, there have been concerted efforts to deal with urban sprawl adopting high level planning policies on smart growth and sustainability (Benfield et al. 2001). The challenge in the future is to effectively implement these policies through community planning that creates new development models that are marketable and economically feasible, based on mixed-income housing in more compact, transit-oriented nodes with a sense of community identity (Tsenkova 2006). These new planning approaches are guided by a vision for sustainable cities as places that build on their assets and have a strong sense of place. Although community plans in Calgary create a vision for new sustainable communities that are compact, transit oriented, and diverse in terms of housing choices and neighbourhood amenities, the implementation process tends to be challenging and often diverges from the original concept. The planning policy framework advocates integration of land uses, clustering of neighbourhood activities and an environmentally sensitive approach to development. It articulates the need

to create a strong sense of place and neighbourhood identity through preservation of the cultural and environmental heritage on the land. However, as our analysis of two suburban neighbourhoods in Calgary indicates, the actual development is very different, perhaps due to existing regulatory practices, city standards for infrastructure provision, and developers' reluctance to embrace sustainability in practice and face higher risks and development costs.

19.11 Conclusion

The significant attention that urban growth management receives in different cities today highlights an ongoing debate, which questions the legitimacy of sustainable community planning and its ability to produce livable and sustainable neighbourhoods (Porter et al. 2002; Talen 2003). The achievements in that regard demonstrate the diversity of implementation challenges in different contexts, the evolution of policy development, public involvement and indeed the importance of social sustainability. In the future, planners must continue to focus on shared values and social processes at the neighbourhood level to understand drivers of change and their impact on sustainability. The struggle to understand these complex relationships and their manifestation at the neighbourhood is likely to persist for planners, developers, local politicians and city residents.

Our empirical work focused on neighbourhood cohesion, embedded in social sustainability, to capture the identity of suburban neighbourhoods in Calgary. It provided a simple, but robust framework for comparative analysis that explores important physical planning aspects of suburban neighbourhoods, focusing on key characteristics such as access, connectivity, built form, housing typologies and layout of land uses. These physical characteristics have a critical impact upon the social aspects of the community—psychological sense of community, place attachment, and social interaction of residents. Such dimensions are not necessarily explored in the literature in a comprehensive manner. We

considered the physical and the social attributes of a suburban neighbourhood as an assemblage “portraying social outcomes as relational kaleidoscopes in ever-changing combinatorial arrangements” (Storper and Scott 2016, p. 1131). In measuring neighbourhood cohesion, we focused on four dimensions, adding neighbourhood uniqueness to the original clusters established by Buckner (1988). We probed for sense of gated-ness/seclusion, uniqueness of activities, social practices, and perceptions of the landscape. We measured neighbourhood cohesion using NCI index. Just like other studies (Robinson and Wilkinson 1995; Townshend 2002; Townshend et al. 2015), we support the robustness of this approach and its usefulness as a simple measure for differentiating between neighbourhoods, as well as one that explains the attractiveness of the suburban model. This research confirms these findings and determines that neighbourhood cohesion is high in both neighbourhoods (exceeding 3.5) with Place Attachment and Psychological Sense of Community performing extremely well with values close to 4.4 and 3.9 out of 5, respectively.

The empirical work emphasized the identity/uniqueness aspect of a neighbourhood as a complex spatial and social arrangement defined by an ‘urban land nexus’ (Storper and Scott 2016). In many ways the suburban neighbourhood with its limited set of land uses and emphasis on housing, accessibility by automobile and recreational amenities can be perceived as an assemblage of houses, streets, local amenities, natural/topographic features. It has a physical/functional dimension, territorial dimension and social/symbolic dimension (DeLanda 2006). Bridging the physical dimension and the social dimension of a neighbourhood is important for the understanding of its identity and the reasons behind people’s choices to live in and identify with a place. In our comparative research of two suburban neighbourhoods in Calgary, with a comparative planning and development model and similar socio-economic, demographic, physical and structural characteristics, we found that the gated-ness and the spatial seclusion added an important dimension to neighbourhood

uniqueness, identity and sense of cohesion among residents. We do not advocate the use of gated-ness, reinforced by single access, culs-de-sacs and residential uses with a predictable pattern of single-family homes on large secluded lots. The literature often describes suburban neighbourhoods through this ‘monotonous lens’ reducing the suburban environment to a mere agglomeration of houses, streets, and green areas (Lukez 2007, p. 13). We argue that there seems to be a specific identity and a relatively high sense of neighbourhood cohesion in these places that explains their success in the essentially well-established commodified process of suburban expansion and growth management.

19.12 Annex

Survey Questionnaire

1. Overall, I am very happy to be living in this neighbourhood.
2. I feel like I belong in this neighbourhood.
3. I visit my neighbours in their homes.
4. The friendships and associations I have with other people in my neighbourhood mean a lot to me.
5. I would like to move out of this neighbourhood.
6. If the people in my neighbourhood were planning something, I’d think of it as something “we” were doing rather than something “they” were doing.
7. If I needed advice about something, I could go to someone in my neighbourhood.
8. I think I agree with most people in my neighbourhood about what is important in life.
9. I believe my neighbours would help me in an emergency.
10. I feel loyal to the people in my neighbourhood.
11. I borrow things and exchange favours with my neighbors.
12. I would be willing to work together with others on something to improve my neighbourhood.

13. I plan to remain a resident of this neighbourhood for a number of years.
 14. I like to think of myself as similar to the people who live in this neighbourhood.
 15. I rarely have neighbours over to my house to visit.
 16. I have a strong feeling of fellowship for the people who live in this neighbourhood.
 17. I regularly stop and talk with people in my neighbourhood.
 18. Living in this neighbourhood gives me a sense of community.
 19. People in my neighbourhood work together to keep children safe.
 20. I consider my neighbourhood to be unique.
 21. There are certain dress codes, social practices, or events that characterize my neighbourhood.
 22. Having a well-maintained landscape is important to me.
 23. It is easy to distinguish residents from non-residents who are walking in the neighbourhood.
7. As far as access to your neighbourhood is concerned, are there many entry points to your neighbourhood or only one or two?
 - (a) Does this affect your sense of safety in the neighbourhood?
 - (b) Does this affect your willingness to stop and talk with residents in the neighbourhood?
 8. Would you say that your neighbourhood gives you a sense of community? If so, in which of the following ways:
 - (a) The physical landscape is appealing.
 - (b) You feel safe.
 - (c) You feel attached to the neighbourhood.
 - (d) The residents are friendly, and this contributes towards your sense of belonging.
 - (e) You perceive other residents to be similar to you and you would agree with many residents on what is important in life.
 - (f) The lifestyle, events, and activities in the neighbourhood encourage you to stop and talk with other residents in your neighbourhood.
 - (g) Other. Please elaborate.
 9. In your opinion, is your neighbourhood community or homeowner association dealing with residents' issues in an informal way?
 10. Are there any other aspects of your neighbourhood that, in your opinion, positively impact the quality of your life here?

Interview Questions for Residents

1. How long have you been living in your current neighbourhood? Do you plan to remain as a resident of this neighbourhood for more than five years? Why or Why not?
2. Why did you choose to live in your current neighbourhood? Could you give three reasons in order of importance?
3. Do you think your neighbourhood has particular features that are not found in other neighbourhoods? If yes, could you state some of those features?
4. Are there any neighbourhoods that you perceive to be as appealing to live in as the neighbourhood you are currently living in? In what ways are the neighbourhoods equal?
5. Are there any neighbourhoods that you perceive to be superior to the neighbourhood you are currently living in? In what ways is the superior neighbourhood different?
6. Do you consider your neighbourhood affordable to people of different income categories (e.g. low income and middle income) or do

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Rural Smart Shrinkage and Perceptions of Quality of Life in the American Midwest 20

Kimberly E. Zarecor, David J. Peters, and Sara Hamideh

20.1 Introduction

American small towns and rural communities have been in economic and social upheaval since the 1980s. Most communities in the Midwest experienced this through shrinking populations, an exodus of younger people, job losses, and aging infrastructure (Kusmin 2016). One reason for these changes was the twentieth-century shift away from an industrial society towards a postindustrial one, which hit traditional rural sectors like agriculture and manufacturing particularly hard (Harvey 2005; Peters 2012). In agriculture, increased mechanization, scientific innovation, and the shift from family farms to factory-scale operations reduced labor needs and affected services and businesses that relied on the labor force and their families to prosper (Johnson and Scott 2015). Many manufacturers moved out

of the Midwest in search of lower labor and operational costs, heading first to the South and West in the United States and later to developing countries (Kaya 2010; Kochhar et al. 2005). As in many industrialized countries, low fertility rates in the United States contributed to population shrinkage and coincided with increasing rates of out-migration from rural counties, together accelerating the overall rural population loss (Martin et al. 2019; Martinez-Fernandez et al. 2016).

Due to these multiple trends, those who remain in small and rural Midwestern towns are typically older, less racially and ethnically diverse, and less likely to have a college degree than residents of growing metropolitan areas, including suburbs and cities in the same states (Parker et al. 2018). As populations shrink, communities face school consolidations, reductions in local services, shuttered retail districts, and increasing infrastructure costs on a per household basis. Data shows that these trends have continued consistently over several decades and are unlikely to be reversed (Johnson and Lichter 2016; Peters 2013). Individual communities also have little agency to intervene in these changes on their own, because they derive from social, economic, and geopolitical processes beyond their control.

Scale is another critical component in understanding this transition. Nineteenth-century agricultural exchange required numerous small service centers distributed across the land grid to facilitate the storage and sale of agricultural goods

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and supplies. As a result, towns in the region appeared at intervals determined by the late eighteenth-century principles of the Jeffersonian grid and territorial land surveys (Ghandour 2013). This settlement pattern created many small and rural places, all now competing with each other to hold on to their shrinking populations and find ways to attract new residents. For example, 53% of all cities and towns in the Midwest have populations under 500 people, totaling some 5100 communities (U.S. Census 2018). Sociologist Robert Wuthnow wrote that:

a visitor traveling through the region in 1980 would have come to a town every ten miles if they had been located equidistant from one another—every eight miles in Iowa, where towns were most abundant, and every fourteen miles in the Dakotas, where towns were less common. On average, there were seven towns in every county. Twenty-five years later, the visitor may have noticed that nearly all the towns still existed. But two of every three would have been smaller (Wuthnow 2011, p. 127).

For the smallest and most rural of these towns, the shrinkage was most pronounced, and as the percentage of the U.S. population living in urban and suburban communities continues to increase, it is unlikely that more than a few of these 10,000 communities will grow (Cromartie 2018). Despite this, current thinking about rural population loss focuses primarily on promoting high-cost investments in economic development and other uncertain growth strategies that attempt to increase economic activity and bring people back to these small towns (Peters 2019a).

This chapter presents findings from a multi-year research project about quality of life (QoL) in shrinking rural towns in the State of Iowa.¹ The project began with an overarching research question—how were some small and shrinking rural communities in Iowa able to maintain QoL as they lost population, jobs, and occupied housing units since 1990? An explicit goal of the project was to initiate a different conversation about rural communities by changing the dominant analytical paradigm from growth to one that encouraged

adaptation to population loss as a form of community resiliency. To integrate multiple methodological perspectives, the project was led by an interdisciplinary team from the fields of Architecture, Community and Regional Planning, Data Science, and Rural Sociology.² The research team did not approach population loss as a problem that needed to be solved, instead shrinkage was accepted as a given context. From this starting point, the work sought to develop new knowledge about how some communities had been better able to adapt to population loss than others. Using qualitative and quantitative data, derived from unique longitudinal polling, one-on-one interviews, and public data sources, the team investigated changing perceptions of QoL in a group of seven rural Iowa towns over the last 25 years. One of the project's contributions to QoL research was to situate this study in small and shrinking rural communities in the Midwest, which have rarely been the focus of academic research.

During 2 years of site visits, interviews, and multi-disciplinary data analysis, the team observed that the negative trends in QoL perceptions that often accompany population loss were best mitigated by investments in social capital, rather than in economic development planning undertaken with a growth mindset. In shrinking towns where residents had reported improving measures of QoL in longitudinal polling, the team found evidence of local activities over several decades to raise funds and contribute personal time to protect community services and build strong social networks. Data indicated that these communities were not wealthier, more educated, or demographically different than shrinking communities of similar sizes that experienced declining perceptions of QoL over the same period. The team therefore concluded that other factors were at work. Evidence indicated that purposeful collective action toward

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²The authors acknowledge the contributions of Marwan Ghandour (Louisiana State University) and Eric Rozier (formerly of Iowa State University) as members of the faculty research team that developed the grant proposal, research questions, and data analysis methods for this project.

shared goals significantly contributed to positive QoL trends (Peters et al. 2018; Peters and Zarecor 2017).

This process of adaptation, described in the project as *rural smart shrinkage*, operates within the social fabric of a community and intensifies over time. Motivated local individuals need to be present to lead these efforts and also to mentor others to assume positions of leadership in the future, otherwise the process cannot be sustained.³ Approaches observed in the communities that contributed to improved QoL perceptions included new services for seniors and children, creating shared community spaces, and encouraging new voices in leadership. As a framework for moving forward, rural smart shrinkage shifts away from the negative associations of population loss with community decline and turns instead to intentional and low-cost strategies that small rural communities can utilize as they look to the future.

The following sections describe the project methodology and findings. The chapter begins with an introduction to the research framework and terminology. A summary of the relevant shrinking cities concepts developed in Europe and the United States is presented to provide a context for research on rural smart shrinkage. This is followed by quantitative analysis of decennial longitudinal polling data that the team used to identify the effects of smart shrinkage processes on QoL perceptions. Some of the qualitative findings from interview data is integrated into the sections to provide a nuanced picture of

everyday life in shrinking rural places.⁴ The interview analysis uses a grounded theory approach to search for perceptions of QoL that are strong indicators of purposeful collective action, as such actions are important to the process of rural smart shrinkage. Finally, a set of principles, developed from the project data, is presented to help researchers differentiate rural smart shrinkage from related urban phenomena.

20.2 Smart Shrinkage as a Research Framework

The term “smart shrinkage” was borrowed from earlier studies of post-industrial and post-socialist European cities, many of which experienced significant population loss in the decades after the fall of the Berlin Wall. Across Europe, urban population loss accelerated in the 1980s and 1990s after the collapse of multiple industrial sectors led to economic crisis and out-migration from urban centers (Haase et al. 2016a). Large state subsidies protected uncompetitive industries in the Eastern Bloc until the end of Communist Party rule in 1989, but a period of instability, economic contraction, and structural change followed (Jeffries 2002). These trends were compounded by declining fertility rates as well as unequal growth patterns between regions and increased mobility within the European Union’s 28 member countries after 2004 (Castro-Martín and Cortina 2015). Following on the European research, scholars of American cities embraced the smart shrinkage framework to look at post-industrial shrinking cities such as Detroit, Michigan and Youngstown, Ohio (Dewar and Thomas 2012; Hollander 2018; Safford 2009). Smart shrinkage has also been applied in the American context to understand and develop strategies to mitigate the long-term negative

³ Qualitative data collection for this project occurred in 2018, therefore the data cannot provide empirical evidence about how smart shrinkage efforts may or may not be sustainable over time in the case study towns. The challenge of sustaining purposeful collective action can be inferred from the insights and information provided in interviews by local stakeholders who often attributed the success of specific initiatives to the personal contributions of individual leaders. In the next stage of the project with additional funding from the National Science Foundation, the team will develop and test a curriculum to share knowledge about smart shrinkage with rural Iowa towns vulnerable to decline and collect data over time about the effectiveness of such strategies in increasing perceptions of QoL and slowing community decline.

⁴ The research team conducted interviews with 45 individuals in seven Iowa communities from November 2017 to May 2018: Correctionville (pop. 800), Elma (pop. 528), Hamburg (pop. 1089), Montezuma (pop. 1412), Murray (pop. 710), Sac City (pop. 2074), Sheffield (pop. 1113). All population estimates from the U.S. Census 2018 Estimates, <https://factfinder.census.gov/>.

effects of real estate boom-and-bust cycles in high growth areas (Hollander 2011).

The European studies that popularized the smart shrinkage concept focused on the built fabric of shrinking cities and municipal governance practices, which were of particular interest to academics in the former East Germany. A group of researchers from German universities and cultural institutions, funded by the German Federal Cultural Foundation, developed the influential “Shrinking Cities” project, led by Berlin-based curator Philipp Oswalt.⁵ They engaged with more than 200 architects, artists, researchers, and community members from 2002 to 2008 to reimagine the future of shrinking cities. The project surveyed evidence of urban shrinkage on every continent and probed more deeply into four cases studies: Detroit, Michigan (US), Manchester/Liverpool (UK), Halle/Leipzig (Germany), and Ivanovo (Russia). The research and creative products from the project emphasized architectural and design-based responses to the effects of population loss on cities as expressed in art, film, design, and text, culminating in a series of exhibitions and publications, including three large edited volumes of research and project proposals (Oswalt 2005, 2006; Oswalt and Reinerts 2006).

Emphasizing a more rigorous application of social scientific methods to questions of urban governance in the context of population loss, a second project based in Germany began in 2009, in part as a critique of the imprecise scientific methodology of the Shrinking Cities collaboration (Haase et al. 2016a). The “Shrink Smart” project was based in Leipzig from 2009 to 2012 and looked at governance practices in ten post-industrial European cities affected by population loss including eight cities in the former Eastern Bloc (Rink et al. 2009; Haase et al. 2016b).⁶ The project focused on how cities could better manage people, resources, and infrastructures as population loss continued, and also how to protect

services and the environment while maintaining QoL for residents who remained (Bernt et al. 2012; Couch et al. 2012). A contribution of the project to the broader research agenda for shrinking cities was to separate the local and the global in seeking to better understand the challenges for cities. Writing in 2009, Leipzig project leaders Dieter Rink, Annegret Haase, and Matthias Bernt wrote that:

Urban shrinkage always appears in a specific context or is embedded in a certain manner. With this understanding, urban shrinkage is always an empirical question. Each shrinking city has, on the one hand, its own ‘local story’ which is due to the specific settings of the historical, political, economic, social etc. conditions. [These conditions] explain the local dimension of the logics of population decline and its impact on urban space, structure and society in a given case. . . On the other hand, there are broader or global contexts that also shape the fortunes of cities, (more or less) independently from their local settings (Rink et al. 2009, p. 12).

In formulating their research to consider the interplay of the local and the global, the project emphasized that individual cities were not able to “shape” their “fortunes” at will, instead they experienced global changes in a particularly local way that required community-level responses.

20.3 Rural Smart Shrinkage

The interplay between the local and the global became a critical framework for this study of rural smart shrinkage, which is the first in the research literature to consider smart shrinkage in the specific setting of small and rural places in the United States. As the Leipzig-based research showed, the topic required attention to both the specific conditions of rural America in “historical, political, economic, social” terms and also to the external realities of post-Fordist rural economic change and the dynamics of rural places in an increasingly suburban and urban world. Our research team had to start by discerning whether or not the concept of smart shrinkage could be

⁵ The results are archived at this website in German, English, and Russian: <http://www.shrinkingcities.com/>.

⁶ The project can be accessed on the Shrink Smart website, <https://www.ufz.de/shrinksmart/>.

productively applied in this context, and if so, in what ways rural adaptation strategies might be different from those in cities.

In the project methodology, the shrinkage itself was not viewed as a negative indicator on its own. Only when the shrinkage led to worsening QoL perceptions over several decades was a town was categorized as in *decline*. The first step was to analyze existing longitudinal polling data about perceptions of QoL in small Iowa towns and ascertain if rural smart shrinkage could be recognized within the data set. For purposes of identification, the research team looked for towns with higher-than-average increases in QoL perceptions over the same period that the town lost population, jobs, and occupied housing units—all three measures were chosen initially to find a multi-dimensional phenomenon of shrinkage that was more than just demographic change. Those that met these criteria were identified as possible smart-shrinking communities. The opposite case, higher-than-average decreases in QoL perceptions over the same period with similar measures for shrinkage pointed the team to rural communities in decline. Two other combinations had significance in the data analysis: *smart growth* with higher-than-average increases in QoL metrics and also in population, jobs, and occupied housing units; and *adverse growth* with higher-than-average decreases in QoL metrics while the size of the town increased. The Iowa towns undergoing adverse growth had experienced an influx of migrant labor to work in low-wage industries like meatpacking.

To learn more about what was occurring in specific local contexts of shrinking towns, the team chose five identified from the data as experiencing smart shrinkage and two in decline for further study. This group of seven were among 99 small Iowa towns that had been participating in the Iowa Small Town Poll (ISTP)—a unique longitudinal poll of perceptions of QoL conducted by Iowa State University researchers since 1994.⁷ In these towns, the

team conducted over 50 hours of semi-structured interviews with community stakeholders, gathered public data, and mapped the spatial characteristics of the communities and their surroundings. This analysis functioned not only to build new knowledge for the project, but also to verify that the ISTP data had correctly identified communities with innovative responses to shrinkage. As might be expected, not all communities on the initial smart shrinkage list engaged in purposive collective action to address the shrinkage. From the five that were studied, two communities stood out as exceptional in the qualities associated with smart shrinkage.⁸

To best capture the multidimensional and intentional qualities of rural smart shrinkage, the inputs of smartness were distinguished from its outputs (Peters et al. 2018). Flora and Flora's (1993) framework of entrepreneurial social infrastructure (ESI) was utilized to describe actions that led to smart shrinkage (i.e. inputs) and separate them from the effects in the community (i.e. outputs) that could be measured in the QoL data. In the ESI framework as adapted for this project, "smart inputs or activities" were conceptualized as "purposeful collective actions to achieve community goals" that have a measurable effect on QoL perceptions over time (Peters et al. 2018, p. 40). The separation of inputs and outputs was critical in the methodology to facilitate translating project findings into recommendations to share with interested experts and communities.

20.4 The Terminology of Smart Shrinkage and Decline

A review of the urban smart shrinkage literature highlighted two concepts that researchers have used to describe communities that are losing population: *decline* and *shrinkage*. The term decline in the social science literature implied a

2004, and 2014; another poll is scheduled for 2024. <https://smalltowns.soc.iastate.edu/iowa-small-town-poll/>.

⁸ The towns in the study with the best measures of smart shrinkage were Elma, Iowa (pop. 528 in 2018), and Sac City, Iowa (pop. 2074 in 2018), based on the 2018 U.S. Census Estimates.

⁷ Researchers collected data from the 99 towns in the Sigma Study (later the Iowa Small Town Poll) in 1994,

downward trajectory of several indicators including economic performance, labor force numbers, and demographic changes with negative consequences for the affected city or urban region (Lang 2005). The Leipzig research team defined urban shrinkage as “an empirical phenomenon resulting from the specific interplay of different macro-processes at the local scale” resulting in population loss (Rink et al. 2009, p. 19). Planner Daniel Hummel added specificity to the numerically focused definition by defining shrinkage as “endemic population loss” (Hummel 2015). Smart decline, promoted in the U.S. context by urban affairs scholars Frank J. Popper, Deborah Popper, and Justin Hollander, was a variation on this approach that proposed combatting the negative consequences of population loss with what the Poppers described as “planning for fewer people, fewer buildings, [and] fewer land uses” (Popper and Popper 2002, p. 23; Hollander and Németh 2011).

In much of the literature, decline and shrinkage were used interchangeably, since there was widespread agreement that population loss in cities inevitably led to multi-faceted urban decline (Hartt 2018a, 2019). The discussions often focused on how cities, or in the case of the work of Popper and Popper on how entire regions, could become smaller and also better, but only after experiencing a major downward trajectory on most QoL measures. For the Shrinking Cities project, the emphasis was on seeing the potentials latent in the overbuilt and no-longer-needed spaces of shrinking cities (Oswald 2005, 2006). The authors called for reimagining shrinking cities through their physical and material assets and learning from the resourcefulness of their inhabitants (Oswald and Reinerts 2006). For the Leipzig project, population loss was a neutral factor and the context in which communities had to operate (Rink et al. 2009). The broad objective was to help communities find balance so that the size, capacity, and costs of infrastructure and services were proportional to the number of residents. The Poppers and much of the American research on shrinking places that they inspired referred to this process of balancing with the term “right-sizing” (Hackworth 2015; Hollander

2018; Hummel 2015; Popper and Popper 2002; Schilling and Logan 2008). Hummel wrote that “the crucial goal of right-sizing for shrinking cities is to arrest population decline. The consequences that result from this decline are evidenced in the negative impacts it has on the municipality and the general well-being of the city” (Hummel 2015, p. 406).

The literature has recently started to address the methodological problems that arose when shrinkage and decline become interchangeable. Planner Maxwell Hartt has published a series of articles on prosperous shrinking cities in the United States and different typologies of urban shrinkage with diverse paths for future economic growth and population trends. His work emphasizes that data does not support the linkage between shrinkage and decline in a large number of cities and that changing household size, with more prevalence of smaller families and single adults, leads to population loss and does not necessarily affect prosperity in some cities (Hartt 2018a, 2018b, 2019; Hartt and Hackworth 2018). In a recent article about the specific context of a shrinking post-socialist city, urban researchers affiliated with the Leipzig project from the Czech city of Ostrava summarized the changing scholarly approaches to shrinkage and decline in the last 10 years:

Although shrinkage ha[d] affected 40% of medium-sized and large cities in Europe 10 years ago and 70% in Central and Eastern Europe, today it seems that some of the previously shrinking cities are gradually succeeding in mitigating or countering this process. Unlike previous research on urban decline or urban decay, this process can be perceived to be somewhat neutral, because, under certain conditions, it can be an alternative path of sustainability in a city’s trajectory that can create a favorable environment for the renewal of urban growth. In other words, urban shrinkage represents a complex open-ended process. Rich empirical evidence suggests that there are cases in social reality where the urban shrinkage process shows both positive and negative effects. Finding adequate local policy responses is, however, still rather rare, although

the shrinkage presents many specific challenges for sustainability (Slach et al. 2019).

The article details how population loss in particular areas of a city like Ostrava and the effects of “too much infrastructure available for too few residents” could inform municipal policy responses and expenditures (Slach et al. 2019, p. 1). The conclusion warns that this case study and others by researchers affiliated with the Leipzig research team “show the financial unsustainability of neoliberal pro-growth governance in shrinking cities” and the failure of many municipal governments to curb excess spending on economic development projects that do not bring promised population growth (Slach et al. 2019, p. 15; Rink et al. 2012; Haase et al. 2016b; Bernt et al. 2014).

For this 2-year research project, the team used a hybrid framework influenced by the Leipzig methodology. Shrinkage denoted losses of people, jobs, and housing units, but this was not assumed to correlate directly with decline (defined by worsening QoL metrics as perceived by residents in the context of shrinkage). Population loss was an important variable, however, that contributed to community decline in combination with other objective and subjective measures of community resources, services, and social capital. Population loss was, therefore, not only an empirical phenomenon in this setting, it was the given local context that characterized the condition of the place.

To sustain quality of life, the thesis that has emerged from this project is that communities should adapt to shrinkage, rather than fight against it. Changing perceptions of QoL going forward would then reflect the success in smart-shrinking towns, or failure in declining towns, of the adaptation strategies and measure the community’s resiliency to the shrinkage in the midst of complex changes. Unlike in the urban context, our data shows that rural shrinkage will likely never fit within the sustainability paradigm that has emerged as a compelling logic for why not all shrinkage is negative. The argument, as expressed by Hollander, Hartt, Slach, and others, is that some cities are better off becoming smaller so that economic renewal can result from better

utilization of the remaining economic, educational, and geographic resources (Flora 2019; Hollander 2011; Hartt 2018a; Slach et al. 2019). The qualitative and quantitative data collected and analyzed for this project shows that, in the rural context, all shrinking communities experience some negative changes due to population loss and therefore are vulnerable to decline. Even those that proactively pursue purposeful collective actions to address community-level problems do not start growing again, as in some cities. For rural places, the findings show that slowing population losses and improving QoL perceptions are more realistic and meaningful targets. In the longer term, these efforts may or may not lead to population increases, but those residents already in a community are less likely to leave and some may choose to return after a period away if satisfaction with quality of life is increasing.

In the specific setting of rural Iowa, the team observed that the population of small and rural communities changed at a slower pace and for different reasons than in cities. Small places have less human capacity and fewer financial resources to rebound from shrinkage even when the changes happen slowly (Hospers and Syssner 2018). In many places, towns have already right-sized in some dimensions, such as consolidation of school districts and cooperative agreements to provide senior services, emergency services, utility and facility maintenance, and financial processing (Mohr et al. 2010). Without excess capacity and often too few people to keep shops, restaurants, and local businesses open, it is harder to find ways to implement the Poppers’ idea of planning for “fewer people, fewer buildings, [and] fewer land uses.” On the other hand, there are significant challenges to more radical change; for example, the Poppers’ controversial 1987 proposal to depopulate large areas of the Great Plains and create a new “Buffalo Commons” by returning the region to pre-European settlement land uses without conventional rural towns (Popper and Popper 2006). Changing regional demographics, increased interest in environmental stewardship, and concerns about the climate crisis make interventionist

approaches appealing to some. Yet a plan like the Buffalo Commons, which the Poppers called “a combination of literary metaphor, public-policy proposal, futurist prediction and ecological restoration project,” cannot function as a real-time framework for individual communities trying to manage their own shrinkage (Popper and Popper 2006, p. 2). The scale of action needed to create any regional-scale depopulation or resettlement plan, or even environmental mitigation strategies focused on improving land management, would necessarily require cooperation among many municipal, state, and federal stakeholders.⁹ Therefore, with growth unlikely and population losses continuing, rural residents in individual towns urgently need small-scale, on-the-ground guidance for steps that they can take in their community to intervene in what now appear to be inevitable processes of decline across the American Midwest.

20.5 Rural Smart Shrinkage as a Distinct Paradigm

To differentiate rural smart shrinkage from other examples in the broader discussions of shrinking communities, the research team developed seven principles observed during our 2-year study that are posited as differentiating shrinkage in a rural setting from the more well-known urban and suburban examples. Delineating these differences is necessary, because the economic, social, and environmental challenges facing these communities are distinct, poorly understood, and pervasive (Hospers and Syssner 2018). Based on our qualitative and quantitative data analysis, the dynamics in rural communities are more complex

than non-residents anticipate. Perceptions about QoL are closely tied to local histories, cultural attachment to place and lifestyle, and not driven primarily by economic considerations.

These seven principles are offered to establish the topic of rural smart shrinkage in the United States as a distinct phenomenon worthy of further study.

- *Rural residents face an existential question of whether or not their towns can survive.* As fewer people choose to live in rural places, there are concerns that some towns might become too small to remain viable. As the urban shrinkage literature shows, urban residents think about alternate futures for their cities and what positive qualities could be marketed to potential newcomers or investors. Growth is still a possibility, because cities are full of potentials deriving from existing strengths and legacies of earlier economic prosperity. Rural residents, on the other hand, often emphasize those aspects of their community that were positive in the past and seek to revive some of what has been lost. Becoming more open to new ideas, better integrating newly arrived people into community life, and encouraging people of all ages to take on leadership positions are qualities that smart-shrinking communities share.
- *Rural shrinkage is slow and not always visible in people’s day-to-day lives, therefore it is not experienced as a crisis.* Residents of smart-shrinking rural places reported in interviews that they thought their town’s population was similar now than in the past. Some children will go to college and decide not to return, a few families will leave for new job opportunities, but others will come back to care for aging parents or to take advantage of the low cost of living. Family size is smaller than in the past and the population is aging, so schools consolidate in response, but most houses are still occupied and the town itself remains physically the same size. This creates the impression for long-term residents that the overall population size is stable. When shops, restaurants, and businesses close, people in

⁹ On the potential of sustainable urban systems approach as a response to shrinkage in communities within the Mississippi River Watershed, see Passe, U., Thompson, J., and Zarecor, K. (Eds). (2020). *SUS-RURI: Proceedings of a workshop on developing a convergence sustainable urban systems agenda for redesigning the urban-rural interface along the Mississippi River watershed held in Ames, Iowa, August 12–13, 2019*. Ames, Iowa: Iowa State University Digital Press. <https://doi.org/10.31274/isudp.35>.

towns with improving perceptions of QoL are more likely to attribute these changes to external pressures, such as new big-box stores or chain restaurants in nearby towns or the ease of online shopping, than to population loss. Conversely, in the two declining towns in the study, residents reported in interviews that the shrinkage had clear negative effects on QoL and local amenities. This held true even if the percentage change over the same period was similar between a smart-shrinking town and one in decline. This contributes to the adaptation hypothesis—that rural residents can adapt to the conditions created by shrinkage for a period of time and in the best cases create a lifestyle and rich social networks that operate within this new normal without focusing on the population loss itself.

- *Fewer people live in rural communities as a percentage of the total population in the United States because of growth in suburban areas, not because of an exodus from rural communities.* Rural communities are much the same now as they were in the recent past, but the world beyond has changed. Demographics show that a majority of younger, better educated, and more diverse people in the United States choose to live in suburbs or in a group of growing cities, rather than rural places (Cromartie 2018). In interviews, rural Iowa residents talked about wanting to stay in communities where they knew their neighbors, they were among people who shared their values, and where they felt safe. If such views extend to making people who are different or new feel unwelcome, then the futures of rural and suburban/urban communities in terms of vitality and growth will continue to diverge.
- *Powerful social and cultural forces are behind rural population loss, it is not just a question of economics.* Exposure through higher education or professional experiences to new ideas, more plentiful community amenities, and more diverse people makes the choice to live a small community less likely. Demographics are also important, since as a group, people born after the mid-1960s are more secular, more

welcoming of diversity, and more open to changing social norms, such as divorce or gay marriage, than previous generations (Taylor 2014). The interviews showed that, as a group, rural Iowa residents are more conservative in their beliefs and values and want to live in a community with people who share their views. Some residents reported limiting their professional ambitions in order to return or to stay in their rural town; they viewed this as a positive personal choice that benefits them and their families in ways that are more social and cultural than economic.

- *The profile of people who leave rural places is different than people who leave urban places.* Interviews suggest that rural out-migration is linked to opportunity and not significant change in the rural place itself. Rural residents reported that for their children or for neighbors who had moved away, the small town no longer fit with their life aspirations. This could be described as the pull of a new place that draws people out from small towns. Whereas in a city, it is a push. Many white urban residents left cities in the latter half of the twentieth century because of changing racial demographics and inexpensive housing in the suburbs. As populations dropped and urban quality of life suffered, poor city services, failing schools, drugs, and violence pushed additional people and opportunities to the suburbs. Those who left cities often had more financial and professional resources at their disposal than the primarily minority and immigrant residents who remained. More recently, people have migrated out of growing cities with high concentrations of wealth, because housing is no longer affordable.
- *Rural places struggle to develop multidimensional economies beyond their historic function as service centers for nearby farms.* There are now fewer farming families living outside of small towns, and they need fewer services, therefore the economic portfolio of rural towns must diversify. When satisfactory jobs remain within commuting distance, incomes are stable, but local shops, restaurants, and small businesses often lose customers as people

spend more time and money outside of the community. Residents spoke in interviews about easy accessibility by car to services in other communities and the negative impact of this on the viability of the small locally owned businesses that had been mainstays of spatially isolated rural communities until recent decades. This combination of factors creates a challenging regional economic outlook beyond agriculture-related industries. Although overall income levels were similar in smart-shrinking and declining towns, the ISTP data showed some growth in manufacturing jobs in the smart-shrinking towns since 1990.

- *Rural smart shrinkage requires committed local leaders.* Local residents volunteer more often and spend more hours doing community service in smart-shrinking towns than in other places. Private philanthropic groups and active non-governmental organizations fund and manage local programs and social events. Interview data shows that these activities are led by a local elite, who typically work in higher-paid professions and have higher educational attainment than the average resident. In the best cases, the leaders become mentors to younger people interested in future leadership roles, so that the next generation can continue the work. For example, in one town, young members of a civic organization use social media and online communication tools to share information and build a strong community identity. They run an active Facebook page that draws a regional audience; the page has been liked by seven times more people than the total population of the town. In declining towns, interviews pointed to problems such as an entrenched elite that blocked others from leadership positions and the disappearance of previously strong community organizations. Without encouragement and role models, new and younger residents in declining towns are less likely to participate in community-building efforts.

These seven principles of rural smart shrinkage show the distinct challenges for small and

rural communities. While some problems can be addressed, such as increasing participation in QoL initiatives and becoming more welcoming to new and younger people, some exceptional qualities of rural settings are beyond the control of any one community. The general trends indicate that in the future more younger and highly educated people will choose to live in larger and more diverse communities than in small and rural ones, economic opportunities will cluster in metropolitan regions, and populations will continue to shrink in rural places (Cromartie 2018; Kusmin 2016; Parker et al. 2018; Taylor 2014). These are the given conditions for rural places, especially in Iowa and the Upper Midwest. Discussions of smart shrinkage in rural settings must acknowledge these specific challenges so that recommendations will focus on those aspects of community QoL that can be improved through purposeful collective action.

20.6 Comparing Smart Shrinkage, Decline, and Smart Growth in Rural Towns

Unlike studies of urban shrinkage that propose new more sustainable futures for cities and adaptations that will eventually reverse population loss, one of the goals of this project is to focus the rural smart shrinkage discussion at the scale of individual communities and on aspects of QoL perceptions over which they can exert some control. The data shows that economics are less important to people's perceptions than might be assumed, and the most valued qualities relate to social connections and attachment to place. The multidimensional data analysis showed that some QoL variables could be isolated from the shrinkage itself, because small towns with similar percentages of shrinkage had significantly different dimensions and directions of change from 1994 to 2014. In other words, the QoL trends diverged for towns of similar sizes that lost similar percentages of people, jobs, and occupied housing units from 1994 to 2014. Some communities improved their QoL metrics, while others saw significant negative change. The project findings rely on the unique baseline data from

the Iowa Small Town Poll (ISTP) to established norms in small and shrinking towns. This step was critical to identifying statistically significant deviations on QoL metrics within the group of 99 participating towns.

The following sections summarize the findings of this quantitative and qualitative data analysis. Features of smart shrinkage, decline, and smart growth were compared using U.S. Census and the Iowa Small Town Poll (ISTP) data. The qualitative research on QoL perceptions and narratives shared by residents in interviews were then integrated into a broader picture of Iowa and the local context of each town. From this integrated analysis, the team developed a synthetic understanding of the characteristics of smart shrinkage in the setting of rural Iowa.

The analysis uses ISTP data gathered from longitudinal surveys conducted in Iowa in 1994 and 2014. Small towns are defined as municipalities not adjacent to a metropolitan city (50,000 or more) that had populations between 500 and 10,000 people in 1990.¹⁰ The response rate for surveys mailed to residents (RR3) was 72.7% ($n = 10,796$ respondents) in 1994 and 41.5% ($n = 6163$) in 2014. In each wave, the sampled communities were representative of all Iowa towns meeting the ISTP criteria, based on decennial Census data (Besser et al. 2015). Secondary data for sampled small towns are ZIP code estimates obtained from the 1990 Decennial Census and the 2008–2012 American Community Survey (ACS).

The interviews were conducted with stakeholders in the seven communities in person or over the phone. Potential informants were invited to participate based on their role within the community such as city clerk, mayor, school board member, police chief, leader of a civic organization, or religious leader, and contact information gathered from public sources. After contacting 96 potential interviewees by phone and/or email, the team completed 45 one-on-one semi-structured interviews (33 in smart-shrinking towns and 12 in declining towns with at least

4 interviews and no more than 8 in any one community). Each meeting followed a prepared interview script that asked respondents to consider QoL perceptions in relation to population change. At the end of each interview, participants were prompted to recommend additional people to speak with, leading to contacts beyond the stakeholder lists. The interviews were recorded and transcribed, then analyzed using grounded theory coding (Charmaz 2001; Hamideh 2015; Strauss and Corbin 1998).¹¹

Shrinkage is operationalized using three indicators: percent change in population to measure population shrinkage; percent change in local jobs to measure economic shrinkage; and percent change in occupied housing units to measure physical shrinkage. In Iowa, the analysis showed that population shrinkage on its own was the strongest indicator of shrinkage. To assess the smartness of the communities' efforts to maintain and improve quality of life, the team created a QoL index that averaged the ISTP results for seven QoL dimensions: local jobs, medical services, public schools, housing, local government services, child care services, and senior services (Cronbach's alpha of 0.777 in 1994 and 0.841 in 2014). After eliminating towns from the group of 99 with average changes on the shrinkage metrics and QoL perceptions (0.5 standard deviation around the mean), the team focused on communities that had above or below average changes.

From the group of 99 towns, seven had faster than average shrinkage (less than -0.25 standard deviation below the mean) accompanied by above-average gains in perceptions of community QoL (more than 0.25 standard deviation above the mean). Presented in Table 20.1, the metrics for the group of smart-shrinking towns from 1994 to 2014 indicated that population fell by -14.0% , local jobs by -32.3% , and occupied housing units by -9.5% in that time. Over the same period, QoL as a composite metric across the seven dimensions grew by 10.6%. On the other hand, in 12 *declining* towns with similar levels of

¹⁰ Data is collected by the ZIP postal code associated with each town.

¹¹ The detailed grounded theory analysis of the interview data is in preparation for a future publication.

Table 20.1 Indicators of shrinkage and quality of life

	Base in 2010/2014				Change from 1990/1994					
	Smart shrinkage	Decline	Smart growth		Smart shrinkage	Decline	Smart growth			
Shrinkage										
Population (#) ^{a,b}	1295	1441		5079	*	-14.04	-12.47		38.86	*
Local jobs (#) ^{a,b}	260	320		888	*	-32.31	-24.10		48.88	*
Occupied housing units (#) ^{a,b}	545	608		2041	*	-9.53	-6.32		42.85	*
Quality of life										
Overall (0–100)	54.65	44.55	*	61.41	*	10.64	-2.26	*	13.23	*
Jobs (0–100)	34.46	24.70	*	42.49	*	8.96	2.06	*	14.60	*
Medical services (0–100)	56.14	42.77	*	59.09		15.45	0.50	*	19.99	
K-12 schools (0–100)	68.73	64.49	*	87.23	*	4.88	-5.18	*	9.45	*
Housing (0–100)	49.87	44.51	*	60.12	*	9.79	-0.16	*	13.58	*
Local government (0–100)	64.59	57.30	*	67.67	*	14.74	4.26	*	16.83	
Child services (0–100)	57.45	39.85	*	62.68	*	17.78	-3.60	*	14.60	
Senior services (0–100)	51.28	38.24	*	50.60		2.90	-13.71	*	3.57	

Notes: * $p < 0.05$ statistical difference from Smart shrinkage mean using Games-Howell Test holding 2010 population constant at 2632

(Source: Cohen et al. 2003)

^aDenotes actual mean without population constant

^bDenotes percent change

shrinkage from 1994 to 2014, the QoL composite metrics worsened by -2.3% while populations dropped -12.5%, jobs dropped -24.1%, and housing dropped -6.3%. As a comparison, in eight thriving towns with increases in population and also improving perceptions of QoL (*smart growth* in the quadrant analysis), populations grew 38.9%, jobs gained 48.9%, and occupied housing unit increased by 42.9%. The composite QoL metrics for smart growth towns increased in that period by 13.2%.¹²

20.7 Rural Smart Shrinkage: Education and Family Life

In comparing smart shrinkage and decline in specific groups of shrinking towns from the ISTP data, one finds that although populations were similar (1295 vs. 1441 in 2010), smart-shrinking places had much lower population densities

(30.1 vs. 79.9 people per square mile), indicating geographically larger towns. Population differences in Table 20.2 show that smart-shrinking towns had more children under 18 years of age (24.6 vs. 23.0%), fewer single-headed families with children (21.0 vs. 27.7%), and more college graduates (17.8 vs. 14.6%). There were no differences in the minority, elder, or low-education populations. Faster growth in college graduates (6.3 vs. 4.6%) and slower growth in single-headed families (6.7 vs. 11.4%) signals improving social conditions in the group of smart-shrinking towns when compared to those in decline (Peters 2013).

In comparison to smart-shrinking towns, smart growth towns differed by having much larger population densities, far more minority people (especially Hispanics), fewer older residents over 65 years of age, and better educated residents with low numbers of high school non-completers and more college graduates. However, smart growth places also had many more single-headed families versus smart-shrinking towns, a correlate of potentially at-risk children. Along with growing populations, smart

¹² A general linear multivariate model (MANCOVA) is used to test mean differences controlling for population size in 2010 using the Games-Howell Test, which corrects for unequal group sizes and unequal group variables.

Table 20.2 Demographic and economic indicators

	Base in 2010					Change from 1990				
	Smart shrinkage	Decline		Smart growth		Smart shrinkage	Decline		Smart growth	
Population density (sq.mi.) ^a	30.06	79.90	*	152.96	*	-4.12	-8.00		27.76	*
Minorities (%)	3.97	3.62		8.64	*	2.87	3.01		7.23	*
Age 17 and under (%)	24.64	23.02	*	25.41		-2.64	-3.35		-2.21	
Age 65 and older (%)	21.26	20.54		16.10	*	0.56	0.32		-2.37	*
Single-headed families w/children (%)	20.96	27.74	*	26.44	*	6.70	11.38	*	9.84	
High school non-completers (%)	11.82	12.90		9.61	*	-9.82	-11.42		-14.21	*
College graduates (%)	17.80	14.56	*	20.88	*	6.28	4.59	*	10.09	*
Employment										
Employment participation (%)	47.00	47.28		52.51	*	2.74	3.57		6.50	*
Full-time and full-year jobs (%)	66.68	71.10	*	71.63	*	5.44	6.37		7.68	
Agriculture and natural resources (%)	9.07	7.54	*	3.62	*	-6.09	-3.24	*	-6.51	
Goods producing (%)	25.21	24.30		30.01	*	6.21	-1.70	*	5.22	
Transport, telecomm and utilities (%)	7.62	7.72		6.84		0.44	1.90	*	0.46	
Professional, health and Educ Srvs. (%)	28.83	30.85		32.84	*	0.71	3.29	*	6.57	*
Retail and leisure Srvs. (%)	23.03	22.85		19.92	*	0.50	1.68		-3.75	*
Income										
Median household income (2018\$) ^b	\$48,329	\$47,330		\$60,188	*	13.26	10.33		23.87	*
Gini income inequality (0-100)	39.67	39.26		36.77	*	1.70	2.46		-0.67	*
Poverty (%)	13.36	13.03		8.65	*	1.32	1.28		-1.75	*
Median home value (2018\$) ^b	\$96,734	\$85,939	†	\$133,010	*	61.27	45.17	*	69.58	

Notes: * $p < 0.05$ and † $p < 0.10$ statistical difference from Smart shrinkage mean using Games-Howell Test holding 2010 population constant at 2632

(Source: Cohen et al. 2003)

^aDenotes actual mean without population constant

^bDenotes percent change

growth towns saw faster increases in the percentage of minority residents and college graduates; declines in the elder population; and large drops in those without a high school degree. In Iowa, most smart growth towns saw population gains due to in-migration of minorities (mostly Hispanic) to work in food manufacturing industries. The fact that QoL is high and growing suggests these smart communities have been successful at integrating new residents who are quite different from long-term residents (Peters 2019b; Peters and Zarecor 2017). Information on demographic differences is presented in Table 20.2.

In the interviews in two smart-shrinking towns, residents linked population change with educational attainment and housing costs. They suggested that a lack of professional job opportunities led some segments of the working population with better skills and more professional ambition to leave. At the same time, it was repeatedly noted that inexpensive housing was attractive to both working and non-working populations and their families. Descriptions of the incoming population from the interviews can be categorized into two major groups: (1) people who are employed in towns or cities within

commuting distance who moved in to take advantage of affordable housing costs, (2) more transient groups who moved in due to very low housing costs regardless of job opportunities.

20.8 Rural Smart Shrinkage: Quality of Jobs

There are very few differences between smart-shrinking and declining towns in terms of employment characteristics, which are detailed in Table 20.2. Both sets of shrinking places were statistically similar with regard to labor force participation, income and poverty, and local employment structure. However, there are some notable differences. Smart-shrinking towns had larger shares of people employed in agriculture (9.1 vs. 7.5%), but these jobs have contracted at double the rate since 1990 (−6.1 vs. −3.2%). Smart-shrinking towns also had fast growth in goods-producing jobs (manufacturing, constructing, and mining), while declining towns posted losses over the same period (6.2 vs. −1.7%). On the other hand, smart-shrinking towns lagged behind declining ones by having fewer full-time and full-year jobs (66.7 vs. 71.1%); slower job growth in transportation services, telecommunications, and utilities (0.4 vs. 1.9%); and slower growth of high-skill jobs in professional services, education (K-12 and college), and healthcare (0.7 vs. 3.3%). In short, smart-shrinking places are strong on traditional rural employment sectors like agriculture and manufacturing, while declining towns are becoming increasingly dominated by the service sector.

In the interviews, the team found strong acceptance of the notion that many people commute to their jobs. Also, a regional distribution of commuters from small towns was described in which factory jobs are closer to home requiring shorter commutes, while higher-skill jobs are in larger cities farther away. The perception is that commuting from these small bedroom communities is easy and the additional costs and time are more than justified by the affordable housing costs and feeling of safety that comes from living in a community of like-minded and familiar people.

Using ISTP data to contrast smart growth with both smart-shrinking and declining towns fills out the picture even more. Smart growth towns had higher labor force participation and more full-time/full-year jobs; more jobs in goods-producing industries; more jobs in professional services, education, and healthcare; and fewer jobs in agriculture and low-skill/low-wage retail and leisure services. Middle-skill and middle-wage jobs are desirable for small towns because they provide good wages and benefits, while still being accessible to residents without high levels of education. Jobs in manufacturing, construction, transportation, telecom, and utilities all fall into this category. By contrast, high-skill and high-wage jobs in professional, education, and healthcare services are also desirable, but they require high levels of education and training that often disqualify many residents in small towns (Peters et al. 2018).

In the interviews, the focus of employment concerns for residents of shrinking small towns is less on job availability and more focused on the type of jobs and low wages. The ISTP data shows that the most common jobs are related to agriculture-supporting businesses, healthcare, and schools. One of the recurring concerns about types of available jobs is that some of the lower-wage jobs have high rates of turnover, which makes it more difficult for small towns to attract new hires to become long-term residents.

20.9 Rural Smart Shrinkage: Income and Wealth

There are no statistical differences in incomes or inequality between smart-shrinking and declining towns (refer to Table 20.2). This indicates changes in QoL are probably not driven by wealth differences across the towns. Both smart and declining towns had a median income of about \$48,000, below the average for Iowa (\$51,130) and the U.S. (\$53,050). About 13% of residents in both sets of shrinking towns lived in poverty, a bit higher than the state rate (12.2%), but far below the nation (14.9%). Income inequality was measured using the Gini coefficient, where scores closer 1.0 indicate greater income disparities.

Inequality for both groups of shrinking towns was below average (0.390) compared to the rest of Iowa (0.430) and the nation (0.471). The only difference between smart-shrinking and declining towns is median home values, where property in smart towns was higher valued (\$96,734 vs. \$85,939) and appreciated much faster in real dollars since 1990 (61.3 vs. 45.2%). Higher home values are a good indicator of both the condition of properties and market demand for homes (Hospers and Syssner 2018).

The qualitative data found a less optimistic perspective among residents about housing in smart-shrinking towns. In both smart and declining small towns, the quality of existing housing is often evaluated as low or declining; a view strongly supported by many participants in various stakeholder positions. There is a clear shortage of decent quality low-income and affordable housing in all of seven of the case study towns as well as abandoned and occupied but dilapidated homes that become a burden on the local government or sometimes local community betterment groups. In interviews, many residents expressed the opinion that lack of acceptable quality affordable homes and the presence of abandoned or dilapidated homes are partly to blame for the difficulty of attracting new families to small towns.

In comparison, smart growth towns show strong upward income trends. Household incomes were higher and growing faster than in smart-shrinking and declining towns; and also had lower rates of poverty and inequality that fell over the past two decades. Home values were much higher than in shrinking places, although the rate of appreciation over time was the same as in smart-shrinking towns. This suggests that positive QoL perceptions can increase the price of homes even in the context of shrinkage.

20.10 Rural Smart Shrinkage: Social Capital

Social capital is defined as feelings of trust, norms of cooperation, and social networks that exist in a community that facilitate coordinated actions (Robison and Ritchie 2010). Bonding social capital are ties between very similar people based on

emotional bonds, such as close friends and family. By contrast, bridging social capital are ties between very diverse and unfamiliar people based on achieving some common goal (Ferlander 2007; Poortinga 2012). Research has shown that bridging social capital is critical for community development (Halstead and Deller 2015). The ISTP data, presented in Table 20.3, shows that bridging ties are stronger in smart-shrinking versus declining towns (58.5 vs. 55.4 on a 100-point scale). Although it has weakened over time in all of the shrinking towns, the decline in bridging ties was slower in smart towns than in declining places (−4.1 vs. −7.9 points). Even though the seven case study towns in the project are small (with populations ranging from 528 to 2074 in the 2018 Census Estimate, and averaging 1103), they each have multiple active civic groups that represent some level of bridging social capital. There were no statistical differences in bonding social capital in smart-shrinking or declining towns, but rates were stable in smart towns while they have fallen since 1994 in declining towns (0.3 vs. −1.3 points).

In comparison, residents in smart growth places had higher bonding social capital that has strengthened over time. These communities also had slightly stronger bridging social capital that has remained stable, instead of weakening. This may be attributable to the presence of sizable minority populations that increase within-group connections, but also foster between-group links out of necessity. People in smart growth towns were just as civically engaged and just as attached to their community as residents in smart-shrinking towns, although attachment declined more slowly in smart growth towns since 1994.

Civic engagement is an important indicator of pro-active and thriving communities (Flora et al. 1997). The ISTP data shows that in smart-shrinking towns nearly half (46.6%) of all residents reported participating in a community improvement project in the past year, compared to only two-fifths (42.8%) in declining places; in both contexts the rates are higher than the national average for rural communities (30.9% in 2003 and down to 25.2% in 2015) (Grimm and Dietz 2018). On the other hand, civic engagement fell in both sets of shrinking towns from 1994 to

Table 20.3 Social capital and civic engagement indicators

	Base in 2014			Change from 1994		
	Smart shrinkage	Decline	Smart growth	Smart shrinkage	Decline	Smart growth
Social capital						
Bonding social capital (0–100)	66.14	64.89	68.47 *	0.34	-1.33 *	3.09 *
Bridging social capital (0–100)	58.49	55.44 *	60.39 †	-4.07	-7.91 *	-0.80 *
Membership in outside groups (#)	0.91	0.77 *	0.71 *	0.05	-0.05 *	-0.15 *
Membership in local groups (#)	9.72	9.25 *	9.92	-2.90	-2.62 †	-2.51 *
Civic engagement						
Participated in a town project (%)	46.55	42.77 *	43.63	-4.21	-5.25	-5.38
Community attachment (0–100)	47.27	46.75	46.95	-6.95	-5.63 †	-3.87 *
Years lived in the community (#)	36.13	35.88	34.11	2.22	5.10 *	3.61
Community perceptions						
Friendly (0–100)	76.73	75.73	79.36 *	1.41	-1.28 *	3.98 *
Safe (0–100)	81.28	78.60 *	82.77	4.70	0.57 *	3.76
Supportive (0–100)	70.07	68.07 †	71.82	5.53	2.30 *	6.32
Tolerant (0–100)	66.07	64.35 †	68.28 †	11.14	7.82 *	13.35
Open to new ideas (0–100)	61.37	56.13 *	62.17	4.69	-1.13 *	7.96 *
Trusting (0–100)	69.87	66.78 *	71.31	2.01	-2.41 *	2.46
Well-kept (0–100)	68.37	62.28 *	74.43 *	0.53	-6.73 *	1.72

Notes: * $p < 0.05$ and † $p < 0.10$ statistical difference from Smart shrinkage mean using Games-Howell Test holding 2010 population constant at 2632 (Source: Cohen et al. 2003)

2014, reflecting broader national trends. Membership in organizations is another indicator of civic engagement. Residents in smart-shrinking towns were more engaged in both local organizations (9.7 vs. 9.3 organizations per person) and groups outside the community (0.9 vs. 0.8 organizations per person). Further, residents of smart-shrinking towns have managed to maintain these external links over the past two decades, whereas external links fell in declining and smart growth towns.

Civic groups emerged in the data analysis as essential elements of smartness in the case study towns, because they embody community-level forces of improvement and facilitate collective actions to address the effects of population loss. In interviews, those who are involved in these efforts expressed a more positive evaluation of overall QoL in their towns, but also spoke more critically about conditions that they want changed. The team also observed considerable differences in the seven case

study towns with respect to the contributions of governmental versus non-governmental/civic groups in responding to shrinkage. The evidence suggests that non-governmental/civic groups contribute more to the development of a vision for the future of smart-shrinking towns than local government. In the two best examples of rural smart shrinkage, community foundations and civic groups provide significant financial support and volunteer hours for social activities and community betterment efforts.

20.11 Rural Smart Shrinkage: Safety and Trust

Besides simply documenting differences in population and economy, it is also important to understand how people think and feel about living in their communities. The data in Table 20.3 shows

that residents in smart-shrinking compared to declining towns rated their communities as safer (81.3 vs. 78.6 on a 100-point scale), more trusting (69.9 vs. 66.8), better kept-up (68.4 vs. 62.3), and more open to new ideas (61.4 vs. 56.1). Smart-shrinking towns also tended to be slightly more supportive and tolerant of others in the community. Importantly, these positive perceptions have become stronger in smart-shrinking places over the past two decades. The largest differences between smart and declining places were on being better kept-up (0.5 vs. -6.7 points), more open to new ideas (4.7 vs. -1.1 points), more trusting (2.0 vs. -2.4 points), and being safer (4.7 vs. 0.6 points) than in 1994.

From the interviews, the team observed that perceptions of quality of life are, to some extent, driven by social norms such as trust and support for community and lifestyle preferences, more so than from pragmatic concerns about infrastructure and services in town. There is a general attitude in smart-shrinking towns that people can tolerate or accept that the quality and availability of jobs, housing, recreation, retail, healthcare, social services, schools, and infrastructure, are not going to improve much beyond some small changes. They draw upon their positive and strong sense of social ties, trust, support, and attachment to place when asked to think about the quality of community services, limiting the effects that any dissatisfaction might have on their perceptions. This is an adaptation strategy that helps to build community resiliency.

Compared to smart-shrinking places, smart growth towns were more friendly (79.4 vs. 76.7), more well-kept (74.43 vs. 68.4) and slightly more tolerant (68.3 vs. 66.1). Smart growth towns also become more open to new ideas (8.0 vs. 4.7 points) and more friendly (4.0 vs. 1.4 points) than their smart-shrinking counterparts. In short, residents in smart-shrinking towns view their communities much more positively than residents in declining towns. In smart growth places, the metrics improve even more for friendliness, quality of the environment, tolerance, and openness to new ideas.

20.12 Recommendations for Rural Smart Shrinkage

The comparison of smart-shrinking and declining towns (using ISTP, Census, and interview data) and previous research on shrinking communities (Peters 2019a; Peters and Zarecor 2017) yields recommendations for places looking to implement strategies for smart shrinkage. Importantly, if shrinkage is a given context as argued here, small rural communities should not wait to experience signs of decline before acting. The first priority should be building social capital and improving community services through purposeful collective action. In smart-shrinking towns, the team observed multiple collective efforts that positively influenced residents' desires to remain with some former residents even choosing to return and residents of nearby towns participating thus expanding the reach of these efforts to a regional scale. Such actions are more important to community well-being than trying to reverse the population loss by reaching outside of the community to attract new people or more jobs. Programs to spur growth are costly, slow, and unproven, and also affected by factors largely outside of the control of any one town.

Primary recommendations for shrinking towns to enhance QoL are to build bridging social capital connections, increase civic engagement, and create a culture of openness to ideas and support among all members of the community. Active and engaged local civic leadership, private philanthropic initiatives, and working to collectively address problems are qualities observed by our team in smart-shrinking towns. Younger people and families with children are critical elements in these initiatives; they anchor intergenerational community efforts that allow mentoring of new leaders and result in QoL improvements for all age segments. Bridging social capital can be enhanced by fostering diverse and inclusive linkages between residents. This includes working across dividing lines such as economic class, race and ethnicity, gender, and even newcomers versus long-time residents. To increase civic engagement, a community can encourage

residents to participate in local projects and to join local and outside organizations. Being inclusive in this area is important, because the community will be better able to identify relevant community needs and gain broad support if more people are part of the process. Other benefits of reaching into and working with different community segments are better access to the full range of human and financial resources that exist in the community and better management of conflicts as they arise, so that projects can succeed. Each town will need to assess what inclusion means in their local setting. Many rural places are not diverse in terms of race and ethnicity, but do have other forms of diversity that are equally important to these efforts and can be overlooked.

Creating a culture of openness and support is critical to the success of these efforts. Shrinking towns can nurture this culture by focusing on the personal, process, and physical aspects of community well-being. Personal aspects speak to emotional needs, such as how safe residents feel in their town, whether they can trust their neighbors, and if they feel the community is supportive of themselves and others. Process aspects deal with public deliberation and decision-making, such as a community's openness to new ideas and consideration of alternative solutions. Physical aspects are whether residents feel their town is being kept up and is worthy of future investment, or whether it is too run down and not worth the investment. Smart-shrinking towns do a better job at fostering these positive perceptions and providing for the emotional needs of their residents.

Secondary recommendations for shrinking towns are to stabilize agricultural employment and grow jobs in goods-producing industries. Efforts in this area often require sizable financing and long-term planning and carry significant risk, because the community has little control over national policy or global economic conditions. As summarized in the findings, data indicates that smart shrinkage does not depend largely on geography, income differences, or a community's economic base. However, a higher percentage of residents in smart-shrinking towns earn their

livelihoods from agriculture and related services than in declining towns. The future outlook for these jobs is uncertain as the number has dropped rapidly over the past 20 years. On the other hand, smart-shrinking towns in Iowa saw job gains in goods-producing industries like manufacturing and construction—jobs that have declined sharply in other small towns. This may be due to local self-development, industry specialization, or state policies favorable to these industries. The key role that the agriculture and manufacturing industries play in higher QoL is the opportunity for middle-skill and middle-wage jobs, many of which are full-time and full-year positions with good benefits. These middle-skill jobs are a good fit for the rural labor force. Communities should use local and state economic development programs to recruit and retain middle-skill jobs in agriculture and the goods-producing sector, and also encourage their younger residents train for such positions at colleges, universities, and as apprentices.

As a set of recommendations, those related to social capital are inexpensive to implement, actionable in the near-term, and not dependent on larger socioeconomic or political forces. In all shrinking places, economics are less important to perceptions of QoL than might be expected. This should be encouraging for rural towns as efforts that focus on people and existing community assets do not require external support or financial incentives. Purposeful collective actions and the resulting positive effects on QoL perceptions may stabilize population numbers and even slowly lead to growth in some cases, but the primary goals for shrinking communities should be to invest in building social capital and improve community services to protect against decline.

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Ecosystem Services of Ecological Infrastructure and Quality of Life: Contributions to the Analysis of the Sustainability of the Urban and Peri-urban Area of Mar del Plata, Argentina

Camila Magalí Mujica and Clara María Karis

21.1 Introduction

Scientific studies concerning the sustainability of the society-nature relationship require interdisciplinary conceptual frameworks to address the thinking of the complexity involved in this interaction (García 2006). In this sense, the term socioecological systems (Berkes and Folke 1998), refers to a holistic and systemic concept of “People in nature” (Mace 2014) in which ecosystems are integrated with human society. It is a framework that focuses not on a detailed understanding of the parts, but on how key components contribute to the dynamics of the whole system (Resilience Alliance 2010). In this way, it is proposed that the management of natural resources does not concern only ecological aspects, nor strictly social ones, but multiple integrated and interactional elements. This approach has been used in studies concerning both the management of natural protected areas with human presence (García-Frapolli and Toledo 2008; Palomo et al. 2012) and urban and regional planning (Palacios-Agundez et al. 2011; Vásquez 2016).

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In this sense, cities can be studied as urban socioecological systems (Andersson et al. 2014; Groffman et al. 2017) because they depend on social and also on ecological and biophysical patterns and processes (Pickett et al. 2011). These systems are composed of small patches of high heterogenic land uses (Andersson et al. 2014) because they have evolved under extremely complex influences given by the different styles of land occupation and consist of both the set of elements and phenomena specifically urban, as well as those bio-geo-climatic phenomena located in them (Antequera 2004).

In this context of complexity, the concept of urban sustainability becomes relevant. Sustainability requires dynamics that ensure social development without exceeding the capacity of ecosystems, thus ensuring the full subsistence of future generations. This requires implementing strategic policies, which are often not simple to define, and which require balancing multiple, conflicting and resource-constrained objectives (Keeler et al. 2019).

In this sense, the sustainability of a socioecological system is dynamic and does not necessarily mean continuing a situation or achieving an unchanging future state on the basis of a static balance; this relates to the concept of resilience (Jiménez Herrero 2002). The term resilience (Holling 1973; Folke et al. 2002; Folke 2016) has

different meanings, each with different implications. In this chapter, the socio-ecological definition developed by C. Folke shall be adopted (Folke et al. 2002, 2010; Folke 2006, 2016) which defines resilience as the capacity of a socioecological system to absorb change and maintain the basic functions of a system during and after disturbance. In addition, and in contrast to the idea of returning to the pre-disruption state, resilience envisages an element of reflection and learning. In this way, it understands the complex dynamics of the adaptive system and its uncertainty and, within this context, how to learn to cope with change (Folke 2016). At this point, a concept that will be useful is that of adaptability (Walker et al. 2004) which refers to the ability of actors to influence management, so adaptability is primarily a function of the social component.

Globally, it is estimated that two out of three people will live in urban areas by 2050 (United Nations 2014). Given this situation, and given the certainty that global changes are inevitable (Duarte et al. 2006), emphasis is given on how to manage the resilience of socioecological systems to ensure sustainability. In this context, and considering that stability in a system cannot be maintained constant, it is necessary to enhance its degree of resilience.

The resilience of urban and peri-urban areas depends to a large extent on the natural components of the urban ecosystem, which generate benefits on the quality of life of the population (Gómez-Baggethun et al. 2013; Andersson et al. 2014). A key aspect of ensuring the achievement of these benefits is to recognize the multifunctionality inherent in the system, since this attribute will allow it to maintain and even increase its resilience. It is also essential to take into account the processes of urban expansion, as well as the way in which the natural spaces of a city are intervened, since its quality of life could be affected.

From a socioecological perspective, the benefits of natural components over the quality of life of the population can be interpreted in terms of ecosystem services (ES). ESs are defined as the benefits that people obtain directly and indirectly from ecosystems (MEA 2003, 2005).

The concept originates from the U.S. environmental movement in the 1970s and the increasing conceptualization of nature as sets of integrated systems, but it appears clearly in the academic media with the journals of Daily and Costanza in the late 1990s (Costanza et al. 1997; Daily 1997). Early work from this approach focused on the use of economic valuation techniques to assign a value to ecosystem components and functions (Costanza et al. 1997). However, recent work adopt value pluralism, giving greater space to ecological valuation, biophysical and metabolic analysis, and also to social, symbolic and cultural assessment, incorporating issues such as equity, environmental justice and aesthetic values (Chan et al. 2012).

In this plural valuation of the benefits offered by nature to the urban population, the urban green areas interpreted in terms of ecological infrastructure (EI), take on a central role. The provision of ES that affects the resilience of urban ecosystems and the quality of life of the population is multiple, complex and conclusive to achieve sustainability objectives. However, these areas are often considered limitedly in planning processes. Practice, from the framework of socioecological systems, could play a fundamental role in sustainability by reconnecting cities with nature, reducing the ecological footprint and ecological debt of cities, while promoting the resilience, health and quality of life of the inhabitants.

Based on these considerations, the main objective of this chapter is to analyze, in the first instance, some ES provided by urban green areas¹ and their impact on quality of life, taking as a case study the city of Mar del Plata (Argentina). In particular, and in order to contribute to the overall objective, this work proposes to assess the availability of green areas and vegetation cover in the study area, and to analyze the ES of temperature regulation provided by these structures, and how their physical attributes could relate to the provision of cultural ESs, which can be analyzed based on objective

¹ Gathered under the concept of ecological infrastructure (EI).

indicators.² Prior to this, it is appropriate to carry out a review of the conceptual aspects involved in the analysis.

21.2 Quality of Life from the Ecosystem Services Approach

At present, it is generally understood that the concept of quality of life comprises both the conditions of the material environment (social welfare) and the psychosocial environment (psychological well-being) (Casas 1996). This includes objective and subjective components, which, according to Cummins and Cahill (2000), would arise from various fields such as material well-being, health, productivity, privacy, safety, community and emotional well-being. Objective components include culturally relevant well-being measures such as wealth level, education and health care, housing quality, existent infrastructure, etc. That is, basic, economic and environmental human needs, considered important for the welfare of society, and which are easily measured at the population level. On the other hand, subjective components take the level of satisfaction of individuals through different fields, according to the importance they attach to each of them. Therefore, quality of life is today conceived as a multidimensional concept, comprising a number of domains, considered with different significance by each person, in relation to the importance that each subject assigns to each of them (Tonon 2010).

In recent decades, new approaches have emerged that regard quality of life as dependent on the natural ecosystem, whose limits are increasingly being exceeded by the pressures exerted by human society (Mace 2014). In this sense, the generation of a satisfactory quality of life requires the interaction between the social

system, which comprises the built infrastructure and the human capital (economy), and the natural system of which it is part (Costanza et al. 2014). The ES approach is located in this line. In general terms, it could be said that the ES approach serves to recognize that the conservation of ecosystems is not only an ethical aspiration of society, but is closely linked both to the satisfaction of the basic requirements of human life (Balvanera et al. 2011; Costanza et al. 2017) and to the subjective components of welfare (MEA 2003; Tonon 2010). Depending on this, there is a straight link between the state of ecosystems in cities and their quality of life.

This relationship was explicit in the Millennium Ecosystem Assessment³ (MEA), which defined ES-quality of life interaction from the access to basic material satisfiers, and, based on freedom of choice and action, health, good social relations and security. Latest explanations (Díaz et al. 2018) conceive of ESs within an even broader context, using the term “Nature contributions to people” by referring to all contributions, both positive and negative, from nature to the quality of life of people.

Conceptually, ESs that have an impact on quality of life are classified into three large groups (Haines-Young and Potschin 2018):

1. Provisioning services: products obtained from ecosystems, such as food and water.
2. Regulation and maintenance services: benefits that are derived from the regulation of ecosystem processes, such as flood and climate regulation.
3. Cultural services: intangible benefits that people obtain from ecosystems, such as recreational and spiritual ones.

² The provision of cultural ES includes both objective and subjective dimensions of quality of life (Celemín et al. 2015). However, in the present research progress was made in the analysis of cultural services that can be objectively evaluated.

³ The Millennium Ecosystem Assessment (MEA 2003, 2005) was an initiative of the United Nations that convened natural and social scientists from different parts of the world in order to learn about the state and trends of ecosystem deterioration. To this end, a conceptual framework was developed that included, among others, the definition of ES, a form of classification of these and a scheme that relates them to different components of human well-being.

The ES approach has the advantage of placing the different types of benefits mentioned in a common language, in order to guide decision-making in favor of more sustainable territories and cities.

When ESs are generated within an urban ecosystem, they are called urban ecosystem services (UES) (Breuste et al. 2013; Gómez-Baggethun et al. 2013). UES become important for their potential to address environmental issues and achieve urban sustainability goals, ensuring an optimal quality of life through nature-based processes and strategies. These services are usually provided by small portions of cities, urban green areas, which are in this work studied under the concept of ecological infrastructure (EI).

21.3 Ecological Infrastructure and Urban Ecosystem Services

The ecological infrastructure (EI), also called green infrastructure (Benedict and McMahon 2002; European Environment Agency 2011) comprises all natural, semi-natural and artificial networks of the ecological systems existing in and around urban areas (Tzoulas et al. 2007). The fact of considering these elements as a type of infrastructure, similarly to the built infrastructure, arose in recent decades to change the perception about these spaces, and to provide them with greater entity within the planning processes, which involves, unavoidably, the need to be strategically designed and maintained (Sandström 2002). Generally speaking, the concept of EI points to the connectivity and multifunctionality of ecosystems, and emphasizes both the quality and quantity of green and blue spaces; being them urban and peri-urban (Tzoulas et al. 2007; European Environment Agency 2011; Gómez-Baggethun et al. 2013).

The scientific evidence regarding the UESs that these infrastructures provide to urban inhabitants is abundant (Secretariat of the Convention on Biological Diversity 2012; Keeler et al. 2019), and encompasses a wide variety of services, such as food provision, air quality regulation, carbon capture, coastal protection,

mitigation of heat island effects, reduction of the impact of river floods, and several opportunities for recreation and education. Urban green areas have been recognized for their contribution to the quality of life of urban residents (Chiesura 2004). In general, these areas provide regulation and cultural UESs, although in certain cities they also offer some provisioning services (Camps-Calvet et al. 2016).

As mentioned above, regulation and maintenance services are the benefits obtained from ecosystem processes, while cultural UESs can be defined as those non-material benefits that people obtain from urban ecosystems (MEA 2003; Gómez-Baggethun et al. 2013).

The production of these services depends on both ecological and social factors, since they are the result of information processing from the biophysical environment through the human senses (Braat and de Groot 2012). However, their generation is conditioned by the characteristics of the areas that provide them. In this sense, the public green spaces present in urban areas are of particular importance in the generation of cultural UESs, since, given their accessibility, in many cases they constitute the only places where urban inhabitants can have direct contact with nature. In turn, the area of these spaces conditions the activities that can be carried out (Reyes Pácke and Figueroa Aldunce 2010).

21.4 Characteristics of the Study Area

In order to analyze the UESs of EI of Mar del Plata city, the study area delimited is composed of the urban and peri-urban space of the city of Mar del Plata (see Fig. 21.1). The borders were defined according to the criteria used by Zulaica and Ferraro (2013). Depending on this, the urban space is characterized by the presence of block delimitations, water and sewage networks. The peri-urban space is delimited on the one hand by the rigid edge of the urban and on the other by a more diffuse one that separates it from the rural area, characterized by the presence of agriculture and extensive livestock. To the limits of the peri-

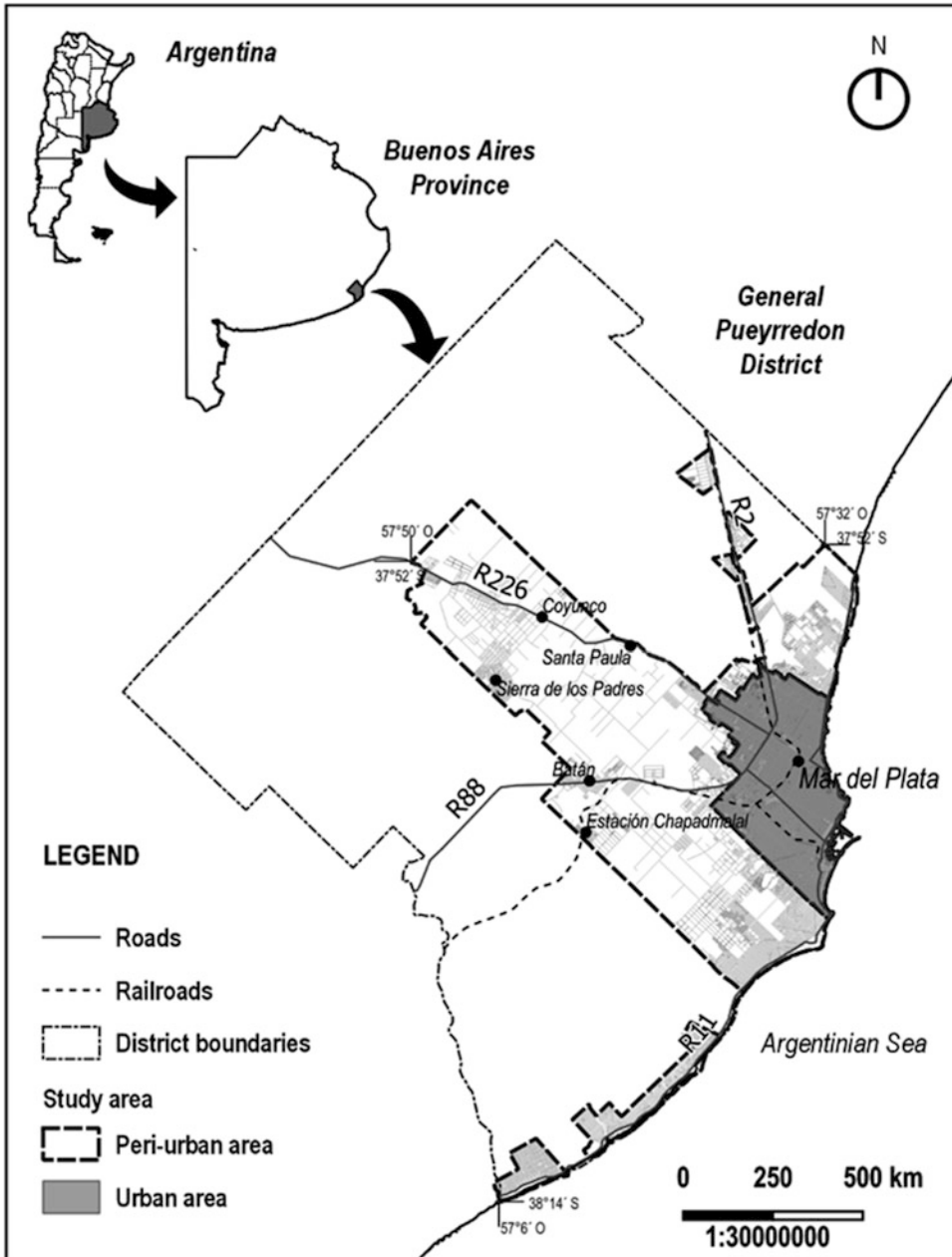


Fig. 21.1 Study area (Source: Own elaboration)

urban space taken from Zulaica and Ferraro (2013) the neighborhoods located on Route 11 were incorporated into the analysis, since it is currently one of the main expansion axes of the city.

The city of Mar del Plata is located on the Atlantic Ocean coast and is the head of the

General Pueyrredon District, located in the south-east of Buenos Aires province, Argentina. This district covers a total of 1453.4 km², of which 79.5 km² correspond to the urban range of the city of Mar del Plata. There are also some locations, including Batán, Estación Chapadmalal, Sierra de los Padres, Coyunco and Santa Paula. The area

has a strong urban tradition. According to 2010 census data, there was a population of 618,989, with 98.35% of urban dwellings. It should also be noted that Mar del Plata is one of the main tourist destinations of the country, so during the summer season its population increases markedly. According to data from the Municipal Tourism Agency, the months of greatest arrival of tourists are January and February, surpassing the million visitors, then followed by the months of December and March with an average that varies between 750 and 800 thousand (Ente Municipal de Turismo 2018).

Numerous activities carried out by the inhabitants of Mar del Plata and tourists depend on EI and their ability to offer both cultural and regulation UESs that affect quality of life. Hence the importance of their identification and analysis. According to Karis (2019), the EI in the study area accomplishes the following components:

- Areas of natural reserve: natural areas, which for their fragility, importance or uniqueness are subject to legal protection to guarantee their conservation.
- Public green spaces: open spaces in which plant cover and natural elements predominate, with free access, which main functions are recreation, contact with nature and social interaction.
- Gardens, including both those belonging to public and private institutions as well as to houses.
- Greenways, which connect the urban network with the ecosystems of the environment.
- Urban green corridors, which are those continuous strips with dominant presence of vegetation and priority use of pedestrians, which crosses the urban network and connects with urban parks and ecosystems of the environment.
- Street trees.
- Disused railroad track, which could function as urban green corridors.
- Spaces dedicated to agriculture and livestock, located mainly in the peri-urban.
- Beaches.
- Surface watersheds and watercourses.

21.5 Methodology

The analysis of UES required the application of indicators, which constitute valuable information tools to know the status of a district, while allowing to generate evidence in the decision-making processes and monitoring of a certain process, and to evaluate its progress, either in relation to certain goals when they exist, or with respect to the levels observed in a base year (Agencia de Ecología Urbana de Barcelona 2007; Quiroga Martínez 2009).

Environmental indicators can be used to assess the situation of a city in relation to its EI and UESs available, since they depend on processes that can be quantified based on the structures that provide them and/or their functions (De La Barrera et al. 2016). In this particular work, six indicators were selected that allowed to describe some components of EI and explore the case of temperature regulation and the supply of public green spaces as cultural UESs providers (see Table 21.1).

Indicators 1–4 required a georeferenced database (QGIS 2.16.3) (Karis et al. 2019) that was developed from information provided by the Habitat and Environment Institute (IHAM), the Territorial Management Code of General Pueyrredon district (Municipalidad de General Pueyrredon 2017a), and the Google Earth satellite imagery consultation for the year 2017, and has vector layers of EI components in the study area. For indicator 5, on the other hand, data from a Landsat 8 satellite image (Path/Row 224-86) was used.

In addition, to be able to compare the results of these indicators within the study area, areas of analysis were demarcated (Karis et al. 2019) using as a basis the delimitation of neighborhoods used by the Municipality of General Pueyrredon (Municipalidad de General Pueyrredon 2017a, 2017b). The areas result from grouping those neighborhoods that can be considered relatively homogeneous in terms of layout, structure and quality of life. While layout and structure were analyzed on the satellite image provided by Google Earth, quality of life data was taken from the indicator elaborated by Lucero et al.

Table 21.1 Indicators considered

Indicator	Description	UES
1. Number of neighborhood squares	The indicator reports the number of squares between 1000 m ² and 3.5 Ha of area in the study area.	Cultural
2. Number of urban squares and parks	The indicator reports the number of squares and parks between 3.5 and 10 Ha of area in the study area.	Cultural
3. Number of large parks and nature reserve areas	The indicator reports the number of parks and reserve areas greater than 10 Ha in the study area.	Cultural
4. Public green area per capita	The indicator measures the extent of existing public green areas and the relationship to the number of inhabitants.	Cultural
5. Normalized differential vegetation index (NDVI)	The NDVI is used to evaluate the vegetation-covered soil surface in public and private spaces. The indicator can take values ranging from -1 to 1. Negative values mainly correspond to the presence of clouds and/or water. Values close to zero mainly correspond to rocky outcrops, buildings and barren terrain or without vegetation. Moderate values (0.4–0.7) represent terrain with shrubs and meadows, and finally high values indicate lush and healthy vegetation, mainly associated with afforestation (> to 0.7).	Temperature regulation
6. Surface temperature (ST)	The indicator reports the surface temperature, expressed in degrees Centigrades. The values are obtained from the calculation and atmospheric corrections on the satellite image.	Temperature regulation

Source: Own elaboration based on Karis et al. (2019); Karis and Ferraro (2017) and Mujica et al. (2019)

(2011). It should be clarified that in the peri-urban area, homogeneity is lesser given that the areas of the urban-rural interface form a highly heterogeneous productive and social area.

Then, to explore the temperature regulation UES, the methodology use (Mujica et al. 2019) was subdivided into two parts. In the first one, the spatial distribution of surface temperature in the urban/peri-urban area of the city of Mar del Plata was modeled during the summer season on a standard day, and in the second one, the influence of the EI in providing the UES of temperature regulation was explored. For both sections, data from a Landsat 8 satellite image (Path/Row 224-86) was used in its 4, 5 and 10 bands. The image corresponds to day 22/02/2018 (13:39 UTC-3). Its choice is due to the fact that it represents the average temperature conditions of the summer season in the city of Mar del Plata and is affected by less than 1% cloudiness. From this image, two indicators were calculated (see Table 21.1, Indicators 5 and 6): (1) Normalized differentiated vegetation index (NDVI), and (2) Surface temperature (ST). To explain the relationship between urban temperature and the presence of EI, the ST and NDVI values were related

on three transects, which cut across different representative land uses within the study area.

Finally, with respect to cultural UESs which can be analyzed based on objective indicators, the results of indicators 1, 2, 3 and 4 were used to analyze features which, according to background studies (Reyes Pácke and Figueroa Aldunce 2010), relate to the ability of EI to provide this kind of benefits. In addition, results of these indicators were presented in a geographic information system (QGis 2.16.3), in order to show the distribution of green spaces and their characteristics within the study area.

21.6 Results and Discussion

Depending on the intended objectives, results are grouped into three sections: the first relating to the availability and characteristics of EI in the study area, the second relating to regulation UESs, specifically temperature regulation; and the third relating to how physical attributes of EI could relate to the provision of cultural UESs.

21.6.1 Ecological Infrastructure in Mar del Plata

The georeferenced database (QGis 2.16.3) and indicators 1, 2, 3, 4 and 5 allowed to describe some characteristics of the EI in the study area, specifically related to public green spaces and vegetation cover.

The study area has 256 public green spaces, considering as such those open in which plant coverage and natural elements predominate and are freely accessible, belonging to the State, and their main functions are recreation, contact with nature and social interaction (Karis 2019).

The results of indicators 1, 2 and 3 show that of the total spaces identified, 234 are neighborhood squares with an average area of 0.71 Ha. In contrast, urban squares and parks (between 3.5 and 10 Ha) add up to only 14, with an average area of 5.1 Ha, and large parks and reserve areas (>10 Ha), 8, representing 81.22% of the total area of public green spaces (see Table 21.2 and Fig. 21.2).

As for the location, parks and urban squares are concentrated in close proximity to the city center and on the seacoast. However, when you move away from these zones, smaller sparse public green spaces appear.

The parks and reserve areas greater than 10 Ha are located in the peri-urban area, with the exception of the Municipal Sports Park, the Natural Reserve of Mar del Plata Port and Punta Mogotes Parks (see Fig. 21.3).

As for the public green area per capita (indicator 4), the results show differences between the defined areas of analysis. If these are compared with the parameters used by most municipalities proposals⁴ (e.g. Ministerio de Desarrollo Urbano Buenos Aires 2009; Agencia de Ecología Urbana de Barcelona 2010), it can be observed that, only 5 areas exceed 15 m² per capita, of which four

locate in the peri-urban area, and 13 exhibit values below 9 m² per capita (See Fig. 21.3).

Finally, the results of the NDVI are related to the different types of layout, urban-fabric and percentage of waterproofed soil of the analysis areas. Within the urban area, moderate to high vegetation values (0.4–0.7) are located in coincidence with public green spaces and residential neighborhoods (located in UX, UV, UIV and UVII). On the other hand, in the peri-urban, values vary according to the state and density of vegetation and crops, as moderate to high values coincide with agricultural areas or those with low-density residential neighborhoods (See Fig. 21.4).

21.6.2 Regulation Ecosystem Services: Temperature Regulation

Regulation UESs could help damping climate change in cities mainly in three ways (Secretariat of the Convention on Biological Diversity 2012): (1) Increasing carbon storage and absorption, (2) Providing shade and cooling, thus significantly reducing the effect of urban heat island and, (3) Reducing maximum total water runoff for rainwaters, storing it in plants and substrates, and then releasing it into the atmosphere through evapotranspiration. Thus, EI could be planned by following sustainability objectives that allow, for example, to face—through natural processes and strategies- (European Environment Agency 2011; Foster et al. 2011) urban environmental problems, associated with climate change on the local scale.

In this particular case, the analysis focuses on the evaluation of temperature regulation service. In this regard, it should be noted that the EI effectively allows to moderate the negative effects of urban warming by providing shade, modifying the thermal properties of the urban network and increasing cooling through evapotranspiration (Manteghi et al. 2015). This ES results in positive consequences of the environment on the quality of life of citizens (Rueda 1996), as it contributes to the lowering of mortality and morbidity, greater comfort and productivity, and a reduced need for air conditioning.

⁴These proposals refer to a recommendation of the World Health Organization (WHO) according to which cities should have a minimum of 9 or 10 m² of green area per capita with an ideal value of 15 m². However, there is no official WHO document to support it.

Table 21.2 Results of indicators 1, 2 and 3

Indicator	Results	Surface (Ha)	Percentage of total public green area (%)
1. Number of neighborhood squares	234	166.73	13.15
In urban area	149		
In peri-urban area	85		
2. Number of urban squares and parks	14	7.36	5.63
In urban area	12		
In peri-urban area	2		
3. Number of large parks and reserve areas	8	1030.02	81.22
In urban area	3		
In peri-urban area	5		
Total	256	1268.11	100

Source: Own elaboration

The analysis carried out on the temperature regulation service identified that the variations in surface temperatures can be explained, in part, by the density in EI and the spatial distribution of the types or uses of urban soil, generating variations depending on the coverage and location with respect to the beach, urban or peri-urban sectors.

As mentioned in the methodological section, two indicators (5. NDVI and 6. ST) were used on three transects. In this way, by analyzing the distribution of the ST in the city of Mar del Plata (Fig. 21.5), it was found that its behavior responds to the phenomenon of cold island, which means that the city center has lower relative temperature values than its surroundings. This cold island situation has also been observed in other Argentine cities such as Rosario (Chiarito and Chiarito 2015), and Bahía Blanca (Ferrelli et al. 2015). The results obtained in these cities, as in the case study, have been the product of records obtained with satellite images in times near noon and during the summer season. In this way, the center area has temperatures between 23 °C and 25 °C, matching the area of least vegetation, that is, with lower NDVI values. Higher ST (between 26 °C and 30 °C) than in the center area are observed on the coast and in the peri-urban area. Therefore, it can be inferred that the urban area accumulates energy during the day and then releases it at night. Generally speaking, spaces with elements typical of EI were characterized by having lower ST values compared to their immediate environment; which is related to the presence of trees, as these

reduce long-wave emissivity from constructed areas.

Regarding the analysis by transects, the first (Transect 1, Fig. 21.2), is entirely located within the urban area. This area is characterized by relative spatial homogeneity, where moderate to high vegetation values (NDVI) are mainly in coincidence with public green spaces. These spaces mainly correspond to the Dardo Rocha Square, San Martín Square and the green spaces located on the property belonging to the Bus and Railway Station. These EI components introduce positive variations in the temperature damping service (reducing it). However, other components such as the roundabout, the Bus and Railway Station, the beach zone, introduce negative variations in temperature regulation (increasing it). The magnitude differences in temperature in this transect has been 9.1 °C at most. This difference is due to the extreme value of ST that takes the sand surface on the beach. If you compare surfaces without sand, but certainly in the presence of ecological infrastructure, such as the ST in the roundabout (28.4 °C) and the “Dardo Rocha Square” point (24.8 °C), you can see that flora can modify the ST, decreasing it by up to 3.7 °C.

To explore the rural/urban interphases, two transects were drawn: one north of the city (Transect 2) located entirely in the peri-urban area, and another to the south (Transect 3), which crosses both the urban and peri-urban areas. Contrarily to what was observed in the city center, these are highly dynamic and heterogeneous territories, subject to continuous transformations and that

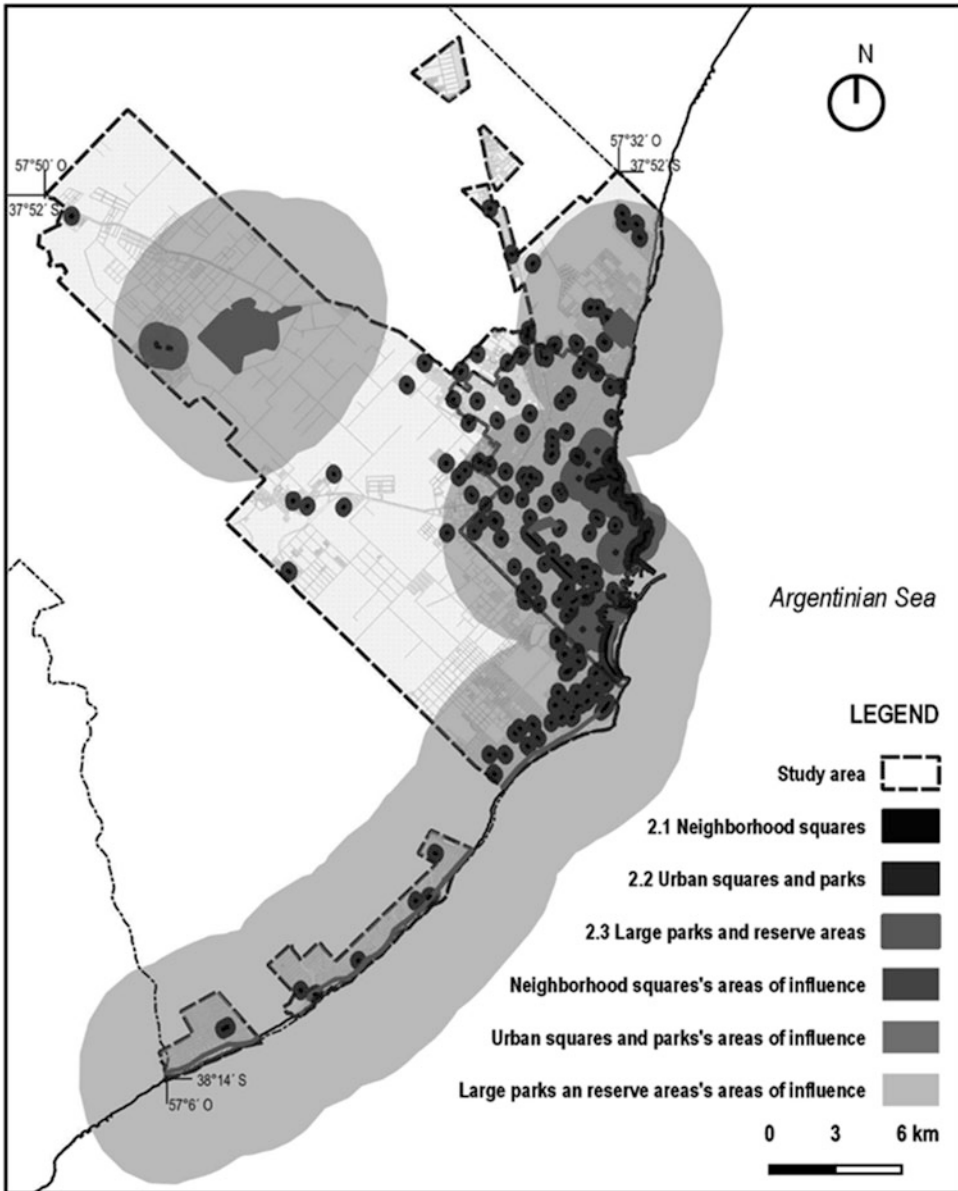


Fig. 21.2 Results of indicators 1, 2 and 3 (Source: Own elaboration)

constitute a fragmented area, with low density of occupation and low consolidation (Ferraro et al. 2013).

In these cases, soils that do not have plant cover generally coincide with rocky outcrops, lagoons, streams, bare soils or the presence of equipment for specific uses, such as the airport.

By contrast, vegetation-covered sectors coincide with agricultural areas or low-density residential neighborhoods, some of which protected as forest reserves. In these cases, NDVI values vary according to the state and density of vegetation and crops, which change considerably over the course of a year. This situation warns that in the

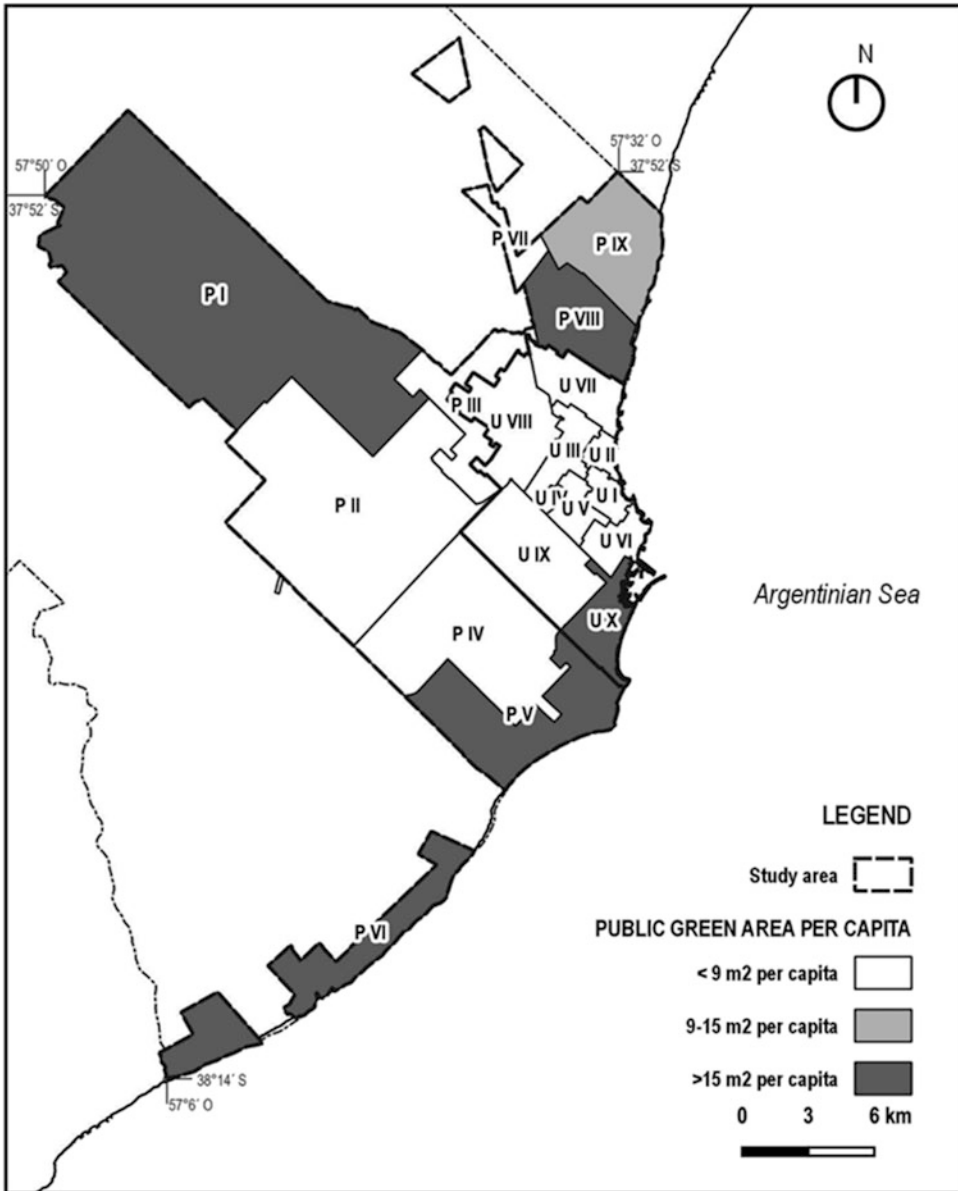


Fig. 21.3 Results of indicator 4 (Source: Own elaboration based on Karis et al. 2019)

peri-urban area the UES is not only given by public green spaces, but in this area other land uses become relevant, many of them privately owned.

The differences in the magnitude of the ST in the peri-urban area have been up to 6.1 °C for transect 2 and up to 8.3 °C in transect 3. The largest ST within the urban area corresponds to

infrastructure erected, such as the Port (30.6 °C), the Airport (29.8 °C) and non-forest neighborhoods (29.7 °C). In contrast, the smallest ST are associated with forest neighborhoods (24.0 °C), areas of natural reserve (23.9 °C) and streams (22.3 °C).

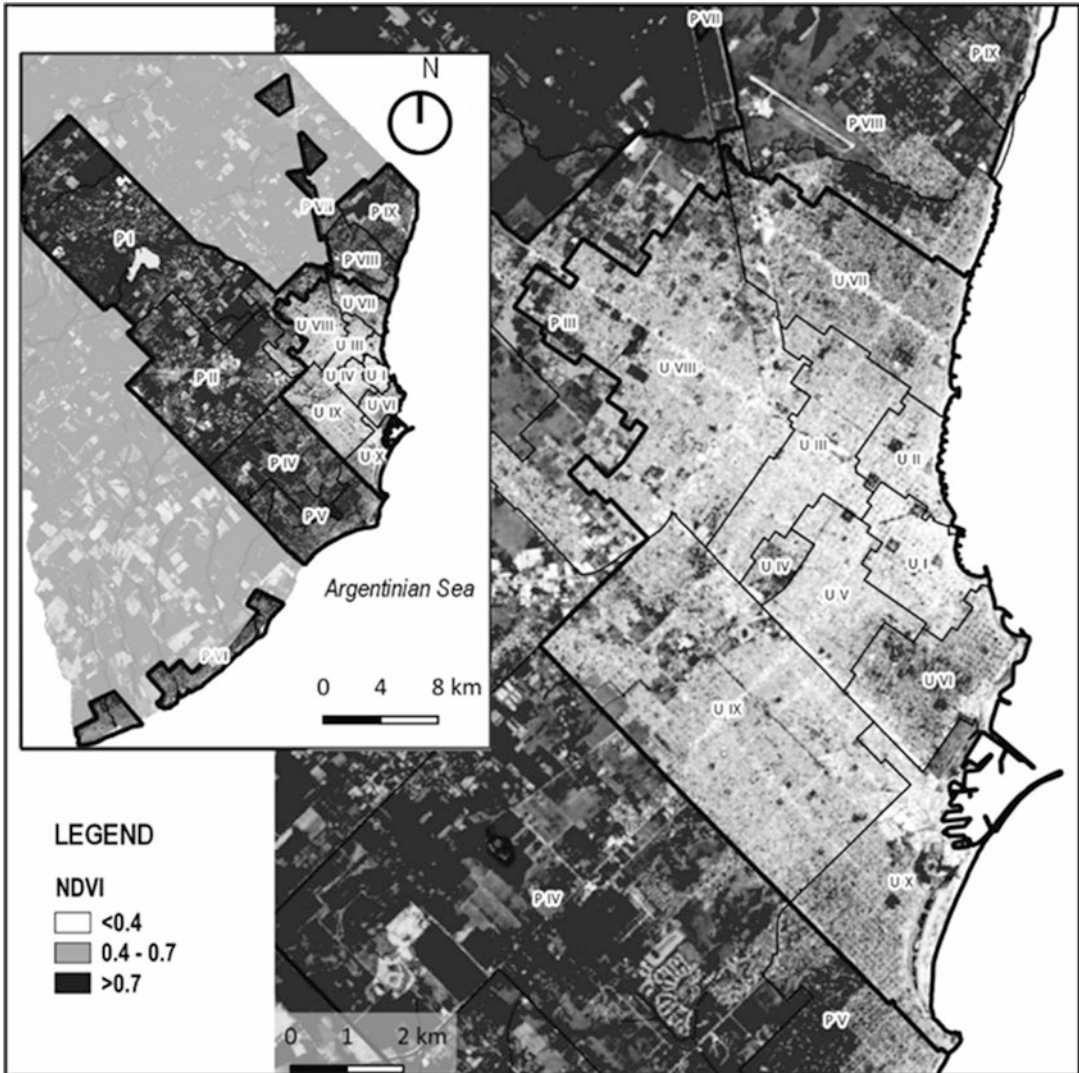


Fig. 21.4 Results of indicator 5 (NDVI) (Source: Own elaboration based on Karis et al. 2019)

21.6.3 Cultural Ecosystem Services and Ecological Infrastructure Characteristics

As mentioned above, cultural UESs can be defined as those non-material benefits that people obtain from urban ecosystems (MEA 2003; Gómez-Baggethun et al. 2013). These services can be classified into two large groups: those that are obtained from direct interaction with nature and that for their production depend on the presence of people, and those that are

obtained indirectly. In the first group, there are opportunities for sports and leisure activities, aesthetic experiences and opportunities for education and research. The second, on the other hand, includes those services of a spiritual or symbolic nature (Haines-Young and Potschin 2018). EI in general and public green spaces in particular, can integrate both groups.

The contribution of the cultural UESs of urban green spaces to the quality of life of the population is undisputed; therefore, their existence and maintenance are considered central to the

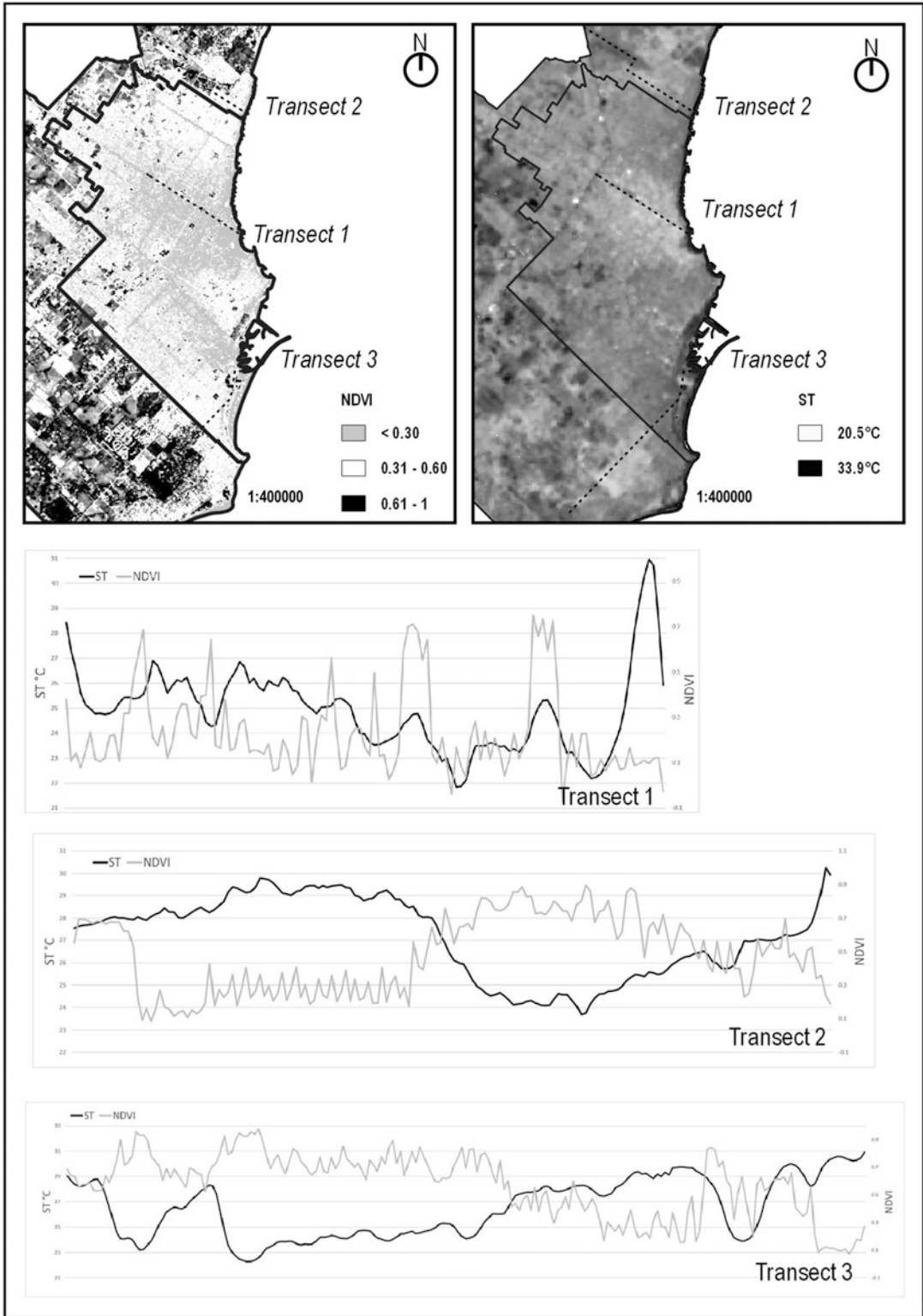


Fig. 21.5 Results of indicators 5 and 6 (Source: Own elaboration)

implementation of environmental policies and the planning of cities. In addition to their landscape-aesthetic function, they offer therapeutic and social benefits. Ballester (2003) emphasizes that these spaces meet needs for coexistence, grouping and socialization of different human groups, fulfilling an important social function. On the other hand, Chiesura (2004) points out that experiences in relation to nature in urban environments generate positive feelings in the inhabitants and meet important non material human needs; while other authors (Ulrich 1981; Kaplan and Kaplan 1989), established links between the contact with nature and the reduction of stress, the sense of tranquility and increased concentration.

Background work indicates that the larger size of public green spaces promotes the accomplishment of various recreation and leisure activities, facilitates the simultaneous presence of different groups such as children, adults and young people (Reyes Pácke and Figueroa Aldunce 2010). Large green spaces also allows the development of greater diversity and richness of plant and fauna species (Breuste et al. 2013), which relates to aesthetic qualities and opportunities to contemplate nature.

In this sense, the results of indicator 1, 2 and 3, shown in 7.1, compromises the offer of some cultural UESs, as most of public green spaces in the urban area are neighborhood squares of small size, while urban squares and parks are concentrated in small parts of the city, specifically in close proximity to the city center and on the seacoast.

On the other hand, various authors (Coles and Bussey 2000; Reyes Pácke and Figueroa Aldunce 2010), point out that there is a direct relationship between the size of these spaces and their influence area: while the larger ones may be fewer and be further away from each other, the smallest should be at such a distance that they could be accessed on foot on a daily basis. In this sense, Fig. 21.2 shows the different types of public green spaces with their respective areas of influence, which evidences an unequal distribution of these spaces. This restricts the possibility of direct contact of great part of the inhabitants with

nature, this being a determinant in the generation of great part of cultural UESs.

Finally, it is important to acknowledge the scope and limitations of the results presented in this section. As the connections between ecosystem processes and functions and quality of life are complex, it is necessary to take a pluralistic approach to assess these connections and to value the benefits (Costanza et al. 2017). The indicators used in this study allowed to evaluate only physical attributes of EI, some of them related to provision of cultural UESs according to background work. For that reason, when analyzing these services, there is methodological bias that make it necessary to include, socio-cultural valuation methods. However, beyond the limitations mentioned, the research provides the basis for analyzing the capacity of EI to provide cultural services from an objective perspective of quality of life, being important to advance in those subjective aspects that motivate ongoing research.

21.7 Conclusions

The debate from socioecological frameworks, capable of capturing the complexity regarding the multiple benefits generated by EI to the quality of life of urban inhabitants is a hardly explored line. In this regard, the use of indicators gave way and exemplified some issues relating to the provision of UES. The use of geographic information technologies for indicator mapping becomes of interest and relevance in determining their influence on mitigating current problems in the study area such as massive population growth in the summer season, the sprawl of peri-urban areas, coastal erosion and even the negative effects of climate change, such as the intensification of heat waves and flooding increase the impact on the quality of life of the population. This information is a necessary input to plan cities with a higher quality of life that allow to anticipate situations or disturbances that could change their essential functions.

In this sense, it can be said that while urban green areas offer multiple benefits in the urban

territorial context, scientific literature has shown that the magnitude of their efficiency depends on its characteristics in terms of size, distribution, design, etc. associated with different environmental problems. For the study area, it is noted that the benefits provided by EI on the temperature regulation are not evenly distributed in the study area, perceiving differences between the urban area and the peri-urban area. In the first, public green spaces stand out as the main element that dampens extreme temperatures. However, in the peri-urban area, there is a mix of elements that make up differences in temperature such as forest neighborhoods, ecological reserves, streams and lagoons. In the first case, the planning and management of green areas takes on a major role in achieving sustainability goals based on the provision of regulation services.

On the other hand, the results of the indicators applied to public green spaces showed concentration of public green area in a small sector in the study area. This is mainly due to the presence of large parks and nature reserve areas located in some areas of the peri-urban region, which allow greater diversification of uses and therefore greater possibilities to provide cultural UESs in this type of spaces. Outside these areas, the indicators showed a shortage of public green surface areas, a situation that could compromise the possibilities of daily contact with nature for much of the population in the study area, this being a determinant in the generation of great part of cultural UES.

These aspects could be addressed from the understanding of EI as an interconnected network system and not merely as isolated elements within the city. For this reason it is apparent that natural spaces in the city should be rethought, incorporating both their ability to regulate natural processes as well as their tangible and intangible values. In other words, the purposes of planning actions on EI should aim at enhancing their multifunctionality, in order to generate synergies that increase the positive impact that these spaces have on the quality of life of people. In turn, it is important to consider the interaction between EI and the UESs they provide, since not all have a directly proportional relationship with the

equitable distribution of green areas, but depend on their typology: for some services, the concentration is positive, and for others the dispersion is positive.

In addition, for better understanding of how EI provides cultural UES, future research should deepen on sociocultural interaction of the users in these spaces, emphasizing the subjective aspects of the quality of life. In this regard, Celemín et al. (2015) point out that the subjective assessment of the quality of life can be substantially conditioned by individual psychological factors. In this sense, it is intended to deepen the work carried out based on the investigation of subjective indicators through surveys that contemplate the diversity of actors in different sectors of the study area.

Finally, since global change can be considered a driver at the local scale, the urban system must be able to generate reorganization strategies that allow it to adapt to changes. In this regard, it is important to increase the adaptive capacity of the system, for which it is essential to address new planning strategies that incorporate both EI and the objective and subjective aspects of quality of life through the study on the condition of the UES, and thus promote resilience in order to ensure the sustainability of cities.

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Part III
Innovations

An Innovative Practice of Social Sustainability: The Fight for a New Housing Legal Framework in Spain

22

Eva Álvarez de Andrés 

22.1 Introduction

After the publication of the Brundtland Report in the late eighties (World Commission on Environment and Development 1987), sustainability has become a new urban paradigm (Whitehead 2003; Brand and Thomas 2013) as well as a key element for international strategies. Some examples are the 2030 Agenda (UN 2015), approved by 150 heads of state and government in order to urge all countries of the world to promote sustainable development, and the New Urban Agenda (NUA, UN-Habitat 2016), subscribed by the heads of most states in 2016. The NUA admits that the environmental unsustainability and the increase of poverty and inequalities are the most relevant challenges for cities in the twenty-first century.

In spite of it, many authors consider that social sustainability has been essentially marginalised from discourse, as well as from politics and research in general (McKenzie 2004; Vallance et al. 2011; Murphy 2012). However, after the outbreak of the economic-financial crisis of 2007–2008, in a context of delegitimisation of the institutions, and in particular of the national governments (Langman 2013; Armingeon and Guthmann 2014; Della Porta 2015), and of intense social mobilisation (Castells 2012; Báez

Urbina 2013; Dekker and Feenstra 2015; Flesher Fominaya 2017), it seems to be emerging again (Woodcraft 2015).

After reviewing the concepts of social sustainability and quality of life (Cummins 2005; Cox et al. 2010; Sirgy 2011; Lee et al. 2015; Woodcraft 2016; among others), this work proposes an “actionable” social sustainability, understood as a struggle to make rights (economic, social, cultural, etc.) fully effective, in an integral way, and for all people. Quality of life is understood as the evaluable result of this process.

The right to housing is a fundamental right recognised for decades in national and international regulatory frameworks (UDHR and ICESCR) and in international urban agendas (Habitat I to Habitat III). Also in the 2030 Agenda, the first target of the 11 goal is “to ensure access for all to adequate, safe and affordable housing”. However, after 30 years of hegemonic neoliberalism, housing has been consolidated as a commodity for the benefit of a few (Lefebvre 1969; Harvey 2012; García-Lamarca and Kaika 2016; Pascual 2016; Zárata 2017). Access to housing has become increasingly unattainable, given the widening gap caused by the increase in the market value of these goods and the loss of wage value, together with the precarious employment of a large sector of society (Portes et al. 2005; Piketty 2015). The number of foreclosures has grown steadily all over the world, leaving millions of people homeless and leading to

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increasing inequalities (Belil et al. 2012; Hardoon et al. 2016; Rolnik 2018).

At present, the “rights approach” has become a strategic issue as it challenges the generalised discourse that exalts individual rights, such as the right to property or profit, above collective rights (Harvey 2012), based on legal and de-facto mechanisms (Marcuse et al. 2009).

This chapter aims to help clarify social and political aspects of the social struggle that tries to affect the right to housing in Spain. It is considered that the Spanish case is paradigmatic for many reasons: the extent of the problem, with more than 700,000 evictions since the outbreak of the crisis in 2007–2008; the policies of “mercantilisation” of housing promoted for decades and the most recent policies of financialisation (Naredo 2010; Alguacil et al. 2013, García-Lamarca and Kaika 2016); and the social mobilisation unleashed since 2009 through the “Plataforma de Afectados por las Hipotecas (PAH)” aiming to enforce the right to housing (Álvarez et al. 2015; Di Feliciano 2017).

This is a single-case study (Yin 1994) of how to promote an “actionable” social sustainability, through the struggle for housing carried out in Spain by the PAH social movement. The information has been collected via participation in assemblies of the PAH, as well as from other sources such as documents, publications in social networks, interviews with other actors, etc. For the extraction of conclusions, the information collected has been analysed by Foucault’s approach, with a focus on the role of two key actors: state and community.

After this introduction, the rest of this work is structured as follows: firstly, a review of literature provides a framework for the concept of “actionable” social sustainability. After that, the research method that has been used for the analysis of the case study is described, and then the evolution of the housing politics in Spain is presented from the times of the dictatorship to the present. The following section analyses the struggle of the PAH to make effective the right to housing in Spain, and more specifically to establish a binding regulatory framework. Finally, conclusions are drawn.

22.2 For an “Actionable” Social Sustainability

As the Brundtland Report was published by the end of the 1980s (World Commission on Environment and Development 1987), sustainability became a new urban paradigm (Whitehead 2003; Brand and Thomas 2013), as well as a key element for international agendas such as Agenda 2030 or the New Urban Agenda (UN-Habitat 2016), in which urbanisation is understood as an instrument to achieve “sustainable development”. However, “development” and “sustainable” are considered antagonistic terms used to conjugate the unlimited economic growth that underlies the concept of “development” with the protection that “sustainability” requires (Gómez Orea 2007). Critics of “sustainable development” describe it as a neoliberal project (Raco 2005; Brand and Thomas 2013) to master the formulation of policies and practices (While et al. 2004), by introducing a discourse with “neutral” appearance (Miller 2007) that limits the debate, the categories and the fields of action, and, in doing so, “transforms the perceptible into non-perceptible” (Rydin 1999). This intentionally relaxed language with diffuse limits conceals conflicts of interest (Rydin 1999) and legitimises “reformist” policies, avoiding deeper transformations that contribute to challenging power and to visualise the structural causes of the problems being faced (Bond 2008). In this way, for example, “environmental” sustainability is legitimised, circumscribing it to “green growth”, in order to avoid criticisms to the current model of growth and consumption (Rydin 1999). Similarly, according to Woodcraft (2016) the “social sustainability” that fundamentally refers to equity, is reinterpreted to accommodate the dominant political and economic structures, emphasising dimensions of “the social” as “capital”, and avoiding others such as socio-spatial justice.

“Social sustainability” has been essentially marginalised both from discourse, in addition to politics and research in general (McKenzie 2004; Vallance et al. 2011; Murphy 2012). Nonetheless, after the outbreak of the economic-financial crisis

of 2007–2008, and in a context of delegitimation of institutions and particularly of national governments, which had been unable to protect citizens against its effects (Langman 2013; Armingeon and Guthmann 2014; Della Porta 2015), and of intense social mobilisation (Castells 2012; Báez Urbina 2013; Dekker and Feenstra 2015; Flesher Fominaya 2017), the debate about topics such as justice, rights, social sustainability, etc. has emerged again (Marcuse et al. 2009; Fainstein 2010; Harvey 2012; Purcell 2013; Belda-Miquel et al. 2016; Woodcraft 2016).

For Woodcraft (2016), “social sustainability” is understood as a process to re-balance economic, social and environmental factors. In this same line, Sirgy (2011) considers that the quality of life, from the sustainability approach, is associated with the balance between economy, ecology and equity (the three E’s of sustainability). The concept of quality of life is considered multidimensional (Cummins 2005; Cox et al. 2010; Lee et al. 2015) and is understood as the measurable result of the social sustainability process.

Talking about quality of life means questioning what life is like for people in a given environment and in relation to specific aspects. The concept of quality of life implies a valuation or evaluation ... When we talk about the quality of life of a society or a collective, we are questioning how a specific group of individuals live in a specific spatial and temporal context, and a value is being attributed to them. (Valdivia 2016, p. 184)

Hence, reference to quality of life implies questioning about the satisfaction of material aspects, such as access to infrastructures and services (Vallance et al. 2011), as well as immaterial aspects such as democratic participation (Dempsey et al. 2011). In his definition of social justice, Fraser (1996) also considers the valuation of interrelated material and immaterial dimensions such as the distribution of resources, recognition and representation.

From these approaches, it is clear that the problem is not claiming a better and better life for a few, but a good life for all people (Marcuse

et al. 2009). A dignified and full life is one in which all people have equitable access to material resources (redistribution) and immaterial (recognition), and ability to participate in the decision-making processes (representation) in order to ensure such equity. In short, it is understood that the focus should be in making economic, social and cultural rights effective, in an integral way, and for all people.

However, despite the Universal Declaration of Human Rights of 1948 (UDHR) and the subsequent development of the International Covenant on Economic, Social and Cultural Rights (ICESCR) of 1966, inequality in access to rights has only increased (Milanovic 2006), which has contributed to undermine and limit discourse when the inconsistency between experience and political rhetoric becomes evident (Brand and Thomas 2013). Any right remains “empty” if there is no political power willing to make it effective (Marcuse et al. 2009). The rights approach has become a strategic issue nowadays, as it challenges the dominant discourse that exalts individual rights, such as the right to property or profit, above collective rights (Harvey 2012). Discrimination is based on legal and de-facto mechanisms (Marcuse et al. 2009) which is reflected in the physical space.

Spaces arise from power relations, power relations establish rules; and the rules define the limits, which are both social and spatial, because they determine who belongs to a place and who is excluded, as well as the situation or location of a given experience. (McDowell 1999, p. 15)

The space reflects and reproduces inequalities (Lefebvre 1996; Sassen 2010; Valdivia 2016) and therefore reflects and reproduces unequal access to rights. The urban space has become the strategic place for the process of “accumulation by dispossession” (Harvey 2004) but also in the privileged space for “fighting” to effect the rights, understanding the local urban space as the space from which people can affect policies (Marcuse et al. 2009).

The right to housing must be understood as a fundamental right, related to other economic, social and cultural rights, a space from which

other rights are accessed such as the right to water, the right to belong to a community, the right to build an identity, etc. (Álvarez 2013). This right has been considered as such for decades in national and international regulatory frameworks (UDHR and ICESCR) and in international urban agendas (Habitat I to Habitat III). However, after 30 years of hegemonic neoliberalism, land and housing have been consolidated as commodities for the benefit of a few (Lefebvre 1969; Harvey 2012; García-Lamarca and Kaika 2016; Pascual 2016; Zárate 2017). Access to these goods has become increasingly unattainable, given the widening gap due to the increase in the market value of these goods and the loss of wage value, together with the precarious employment of a large sector of society (Portes et al. 2005; Piketty 2015). The number of foreclosures has grown steadily all over the world, leaving millions of people homeless and leading to an increase in inequalities (Belil et al. 2012; Hardoon et al. 2016; Rolnik 2018).

Rolnik (2018) argues that, in global terms, there has been a sale of cities to the real estate-financial sector, a process favoured by a set of national policies that have made housing a key element of income extraction, financial profit and capital accumulation. The “right to housing” has been replaced by the “right to get into debt” for buying a home, making homes and neighbourhoods the last frontier of high-risk financial capitalism (Rolnik 2018). In this same sense, García-Lamarca and Kaika (2016) argue that the link between access to housing and access to credit has created an increasingly close connection between daily life practices and the speculative practices of the global real estate and financial markets. In their work, they show how, after the outbreak of the crisis in 2007, macroeconomic changes and the financialisation policies of the housing markets have reduced the ability of people to access housing, impacting on multiple aspects of everyday life: breaking their social networks, affecting their health, etc.

In short, we are facing a global process of “accumulation by dispossession” (Harvey 2004), whose repercussions vary depending on the different contexts (García-Lamarca and Kaika 2016,

Janoschka 2016, Gutiérrez and Vives-Miró 2018, Rolnik 2018). According to Alguacil et al. (2013, p. 188), “there has been an abdication of the public responsibility regarding accessible housing by all the societal sectors, entrusting speculative markets for the satisfaction of the housing accessibility”. As it is shown in this chapter, the housing exclusion problem in Spain continues being a problem of lack of political will¹ to guarantee the right to housing, even though it is a right that is included in the Article 47 of the Spanish Constitution.²

Given the passivity of the institutions, civil society has organised itself. The movements for defence of the right to housing and the city have proliferated in the last decades throughout the world (Cabrera and Scheinsohn 2009; Castells 2012; Della Porta 2015; Di Feliciano 2017).

The right to housing, together with the more general right to the city, are understood as a call to overcoming the prevailing model: “the right to the city is like a cry and a demand, a transformed and renewed right to urban life” (Lefebvre 1996, p. 158). They are aimed at strengthening processes and claims against injustice and social and territorial discrimination, and therefore to promote social justice (Belda-Miquel et al. 2016). The right to housing and to the city is not a question of the legal recognition, but a social struggle (Kuymulu 2013) oriented towards the collective self-government of the urban space (Purcell 2013), so that the production of the city responds to the needs of its inhabitants and not to other commercial interests (Brenner et al. 2012).

All institutions need to be forced to take concrete measures for promoting urban social justice at local and global levels (Pascual 2016). The

¹“We all know that the obstacles to those solutions are not technical but political. Political will is needed to address certain economic interests. No more” (Colau and Alemany 2013, p. 29).

²The Article 47 of the Spanish Constitution, expresses that: “All Spaniards have the right to a decent and adequate housing. The public authorities shall promote the necessary conditions and establish the appropriate standards to make this right effective, regulating the use of land in accordance with the general interest to prevent the speculation. The community will participate in the benefits accruing from the town-planning policies”.

right to housing and to the city are a struggle that begins with the transformation of discourses, that is, with the identification of the causes of the problem and its possible solutions, and of the power relations that determine them (Kipfer et al. 2013). This is a process that cannot be led by the state; it arises from the creative experimentation of those who suffer from housing exclusion and segregation (Álvarez et al. 2019) insofar as their needs become the engine of change in “motivation, mobilization and commitment” (Max-Neef et al. 2010, p. 34).

From this approach, an “actionable” social sustainability is proposed, this is understood as a struggle to make economic, social and cultural rights effective in an integral way and for all people; a process in which effective access to the right to housing is considered a key element in relation to other rights (health, community, etc.).

22.3 Method of Analysis

This paper is based on Foucault’s approach, that is, in the idea that there are multiple relations of authority in society that constitute different “power blocks” that make up different groups of actors, regulatory mechanisms and actions, with different capacities for the production of meaning, for exercising power, and ultimately for transforming the reality (Foucault 1998).

Several aspects make the Spanish case paradigmatic:

- The size and impact of the crisis, with more than 700,000 foreclosures since the outbreak of the economic-financial crisis in 2007–2008.
- The link between the economic crisis and the housing policies that have been implemented for 80 years (Naredo 2010; Alguacil et al. 2013; Jiménez and Fernández 2014; García-Lamarca and Kaika 2016; Gutierrez and Vives-Miró 2018) and the entanglement between financial crisis and political delegitimation, particularly after the implementation of “austerity” policies.

- The magnitude of the process of “taking the street”, and specifically of the social mobilisation to make effective the right to housing promoted in 2009 by the Platform of Affected by Mortgages (PAH) (Jiménez y Fernández 2014; Álvarez et al. 2015; Di Feliciano 2017).

Based on this approach, this article analyses the capacity of a movement such as the PAH to conform as a new “power block”, as well as their capacity to transform the strategies established by the dominant power, that is, to revert the production of meaning and the regulatory mechanisms that have led to the current situation of housing crisis in Spain.

Data collection and analysis comprised four stages: immersion (description); systematic data collection (classification); data processing (making connections); and drawing conclusions (producing and account) (Frediani 2007). All of this has been done starting with a review of the literature on housing policies that have been carried out in Spain since 1950. Then the PAH has been examined closely via participation in assemblies and other activities during the last years, together with the observation of their use of social networks (e.g. Facebook, Twitter, blogs, YouTube, and websites).³ Finally, other actors have been interviewed, and news in the media regarding the struggle for implementing the right to housing have been reviewed.

The research strategy was pragmatic in that we combined methods (Silverman 1993) in order to understand the role of the different actors regarding the right to housing in Spain (and more specifically government institutions and social movements), and actions implemented in addition to regulatory mechanisms imposed or promoted by each of them (Foucault 1998). It is also pragmatic in that it is neither purely inductive nor purely deductive, but follows patterns of creative abduction (Schurz 2008). Inspired by Strauss and Corbin (1990), the data collection, coding, and categorising involved iterative moves between

³ Sources as: <http://afectadosporlahipoteca.com/> or <http://viviendadignatodos.blogspot.com.es/>

data sorting, coding, probing, and collecting until we could reconstruct the story of the struggle for the right to housing in Spain.

The following section presents the context of housing policy in Spain and how they are leading to a process of dispossession favoured by the government. Subsequently, the results on the social mobilisation of affected people (PAH) and their struggle to enforce the right to housing in Spain are shown, to finally present the conclusions in the last section.

22.4 The Housing Policy in Spain: A Dispossession Process Sheltered by the State

Spain has been one of the countries most affected by the financial crisis. This fact responds to the implementation of a real estate-financial-urban model, conceived not to satisfy housing needs, but as the “engine” of the Spanish economy. This model has its roots in the Franco regime, persisting in the current constitutional regime, and it is an anomaly in the European Union. It is a widely studied process (Naredo 2010; López and Rodríguez 2010; Colau and Alemany 2012; Alguacil et al. 2013; García-Lamarca and Kaika 2016; Gutiérrez and Vives-Miró 2018) but, given its relevance for this investigation, we will now present the elements that characterise it:

It is promoting a housing access model almost exclusively based on the private property regime. The period of the Franco dictatorship (1939–1975) laid the foundations of this model. According to the prime minister of housing José Luis Arrese (1957), it was about turning a country of “proletarians” into a country of “owners”. For the dictatorial regime, promoting access to home ownership was a mechanism of social control that avoided the proletariat’s response (Colau and Alemany 2012; Gacia-Lamarca and Kaika 2016). In 1950, 90% of the Spanish population was living in the largest cities, as for example Madrid or Barcelona, where most of the housing was offered for rental (Belil et al. 2012). However, homes for rental currently represent only the 13.5% of the housing, while 78.9% are private

properties inhabited by their owners.⁴ This change has been driven by policies based on the tax relief for the purchase of new properties but not for the rental, or by promoting access to public housing also under the ownership regime. At the same time, the institutional authorities and the banking system promoted the idea of the rent being a form of wasting savings (ODESC 2013). As a result, the rental market in Spain is around 17%, when the European average is around 30%. In parallel, the stock of public social housing was reduced almost to extinction; currently it barely reaches 2% of the Spanish real estate. The construction sector became, along with tourism, the key element of economic development, while dismantling the productive apparatus (López and Rodríguez 2011).

Housing construction is considered a key element of economic development, as an investment asset rather than a right. Between 1997 and 2007, there was an exponential growth of the construction sector, and property speculation skyrocketed (Charnock et al. 2014). It is estimated that 6.6 million homes were built in Spain in this period, which is 40% of the housing built in Europe in the same period. The financial real estate sector became the engine of the Spanish economy, accounting for 18% of GDP, 13% of employment, and the destination of 70% of the credit (Colau and Alemany 2012). All of it has been accompanied by the deregulation of the land, real estate and the financial market. Consequently, Spain has the highest percentage of empty housing in all of Europe, which is always above 10%.

Force families to be over-indebted as the only way to affect their right to housing. From the real estate-financial sector and public administrations, the message that housing was a safe investment was spread (García-Lamarca and Kaika 2016). Between 1997 and 2007, the population has been forced to go into debt “beyond the reasonable limits”. In this period, the debt amount turned from the 55% of the household disposable

⁴ According to the last population and housing census 2011. Source: <http://www.ine.es/prensa/np824.pdf>. Last access: July 9, 2014.

income, up to the 130%, with all the implications this has on living. By the end of 2007, housing had become the “greatest asset in people’s daily lives”. 82% of the population were considered “homeowners” when in fact they were over-indebted “mortgage owners”, highly dependent on an opaque, complex and unpredictable global financial system (in 2007 it was estimated that the debt had been securitised by 36%), and immersed in a precarious labour market highly dependent on the construction sector (García-Lamarca and Kaika 2016).

All of it seasoned by a generalised system of corruption in the financial, political and real estate sectors. The implementation of the speculative model has been possible thanks to the close relationship between the housing-construction sector, the financial banking and the political power. According to Alguacil (2013, p. 18) “The list of cases where local authorities, construction companies and real estate companies work together are so common around the territory that could even be the subject of a monograph.”

All this has revealed that Spain had a structural problem of denial of access to the right to housing that was contemporary to the “real estate boom”, both prior to the financial crisis. By the end of 2006, following a visit to Spain, the UN Special Rapporteur for the Right to Housing issued a report pointing out that the main housing problems in Spain were caused by the poor management of the public administration. The report denounced the commercialisation of the social housing programmes. In the same line, the FEANSA 2008 report highlighted that 20% of the Spanish population was being excluded from the housing market.

In this context, the outbreak of the international financial crisis had hit Spain with devastating consequences. The rise of the interest rates and the interruption in the international credit flow seriously affected the real estate business, which was the foundation of the “Spanish miracle”.

The Achilles heel of the Spanish economy was the non-payment of the real estate sector and the amount of money invested in “toxic assets” by the financial sector, and families in debt, and with

fewer resources, paid the consequences. After the financial crisis of 2008, the unemployment reached ratios over 20%, and families found it more and more difficult to face the payment of mortgages. At the same time, the financial pressure to return the debt increased, and “austerity measures” were imposed, supposing the contraction of the public funds and making the situation of people in risk of exclusion even more difficult. Since 2010, it was estimated that more than 121 million euros were cut in education, health, pensions and other social rights (La Marea 10/12/2013b), while the public aid granted to Spanish financial entities was estimated at 1,427,355 million euros (La Marea 10/10/2013a). In 2012, Spain becomes one of the most rescued countries in Europe (with public aid of 3.8 billion euros) and, after decades of promotion and deregulation of the mortgage market, the European Central Bank requires solvency of rescued financial institutions, what is done by selling these assets to foreign investors.

People become “financial objects” susceptible to “be used and thrown” (Dean 2012) and their daily lives and their future work become objects of financial speculation. There is a transfer of the debt from the private sector to the public sector, “socializing the losses and ensuring the satisfaction of the amounts lent to European banks” (Gutiérrez and Vives-Miró 2018, p. 9). As a result of all this, between 2007 and 2019, the public debt triples, and there are more than 700,000 foreclosures, condemning them to a life of social exclusion, while there are over 3.4 million empty homes.

In such a dramatic moment for hundreds of thousands of families, the public administration chose to address its efforts to protect the interests of the financial real estate sector, instead of guaranteeing the right of citizens to housing. It could be affirmed that the housing policies in Spain not only have been “a clear example of the failure of the liberal market, both in social and economic terms.” (Alguacil et al. 2013, p. 24) but also a “scam circumscribed and protected by law” with devastating consequences for most of the population (Colau and Alemany 2012).

In this context, since 2009, people affected by foreclosures decided to organise themselves. The PAH was created in order to unleash a collective action that allowed them to change meanings, norms and power relations, and finally show that reality can be transformed.

22.5 Fighting for a New Housing Legal Framework in Spain: A Test of Democracy!

The PAH was established in 2009 in order to respond to the tragedy experienced by 700,000 families affected by foreclosure processes. It grew very quickly in a hybrid space, between face-to-face meetings in the streets and communication networks such as Facebook, twitter, etc.

The first challenge was to make those affected lose their fear and become active subjects of the change (Colau and Alemany 2012, 2013). In this sense, the assemblies became a key instrument to create a space of trust that can be established as a mutual support network, a space where victims become fearless, learn to self-organise to act collectively, and to unleash the creative power of hope (Castells 2012). Public denunciation campaigns were carried out, pointing out the banks as those directly responsible for the population's suffering "This bank lies, scams and kicks out people from their home". These campaigns contributed to help people "to face Goliath", to re-balance an unequal negotiation relationship.

The PAH managed to carry forward useful actions, in which all could participate, and that responded to the needs of people affected. More than 2045 evictions were stopped, and more than 2500 people were relocated through the occupation of empty housing in the hands of financial entities. These actions contributed to make the problem visible and, at the same time, showed that reality is transformable (Álvarez et al. 2015).

The PAH used the social networks and the media to spread their struggle; it had achieved empathy with the majority's feelings: "it has achieved the most difficult: to articulate a demand recognised by the 90% of the population" (Colau

and Alemany 2013, p. 94), gaining legitimacy. The collective imagination began to transform; denunciations and actions showed that housing cannot remain a commodity for the benefit of a few and that it can be fought for to recover it as a right.

Little by little, the capacity of the movement to force the political agenda was shown. In 2013, the PAH decided to draft a state housing law and managed it to be admitted for debate in parliament, through a Popular Legislative Initiative (ILP). At the same time, it pressed the local public administrations to present autonomic laws, given that housing is a regional competence. In 2013, the Navarre Regional Law was approved (24/2013) and the Andalusian Law (4/2013) and in 2014 the Canary Law (2/2014). All these laws have as a final purpose to regulate how to make effective Art. 47 of the Spanish Constitution, which states that everyone has the right to decent housing and that institutions have to regulate to make it effective and to prevent speculation with real estate. These laws collect part of the PAH demands to recover the social function of housing. In general terms, these laws recognise the situation of social emergency, propose measures to sanction empty housing in the hands of financial and real estate entities, and propose measures to respond to families at risk of exclusion such as the stoppage of evictions or the start-up of new autonomic housing plans.

However, all these laws have been totally or partially suspended provisionally by the Constitutional Court (CC) considering that, although the autonomies have jurisdiction over the housing policy, they do not have jurisdiction over other matters such as credit and mortgage policies or in the matter of evictions. Furthermore, it is alleged that these laws affect the regulation of property rights and that they endanger the Spanish financial system and therefore the public interest. Nevertheless, local administrations argue that it is precisely the precautionary suspension of these laws or some of their articles that produces irreparable damage to the public interest by not guaranteeing the right to housing. This condemns hundreds of thousands of families to live at risk of exclusion while they are thousands of empty

homes in the hands of large holders of housing that are making an antisocial use of them.

In 2015, the PAH continues fighting by presenting, again through ILP, the Catalan law 24/2015. This law is approved by a majority in the Catalan parliament. The law provides measures and mechanisms to, among other things: resolve situations of over-indebtedness, avoid evictions, create public funds for rental housing from the empty housing stock in the hands of financial and real estate entities. Like the previous ones, this law is provisionally suspended by the CC. In order to avoid the precautionary suspension of the CC, the PAH presents in 2016 the law of measures to protect the right to housing of people at risk of residential exclusion (Law 4/2016), but this law is again appealed by the CC.

In 2017, the community of Madrid still did not have a regional law that guaranteed the right to housing, so the PAH mobilised again and managed to register a housing law for Madrid through the ILP procedure: However, this was not even accepted for debate, and the local government, with a majority in the regional parliament and of the same party of the central government, argued that there was no need for a housing law even though solely, in the municipality of Madrid, there was a registered demand for more than 16,000 units of public housing.

In 2018, the PAH presented a national housing law in order to “end the housing emergency and laid the foundations for a new model that guaranteed the right to housing”. The law proposed 5 measures: retroactive payment by account, development of an affordable rental market in order to guarantee stability and adequate prices, stop evictions, social housing to relocate families in empty flats in the hands of financial institutions and basic supplies (water, electricity and gas) guaranteed. But once again it was vetoed by the parliamentarians of the party with a majority in the current government and is not even admitted to debate.

These laws have become an examination of the state of the Spanish democracy. The vetoes that prevented that laws were debated, together with the precautionary suspension by the CC of

those that had been approved in the regional parliaments (Navarre, Andalusia, Canary and Catalan), have shown, as one member of the PAH said, “that the current government is not willing to protect the right to housing. The constitutional is being used as a third administrative chamber and regulating according to the economic interests of a minority and not of the common good”. The PAH’s struggle has contributed to show the use by the state of the regulatory frameworks as instruments of power at the service of the interests of the real estate financial sector. Likewise, it has been shown how to transform the laws so that the right to housing set forth in Article 47 of the Spanish Constitution becomes effective, allowing: to sanction empty housing in the hands of financial and real estate entities, stop evictions and mobilise mechanisms to expand the rental housing stock.

After 8 years of struggle, in 2017, the PAH has succeeded in having the European Court of Justice to pronounce in its favour, which opens the door to demand the nullity of all foreclosure proceedings and the evictions carried out in Spain since 1995. At the same time The Committee of Economic, Social and Cultural Rights (CESCR) of United Nations has also pronounced in favour of the PAH declaring that any kind of evictions, as they occur in Spain on a daily basis, constitute a violation of Human Rights since they usually occur without there being any type of housing alternative.

In this context of internal and external pressures, the CC is currently lifting the suspension of some of the articles of the Navarra, Andalusian or Catalan laws, as the sanction of empty housing. However, the government continues to implement numerous national policies such as mortgage policies, evictions, taxes, control of expropriations, etc., which condition the housing policy favouring market interests instead of guaranteeing the right to housing for the majority.

In all these years, the PAH has shown that the right to housing is a struggle and that it is possible to establish new housing laws in favour of the common good and not of the interests of the financial and real estate sectors. It has become a “power block” with the capacity to transform the

collective imagination and some of the regulatory frameworks.

22.6 Conclusions: “Taking and Doing” Instead of “Asking and Waiting”

Since the economic-financial crisis of 2007–2008, and the result of housing policies implemented in Spain for more than 80 years (Naredo 2010; López and Rodríguez 2010; Colau and Alemany 2012; Alguacil et al. 2013; García-Lamarca and Kaika 2016; Gutiérrez and Vives-Miró 2018), it is estimated that around 700,000 foreclosures have occurred. The response of Spanish local communities has been the emergence of a networked social movement called *Plataforma de Afectados por la Hipoteca* (PAH; the Spanish Mortgage Victims Group), born in 2009.

In this chapter, the struggle of the PAH for realising the right to housing, as a key element to ensure basic conditions of quality of life in Spain, has been analysed. Based on the Foucault approach, this work has shown the capacity of a movement such as the PAH to conform as a new “power block”, with ability to produce new meanings and to force the transformation of reality, becoming an effective and internationally relevant example of innovative practice to promote an “actionable” social sustainability.

After reviewing the concepts of social sustainability and quality of life (Cummins 2005; Cox et al. 2010; Sirgy 2011; Lee et al. 2015; Woodcraft 2016; among others), this work advocated for this concept of “actionable” social sustainability, understood as a struggle to make rights (economic, social, cultural, etc.) fully effective, in an integral way, and for all people. The quality of life would be understood as the evaluable result of this process.

In this chapter, the right to housing has been presented as a fundamental right recognised for decades in national and international regulatory frameworks (UDHR and ICESCR), in international agendas urban agendas (Habitat I to Habitat III), as well as in other relevant international

agendas such as the 2030 Agenda, which aims to “ensure access for all to adequate, safe and affordable housing” in the first target of the 11th goal. Nonetheless, in this work it is shown how the right to housing is not a question of the legal recognition but a social struggle between forces of unequal power (Belil et al. 2012; Harvey, 2012; Belad-Miquel et al. 2016). It is a process triggered by those affected (Max-Neef et al. 2010; Castells 2012; Álvarez et al. 2019) in order to force all the institutions to take measures to promote greater urban social justice (Pascual 2016; Álvarez and Smith 2019).

This chapter contributes to clarify social and political aspects of the social struggle that tries to affect the right to housing in Spain. The work presented demonstrates how the Spanish State has not only abdicated its responsibility to regulate to enforce the right to housing set forth in article 47 of the Spanish Constitution, but has promoted a process of commodification and financialisation of housing for the benefit of a minority (Naredo 2010; Colau and Alemany 2012; García-Lamarca and Kaika 2016), which has given rise to the situation of housing emergency that is experienced today in Spain (Alguacil et al. 2013), with a strong impact on the worsening of the quality of life for a large part of the population.

In this context of the delegitimacy or “political unsustainability”⁵ of the State, those excluded from the system have organised themselves to answer the established power. The movement to fight for the right to housing in Spain led by the PAH has promoted an “actionable” social sustainability by:

- The creation of assemblies, which have contributed to those affected to unite to face “Goliath” that is, the “block with more power”, which is the financial-real estate sector.

⁵ Understood as a policy that not only does not reach the political commitments contained in the Spanish constitution and in the international agendas ratified by the Spanish state, but also hinders its future fulfillment.

- The implementation of useful actions, based on their capabilities and resources, such as stopping more than 2045 evictions, or relocating more than 2500 people in empty flats in the hands of financial institutions. Through these actions, the PAH has shown that reality is transformable, that “yes you can, but they do not want”. They have contributed to change the collective imagination and to make visible that we must fight for housing to be an effective right and not a commodity.
- The production of new regulatory frameworks, which the Spanish State should have established more than 40 years ago. These laws have become an examination of the state of the Spanish democracy insofar as they have forced institutions to position themselves against regulatory mechanisms that are “anti-constitutional” and considered “illegal” by European courts. In the end, this line of action promotes political sustainability, as the social struggle enforces the institutions to revisit the engagements that already are taken in national and international political agendas and that are being ignored.

In summary it is considered that the main achievement of PAH is to have managed to turn an individual problem into a collective problem, and to show that meanings and reality are transformable “if we got organized and we kept on course, we could change things.” (Colau and Alemany 2013, p. 42).

It is considered that further research should be conducted on how to achieve the realisation of fundamental rights such as the right to housing and the city in contexts of unequal power relations, or, in other words, how to eliminate unfair and inappropriate policies which are implemented in favour of a minority and to the detriment of a majority (Harvey 2012), or additionally, about how to promote an “actionable” social sustainability.

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Cities Rethinking Smart-Oriented Pathways for Urban Sustainability

23

Mauro Romanelli

23.1 Introduction

Cities should go into the future promoting sustainable, social, and economic growth by developing knowledge, as well as human and technological sources to design the city as a community that creates value by developing human capital, innovation, and new knowledge. Cities of tomorrow should also use information and communication technologies (ICTs) to promote urban economic growth and development, value creation, and improving the quality of life. Furthermore, these future cities should follow a smart city view for driving social and economic urban development, achieving successful issues, as well as sustaining processes of innovation and knowledge creation over time (Nam and Pardo 2011a, b; Deakin 2014).

Thus, the future and sustainability of cities rely on urban communities that support knowledge-based processes and innovation (Eger 2005). Technology should enable the smartness of cities as a means to proceed towards urban sustainability concerns that contribute to improving the quality of urban life. Smartness can help cities to proceed towards sustainability because a sustainable city is also a smart city (Ahvenniemi et al. 2017).

Cities should contribute to improving quality of life within urban spaces. As smart and sustainable communities, cities should identify the smart approach as a vision that enables the city as a knowledge-based and technology-enabled engine that is able to design and implement sustainable development within urban ecosystems (Lindskog 2004; Gómez-Baggethun and Barton 2013; Leydesdorff and Deakin 2011).

Information technology supports sustainable urban growth within society. Promoting smart urban development helps sustainability and social equity by driving a vision of urban development that is focused on social and environmental issues relevant at the local and city level (Evans et al. 2019). Developing smart cities' agendas and applications contributes to advancing cities towards a future that is sustainability-oriented (Yigitcanlar and Kamruzzaman 2018). Thereby, the "smart city" is considered to be a system that helps to improve the quality of life (Bhagya et al. 2018), with a local urban strategy that is influenced by global drivers and local contingencies (Dameri et al. 2019). Furthermore, sustainability is also highly related to local urban specificity (Angelidou et al. 2017).

Today, cities are rethinking their strategy to plan and develop sustainable urban development (Yigitcanlar and Teriman 2015). Cities that are defining their smart city strategy tend to adopt a strategic thinking vision that relies on promoting collaborative, cooperative, inclusive and participatory processes and principles (Mora and Bolici

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2017). Identifying a pathway for urban sustainability relies on a city's intelligence, which implies that cities should pay attention to strategic urban planning by bringing together and integrating top-down and bottom-up initiatives. This relies on "a collaborative framework among the city's resources, its innovation institutions, and its digital spaces, which generates solutions with the involvement of citizens, companies, and public authorities" (Kominos 2014, pp. 6–7).

As sustainable urban ecosystems (Newman and Jennings 2008), cities should become smart communities to strengthen collaboration between the local government, businesses education, research centers and people to drive change. In doing so, these cities develop smartness as a vision, and community and sustainability as values that drive cities to proceed towards urban development.

Today, the themes of smartness, community, and sustainability tend to be trendy, overlapping, and critical for understanding the pathway of urban growth and development in virtue of rapid urbanization and population. Technology is emerging as important and strategic to drive cities to become smart communities that develop a pathway for sustainability. Promoting smartness helps improve urban competitiveness and quality of life (Appio et al. 2019). The emerging research question refers to how cities are rethinking, designing, and planning their urban development in the future. Thus, this study aims to identify the primary dimensions that orient the pathways that cities are following to drive urban communities towards sustainable urban development.

Cities should select a pathway for sustainability by promoting a smart city vision and strategy, relying on a smart community approach by enabling local public institutions, businesses and citizens to collaborate for urban governance and innovation. This should be done to drive sustainable urban development, paying attention to the perils emerging from uncontrolled use of technology and safeguarding data protection and security.

The main contribution of this study is to provide an interpretive framework to identify the trajectories of development that are driving cities

to evolve as sustainable cities and communities for continuous innovation and change.

The chapter is structured as follows. After the introduction and methodological section, in the third section, discourse on rethinking and planning sustainable urban development for improving the quality of life within urban communities is presented. Technology helps to support urban sustainability to improve quality of life. In the fourth section, the discourse about how to drive cities towards urban sustainable quality of life is presented. Promoting a smart vision and building a smart community are the driving forces that enable a city to proceed towards urban sustainability for a better quality of life. The negative side of technological development is also discussed. In the fifth section, smart urban strategic planning case studies are presented and described to identify the pathway that cities are following to ensure urban sustainability and to better enhance the high quality of life for its citizens. Finally, discussions and conclusions are outlined.

23.2 Methodological Section

The study intends to propose a theoretical analysis on a city that is evolving into a smart and sustainable community and that is driving urban development. The study considers four case studies that refer to cities that are redesigning its urban development planning and adopting a smart strategy as a vision for driving the city towards sustainability. The chapter offers a theoretical study and relies on a review of contributions that refer to understanding the concept of a sustainable city, smart city and smart community as drivers of the city into an urban sustainable community. Smartness, sustainability and community are the key words and values that help cities rethink urban development by improving services and promoting innovation within an urban context and ecosystem. Referred journal articles were selected from *Google Scholar* as the primary web source and database. These reported articles were selected based on the concepts of a sustainable city, smart and sustainable city, smart community and governance, services and innovation, as well

as the threats and dark side of using technology within an urban context. The selected contributions were analyzed and interpreted in a narrative synthesis to accommodate the differences between questions, research design, and context. They will also contribute to elucidating on new perspectives and advancing theoretical frameworks on emerging issues (Denyer and Tranfield 2006; Dixon-Woods et al. 2004). The start of any smart city project planning process is a smart city plan or strategy; thus, an overall smart city strategy is a satisfying way for cities aiming to rethink, plan and develop its urban future in terms of social, sustainable, and equitable growth. The first stage of promoting a sustainable vision for the future enables cities to create a smart strategy for urban development. Therefore, numerous case studies about urban planning about the direction towards smart and sustainable cities were reported (Yin 2011). Recently, several cities are beginning to deal with smartness policies as a vision and means to proceed towards the sustainable development of a city as an urban community oriented towards the future. This is being done to improve the quality of life of people living within cities and urban places. In particular, the focus is on smart city planning or strategies adopted from three European capital cities (Berlin, Paris and Wien) and one Italian city (Florence). These cities have a relevant economic and cultural impact role on the urban and national context, rethinking their urban vision with a sustainable view of urban growth. Furthermore, these cities are rethinking and planning their future following and embracing a smart sustainable vision for urban development and growth within urban places and communities.

23.3 Towards Cities Rethinking and Planning Sustainable Urban Development to Improve the Quality of Life Within Urban Communities

Sustainable cities improve community-oriented and people-centered services (renewable and efficient energy, effective transportation and waste

recycling systems), as well as contributing to the building of a community by encouraging urban governance (planning and decentralization, civil and political rights), promoting social and economic development (education, employment, green economy) and strengthening environmental management as drivers that help ensure a better quality of life (United Nations 2013). According to Bibri and Krogstie (2017a), cities should develop a pathway for urban sustainability with long-term and strategic goals as the desired trajectory. Thus, urban sustainability refers to an urban society where cities achieve integration, environmental protection, economic development and social justice.

Building sustainable urban development depends on improving the quality of life for people living in a city in terms of ecological, cultural, political, institutional, social, and economic elements without burdens that can impact future generations. Sustainable cities develop a change-oriented strategy to keep continuity in urban activities and policies. Urban sustainability refers to resilient cities that are able to maintain continuity while situations are changing and reflect the role of the city (Nijkamp and Perrels 1994). According to Murphy:

A sustainable city is where achievements in the physical, economic, social, and cultural development of a city are delivered to all inhabitants without threatening the viability of the natural, built, and social systems upon which the achievement of such development depends (2000, p. 241).

Thus, sustainable cities have socially inclusive, environmentally responsible, and robust economic growth (Deakin et al. 2012).

In the information age, sustainable cities support quality of life. Smart and sustainable cities play a crucial role in driving urban sustainability and help to support a better quality of life as an issue of urban sustainability in virtue of transformational, knowledge and relations power offered by a new wave of information technology (Bibri and Krogstie 2017b).

Promoting sustainable development helps cities to design and implement urban sustainability policies that relate to social, economic and physical dimensions to ensure distributive and long

term efficiency, environmental, and intra-/inter-generational equity. Developing strategically urban sustainability helps cities to increase urban efficiency and reduce negative externalities (Finco and Nijkamp 2001). Hence, driving cities to become smart and sustainable is considered to be a continuous and long-term change process involving policy-makers and key stakeholders in the urban landscape (Ibrahim et al. 2018). In Europe, smart city strategies and policies are defined to drive cities to improve urban quality of life and support a sustainable future (Yigitcanlar et al. 2019a, b). Rethinking urban planning helps to make the smart city socially smart by involving stakeholders and citizens (Nielsen et al. 2019). Furthermore, cities that are rethinking urban planning tend to select a sustainability-oriented and smart strategy to improve quality of life and preserve urban ecosystems relying on users' participation and multi-actor decision-making (Yigitcanlar and Teriman 2015; Komninos et al. 2019).

Sustainable and prosperous cities develop and implement sustainable urban development by integrating social, economic and environmental issues to enhance urban quality of life and business. Sustainable cities tend to promote urban development by preserving the ecosystem and improving quality of life (Yigitcanlar et al. 2015). Moreover, sustainable cities contribute to promoting sustainable urban development through improving and extending the wealth of people within a community (Trindade et al. 2017).

Cities becoming smart are communities that systematically and proactively promote sustainability by improving the wellbeing of its people, becoming a better place to live and work (Lara et al. 2016).

Urban social sustainability refers to social interaction and networks, as well as participation within the community (Dempsey et al. 2009). Additionally, this concept relies on smartness as the intelligence of the city to foster the social infrastructure pillar by using the potential of information technology to enable people to better improve their quality of life is essential (Silva et al. 2018). Cities should identify a pathway for

sustainability by selecting adequate indicators in relation to implementation stages of smart sustainable city design (Huovila et al. 2019), paying attention to measuring local sustainability to enforce decision-making processes and to improve communication within the urban community and society (Scipioni et al. 2009).

23.4 Driving Cities Towards Urban Sustainable Quality of Life: Smartness, Community, and the Dark Side of Technological Development

Cities are rethinking their pathway towards urban sustainability. A smart vision strategy and smart community approach provide sources for driving cities to identify a virtuous pathway that leads to urban sustainability. However, several perils and risks that emerge from the use of technology constitute the dark side of technology-driven urban development.

23.4.1 Promoting a Smart-Centered Vision to Urban Development

Sustainable cities promote a smart city vision that relies on information technology to meet the needs of people and to support knowledge and an innovation economy (Angelidou 2015). In particular, urban sustainability relies on smart cities that use technology to enhance the social infrastructure pillar in terms of people and their relationships (Silva et al. 2018) through evolving partnerships that relate to *heterogeneous mixes of actors* to pursue alternative urban development scenarios (Bayulken and Huisingsh 2015). Smart city initiatives help improve urban competitiveness, innovation and better quality of life (Appio et al. 2019).

Building a smart city means using technology to improve the quality of economic and social life within urban communities (Lazariou and Roscia 2012). Urban sustainability and development play a relevant role in the virtue of a smart city's trends. In particular, sustainability, smartness,

quality of life and urbanization are attributes embedded in the smart city concept. Thereby, the smartness of the city relies on improving the living standards of urban communities (Bhagya et al. 2018).

According to Yigitcanlar et al. (2019a, b), urban smartness relies on embracing a human-centered approach where technology is a means to drive cities to support sustainable urban development. Only cities that develop a pathway for sustainability can become truly smart in the future by involving all of the stakeholders of an urban community. In other words, cities tend to construct a truly smart and sustainable city by moving from techno-centricity to a post-anthropocentric approach (Yigitcanlar et al. 2019a, b).

Smart and sustainable cities develop through inclusive and sustainable growth that relies on smart people, policies and technologies (Yigitcanlar et al. 2019a, b). Sustainability should be an attribute of smart cities that seek to develop meeting the needs of the future without compromising the rights of future generations (Peris-Ortiz et al. 2017). Moreover, smart cities are a landmark in urban planning and refer to human, infrastructural and social capital as drivers of sustainable urban growth and productivity, as well as being sources to improve the performance of a city (Kourtit and Nijkamp 2012). Thus, a smart city refers to a community where technology, institution, people and lands are the constitutive elements that drive social and economic urban sustainability (Dameri 2013). Technology helps cities as intelligent communities strengthening collaborative action (Saba et al. 2018). Smart cities rely on cities rediscovering an embedded and collective intelligence of the city as an urban community within urban ecosystems (Deakin 2011). According to Yigitcanlar (2017), a smart city refers to a community that uses technology extensively to provide a high quality of life and to promote the overall wellbeing of its citizens by becoming a better place to live, work and play (Yigitcanlar 2017; Lara et al. 2016).

Technology helps cities embrace a smart approach to urban development and promotes smartness as a means of sustainability of urban spaces and growth. According to Kondepudi et al.:

A smart sustainable city (SSC) is an innovative city that uses information and communication technologies (ICTs) and other means to improve quality of life, efficiency of urban operation and services, and competitiveness, while ensuring that it meets the needs of present and future generations with respect to economic, social and environmental aspects (2014, p. 20).

Hence, smart and sustainable cities use ICTs to identify new ways to address urban development by preserving capabilities to meet the needs of future generations (Höjer and Wangel 2015). Following a knowledge-based view, smart and sustainable cities contribute to defining critical priorities, long-term urban planning, as well as integrating knowledge management processes (Chang et al. 2018).

Technology supports cities to develop a smart and sustainable strategy for urban quality of life. Moreover, smart city applications contribute to fostering sustainable urban development and enabling place-based collective intelligence (Angelidou et al. 2017).

A smart city vision and application contributes to improving urban sustainability (Ahvenniemi et al. 2017) and tracking a pathway for a more sustainable future (Yigitcanlar and Kamruzzaman 2018) because cities becoming smarter aim to transition into more sustainable urban communities (Deakin et al. 2012). The advent of technology's use within the context of urban communities and cities helps to support social and economic growth. Meanwhile, productivity and human capital increase to drive urban smart innovation in services, business, the economy and governance, enhancing the quality of life for people within urban places (Nam and Pardo 2011a, b; Shapiro 2006). Smart cities employ strategic technology to improve quality of life, promoting smart mobility, sustaining a smart government, relying on smart people, as well as enhancing smart living and a smart environment. In doing

so, this drives innovation, support management and delivery of public services based on public-private partnerships (Giffinger et al. 2007). Promoting smartness within cities contributes to improving quality of life and developing urban communities (Gil-Garcia et al. 2015), as well as driving cities to invest in human and social capital to develop and integrate technological, organizational and social infrastructures and capabilities (Albino et al. 2015). Similarly, this promotes sustainable economic growth and sustains participatory governance (Caragliu et al. 2011).

Promoting community, technology and policy as drivers of urban sustainable development helps cities to adopt and implement a smart strategy to become smart cities (Yigitcanlar et al. 2019a, b). Cities should promote a human-centered smart vision towards attaining urban development by rediscovering the community approach (Allwinkle and Cruickshank 2011), involving local stakeholders in planning an urban transformation of the city (Lara et al. 2016), as well as promoting collective and collaborative urban innovation and interaction among all players (Andreani et al. 2019).

23.4.2 Rethinking Cities as Smart Communities

Cities of the future will transition into smart communities, with knowledge-based economies playing a central role in improving urban competitiveness and development (Begg 1999). The adoption and use of information technology is a critical element to drive smart cities, while using community sustaining innovation for knowledge creation and diffusion. Cities should be “smart communities, sustainable, healthy, culturally strong, diverse, and exciting places to live and work and play” (Eger 1997, p. 121).

A “smart community” is a community in which members of the local government, business, education, healthcare institutions and the general public understand the potential of information technology, and form successful alliances to work together to

use technology to transform their community in significant and positive ways (Lindskog 2004, p. 2).

Building a smart community means to develop and implement cooperation and collaborative processes between governments and industry and to promote the active participation of all the stakeholders as a method and way to drive urban sustainable development (Eger 2005).

As smart and sustainable communities, cities should encourage partnerships between private and public actors to provide services and to ensure a high quality of life by driving sustainable urban growth and development. Developing smart communities helps open urban innovation (Paskaleva 2011). According to Yigitcanlar et al. (2019a, b), a city is smart in shaping a smart community. Thus, cities embracing technology to become smart contribute to community meaning and building developing participatory governance and civil society’s engagement as a source to drive urban transformation (Lara et al. 2016), and to rediscover a community approach to developing innovation (Allwinkle and Cruickshank 2011). Promoting cities as smart urban communities means to identify a change orientation for driving urban development and improving quality of life (Deakin 2011). Furthermore, smart communities support citizen satisfaction and wellbeing (Silva et al. 2018).

Developing cities as urban and smart communities rely on empowerment or shared governance, which includes the participation of all stakeholders having a dialogue and discussion about their city’s future (Eger 2005). Cities becoming smart evolve as urban communities that adopt a human-centered approach by developing democratic, cooperative, and collaborative processes that foster urban innovation (Andreani et al. 2019). Promoting smartness helps to ensure a high quality of life by reinforcing the urban community’s intended meaning and integration, which relies on collaborative decision-making processes (Macke et al. 2018).

Developing smart communities helps to understand how urban communities can use technology

to transform every sector of the community's economy and society. Chourabi et al. (2012) refer to smart communities in terms of community engagement, which helps people to get more involved in smart city initiatives and has a significant impact on the quality of their life. Similarly, ICTs drive communities to become smart communities (Moser 2001). Smart communities contribute to promoting job growth, economic development, and improving quality of life (Eger 1997).

The urban development model refers to a community approach that relies on consensus building among all stakeholders involved in the process of urban transformation (Bayulken and Huisigh 2015). Promoting human-centered smart cities helps urban communities to create cooperative and collaborative processes that foster urban innovation. According to Eger (1997) smart communities use technology to reinvent governing. Therefore, developing ICT-based participation platforms to face urban related issues helps municipal authorities explore new ways to provide transparent and democratic communication, enabling citizens to participate by designing and sharing. In doing so, this empowers citizens in the urban policy process (Gün et al. 2019).

23.4.3 The Dark Side and Perils of Technology for Quality of Life Within Cities Becoming Smart

According to Evans et al. "smart cities risk marginalizing citizens, prioritizing end-of-pipe solutions, and driving further economic development that runs counter to stated environmental or social objectives" (2019, p. 558). Thus, strengthening the potential of information technology to drive smarter, fair, equitable, transparent and sustainable cities relies on rediscovering the ethical dimensions and principles that should govern the smart city space. Smart city technologies tend to have significant direct and indirect impacts on the everyday lives of people concerning the privacy and security of data and information about citizens (Kitchin 2016).

Paradoxically, smart city applications and visions contribute to providing efficient services and fostering social exchanges and interaction; however, these also tend to enable perils and insecurity regarding the fundamental values of privacy, liberty, and freedom, which are sacrificed for a data economy or a surveilling, securitized state.

In designing and implementing a smart city vision, particular attention should be paid not only to the technical and instrumental aspects of creating smart cities, but also their politics, ideology, and ethics to make the city an inclusive and attractive place rather than one that increases inequalities and social exclusion. A smart city approach is commonly a useful answer to urgent urban challenges that are driven by technological determinism, as well as commercial, market, and industrial needs and responses to urban development. Furthermore, this approach is often inspired by a neo-liberal vision of cities' growth and progress, which take risks to develop smartness as a cultural means to spy on people, exaggerate controlling tools, and enhance surveillance without promoting effective participation and the engagement of people in dialoguing and debating the future of urban growth of local communities and cities (Sartori 2015). In particular, despite promises offered by smart city development in terms of improving services and benefits, including fostering innovation, competitiveness and entrepreneurship, enabling smart government, providing evidence-informed decision-making, accountable and participatory, enabling smart and intelligent mobility, promoting sustainability, resilience and improving quality of life, some perils and risks should still be considered (Kitchin et al. 2018). Thus, a smart city strategy should be cautious of viewing the city as a rational machine; emphasizing top-down technocratic modes of governance; promoting the city as an urban market; supporting the corporatization and privatization of city services; introducing new forms of surveillance and control and eroding privacy; and compromising data security.

Anjos and Coelho (2018) tend to elucidate on the perils of using technology and developing intelligent cities, arguing against the weakening of fundamental individual rights by releasing

access to personal data and transferring them to third parties. New technologies applied to urban environments contribute to stressing the need for surveillance and taking risks with data security, freedom, and the inviolability of human rights. There is growing concern that smart cities are also enabling a dramatic increase in public surveillance and intrusive security capabilities, including the use of sensors that transmit real-time data to facilitate service delivery, city management, and public safety. These are referred to as ‘safe cities’ that incorporate sensors, facial recognition cameras, as well as police body cameras connected to intelligent command centers to prevent crime and ensure public safety when responding to emergencies. Urban platforms in China have emerged rapidly as developing an extension of smart and digitally-enhanced urbanism in the country but have taken some risks in terms of ideological manipulation and increasing the corporatization of city government and surveillance normalization (Caprotti and Liu 2019). However, smart city systems have been shown to be insecure and vulnerable; furthermore, smart city technologies are promoted as an effective way to counter and manage uncertainty and urban risks through the effective and efficient delivery of services; paradoxically, they also create new vulnerabilities and threats, including making city infrastructure and services insecure (Kitchin and Dodge 2017).

23.5 Smart Urban Strategy Planning: Case Studies

Following the *UN 2030 Agenda for Sustainable Development*, Goal 11 refers to the sustainability of urban communities and cities and implies the need to make cities and human settlements inclusive, safe, resilient, and sustainable by enhancing inclusive and sustainable urbanization and the capacity for participatory, integrated, and sustainable human settlement planning and management in all countries by 2030 (11.b3) (General Assembly 2015). According to the European Commission:

cities are not only places where EU policies and instruments are implemented, they can also be the actors in developing EU policies addressing the challenges they face. In fact, through the work in the partnerships, many cities have demonstrated their ability to contribute in a meaningful way to EU policy-making (2017, p. 5).

Planning a smart urban strategy and vision is viewed as a necessary means to drive cities towards a sustainability-oriented pathway. In this section, the focus is on smart city planning or strategies adopted from three European capital cities (Berlin, Paris and Wien) and another Italian city (Florence). These cities are planning and rethinking their urban vision coherently with a sustainable view of urban growth.

23.5.1 Smart City Strategy Berlin

In the document *Smart City Strategy Berlin*, it is elucidated that viable cities achieve a significantly higher or stable quality of life due to the urban management of the lower levels of resources and employing the potential offered by innovative ICTs, linking various sources of information and realizing synergies, achieving a significant increase in efficiency through integrated approaches, as well as involving citizens and investors in the shaping of the city as attractive and viable for the future to increase urban quality of life (Senate Department for Urban Development and the Environment 2015). A smart city strategy implies improvement amid the interaction between public administration, urban society, businesses, science, and research in a way that transcends the borders between the European Union, the national government, federal states and local authorities. At the center of these policy areas lies the preservation and further improvement of the quality of urban life of people living in these urban places. Policy areas ask for the developments, problems and challenges that have to be dealt with a view of long-term objectives. Thus, the following smart strategy goals are explicated: a reduction in the use of finite resources; the establishment of the use of renewable energies; an increase in resource

efficiency and climate neutrality of Berlin by the year 2050; a minimization of the negative side-effects of living in a densely populated urban environment, such as environmental pollution, stress-related illnesses or a diminished feeling of personal safety; further development of the international competitiveness of the capital city region of Berlin-Brandenburg; an increase in economic strength and the creation of jobs; the formation of a lead market for innovative applications; greater networking on a regional, national and international level; strengthening of the resilience of urban infrastructures; the long-term securing and optimizing of public services through public administration, municipal enterprises and social bodies; the improving of a transparent decision-making culture in public administration; an increase in the quality of life and location; and an expansion in opportunities for greater social participation. ICT is a critical technology that ensures the functioning and performance capabilities of a smart city. Data capture, processing, transfer, analysis, and security lie at the very heart of digitalization activities.

The networking of pools of data and information systems opens up new lifestyle possibilities. By developing new communication media or refining existing ones, access to digital information will also mean improved possibilities for productive exchanges between citizens themselves and citizens and public administration.

Thereby, the smart strategy tends to focus on every citizen in terms of the safeguarding of inviolability and freedom, while available technologies are deployed to get the most use out of them and keeping them within the control of providers and consumers. In a smart city, it must also continue to be possible for people to remain anonymous when moving around the city, i.e. without data about their movements being taken and passed on to an indefinite number of private-sector or state agencies. It must be ensured that this data is only used for that specific purpose and subsequently, erased or anonymized.

However, citizens decide whether innovative technologies can be successfully deployed in a

city and new services will bring to the common good. This requires a long-term communication strategy that is based on credibility and that makes the meaningfulness of the smart city approach clear to the general public. The primary areas of action of smart strategy include the following: smart administration and urban society; smart housing; smart economy; smart mobility; and smart infrastructures. Technology and people's involvement play a crucial role in defining the planning and implementation of initiatives and projects. For example, smart administration means simplifying administrative processes by progressive digitalization and the networking of business processes by fostering urban participation procedures. The urban society has to play a crucial role in the social, cultural, and economic development of the city.

23.5.2 Paris: Smart and Sustainable; Looking Ahead to 2020 and Beyond

The document *Paris Smart and Sustainable Looking Ahead to 2020 and Beyond* (Mairie de Paris 2015) is the main framework to understand the address the city of Paris is following to become a smart and sustainable city in the future. Paris is changing by facing the global and societal challenges of today and proceeding towards a smart and sustainable future by embodying social, ecological, cultural, economic, and technological convergences, placing the citizen at its center. Smart and sustainable cities use technology to contribute to improving the quality of life within urban communities. Smartness is a means to drive the city towards a sustainable future related to quality of life improvement. As such, smart cities are places where technology supports people and helps include them in city life, bridging the gap between new public services and policymaking. In particular, a smart and sustainable city relies on the intelligent work of citizens and enables people to face global challenges and play a proactive role for urban future.

Thus, smart and sustainable cities act as a platform that is open, resolutely future driven and eager for experimentation. Developing the city for the future means bringing together social, technological and organizational dimensions to drive a smart and sustainable city that relies on three pillars: the *connected city* relies on constantly changing infrastructures, such as communication networks, connected devices and sensors to continually integrate technological advances. The *open city* stimulates citizen participation and collaborative projects, exchanging, sharing and co-creating with researchers, scientists and academics. The *open city* also strengthens innovative ecosystems and promotes public innovation by transforming public administration through city employees who contribute to reinventing the administration with their ideas and practices. Lastly, is the *sustainable city*, which is the goal.

The *open city* as a method relies on the open innovation approach by referring to people's intelligence, encouraging citizen participation, open data, and project co-creation. The solutions of tomorrow will emerge through collective intelligence and the collaboration between public stakeholders, businesses, researchers, and citizens. It places people at the core of the system. The *connected city* as a tool relies on using digital technologies as a source of inspiration to form a network through which information becomes accessible to enable citizen initiatives to emerge.

The *sustainable city* is a place where technology serves people, improving their inclusion in city life by allowing them to be involved in policy decision-making processes. It is a place where different networks work together towards one common goal: making everyone's lives better every day. Furthermore, the *sustainable city* meets economic, social, cultural, and environmental imperatives. It proposes innovative practices with regards to urban renewal and development, consumption (circular economy, energies, production flows, etc.), and network and mobility interconnectedness by using the methods of the *open city* and the tools of the *connected city*.

23.5.3 Planning Firenze as a Smart City

In the vision assumed by *Firenze Smart City Plan* (Comune di Firenze 2015) cities are living organisms made up of people within the context of urban transformation through intelligent communities. This is where citizens play a proactive role in identifying the pathway of urban development in terms of improving the quality of life for each and every citizen living in an urban metropolitan environment. From this perspective, the smart city plan is considered as a primary means to propel urban growth of the city that contributes to creating value, and helps to improve the quality of life for people within this urban community. In particular, planning a smart urban vision helps the city as a community of people to create meanings, produce culture, creativity and thinking by putting the people as the first actor of human and civil progress. Promoting smartness implies always using technology and serves to make cities more intelligent, sustainable, capable to drive innovation and reinforcing social relationships within the urban community. In the document, a smart city refers to a city that is changing and constructing new social, urban and economic responses to environmental and historical pressures. Furthermore, the smart city plan should be conceived as an open space for debate, confrontation, exchange of information and knowledge among all urban stakeholders interested in contributing to urban, social, and economic development.

A smart city master plan should emerge as a pivotal element to strategically push the city towards continuous urban innovation and to develop urban sustainable planning that relies on clear and strong distributed and collective leadership and vision. This plan considers the city as a processes' system where all the elements of the city are interrelated and connected, promoting collaboration among all the involved stakeholders (public administration, research centers, cultural institutions, businesses, associations, groups, citizens) along the urban value chain.

A smart city strategy should develop the city as a complex system thinking and living organism to drive an open innovation view to ensure both the stakeholders' involvement, interoperability and impact maximization of initiatives and projects. From this view, a smart city strategy tends to refer to the four *Is*: *integration* of all possible aspects and sectors in charge of a municipality's competences and background; *innovation*, in terms of developing innovative services and approaches by relying on the potential offered by digital and interactive information technology; *involvement* as a means to urge stakeholders to identify, plan, share, and implement strategic, long-term vision and goals more ambitious than the present situation; and *information*, as related to the use of ICTs as a way to reinforce the relationships between municipality and citizens to monitor the implementation of urban smart strategy. ICTs as a critical successful factor facilitate all the actions and initiatives indicated in the smart city plan and contribute to digital culture growth within an urban ecosystem.

Regarding stakeholders and citizens, developing adequate communication with citizens and enabling them in the policy process and participatory decision making is essential. Connecting minds and creating a future is a concept that enables technological development and applications that support ideas, knowledge, and social exchanges to promote a comprehensive involvement of the urban community. Therefore, developing communication helps to reinforce citizen's awareness about how to face and solve problems emerging in the urban context, and to support citizenship behaviors and participation into effective action to achieve shared objectives.

23.5.4 A Smart City Strategy for Wien

Smart City Wien Framework Strategy is the document on which Wien is designing the city of the future (Vienna City Administration 2014). The smart city of Wien's 2050 vision relies on building a smart, inclusive and sustainable city as urban and cohesive community. Some key concepts are developed and implemented into

action: quality of living, sustainability, prosperity, opportunities for education and workplaces. ICTs should contribute to simplifying life and enabling people to continue making professional education boundary less. Wien should offer highest quality of living for citizens and resource preservation by designing changing policy and processes in an even more cross-cutting and multi-sectorial manner. Promoting smartness is viewed as a course or route changing process. Thus, the mission of a city going into the future is to become smart: to not let anybody down; integrate the social components in the development process; and to let people have access to the same degree of participation. The city should embrace a smart-oriented pathway to ensure a livable city for the inhabitants of the future.

Promoting a smart city as a change process leads to sustainability considering the long-term horizon achieving some objectives as priority: resource preservation by efficient energy use, renewable energy sources, resource-conserving mobility, new built environments and support by information technology; driving urban innovation, economy and education because the city is an engine of the economy in the twenty-first century; and ensuring top-level quality of living in terms of social inclusion, health protection and urban environmental models. The present document is a framework strategy; its time horizon extends to 2050 since the necessary and often fundamental changes in the fields of energy, mobility or construction cannot happen overnight. The city intends to continue offering all citizens the maximum quality of living, safety and security by preserving social achievements, reducing resource consumption, and promoting continuous innovation over time. The goal is to ensure a top-level quality of living that focuses on social participation and inclusion, safety and security, leisure quality and culture, openness, diversity of gender roles, and an equally high degree of social participation as key factors that enable urban development. Promoting a smart and sustainable city strategy relies on rethinking urban governance models and strengthening co-ordination and cooperation as ways for constructing shared collaborative and governance

processes that involve all stakeholders within the urban community. In particular, it is necessary to strengthen cooperation on the issues of Vienna, a smart city with universities, research centers and institutions to stimulate socially innovative visions and to engender opportunities for experimenting with new opportunities for urban value creation.

Developing a smart strategy relies on strengthening the participation of citizens and experts while promoting co-determination and management by information technology and the Internet. Wien is also focusing on social inclusion by taking into account the needs of all residents, meeting the needs of many different population groups, recognizing this diversity, maintaining high levels of social security, sustaining high standards of public services and the healthcare system, strengthening co-determination and participation to ensure democratic modes of governance that drive the development of the city. Wien is stimulating both social and technological developments and innovations that are inspired by the needs of citizens, as well as taking particular account of the interactions between individuals and organizations.

23.6 Discussion

Cities are rethinking the scenarios of its future and planning a smart vision strategy to shape urban sustainability to better ensure a high quality of life for its citizens over time.

The case studies examined reveal that developing a smart strategy is a necessary pathway for cities aiming to proceed towards sustainable urban development. Cities have defined smart city planning to identify a pathway that leads to sustainable urban development of the city as a source that enables a better quality of life for people and groups within an urban community and that evolves into promoting sustainable innovation and relying on use of information technology.

Berlin's smart city strategy has improved the interactions between public administration, urban society, businesses, science and research and

focuses on freedom and the inviolability of the rights of people. This has been accomplished while using technology as a necessary catalyst of projects that drive the city into the future.

Paris' sustainable city vision stresses three concepts: using the *connected city* as a tool, the *open city* as method and the *sustainable city* as a goal. Cities can proceed towards urban sustainability as the desired stage by using technology to provide networked services and integrated infrastructures as the necessary premise to enabling community engagement and participation. This requires collaborative, democratic and participatory planning in terms of co-creation and co-innovation as drivers of the city improving community reinvention.

Florence's smart city planning focuses on searching for bringing together integration, innovation, involvement and information. As such, a sustainable city is able to use technology to enable citizen and community participation and engagement to promote continuous innovation as a source and driver of urban sustainability.

Wien's smart vision relies on the use of technology as a means to enhance co-participation, co-decision-making and inclusion as a strategic perspective to create an urban sustainable development of the city of the future. Hence, social and economic urban growth depend on how the city will be collaborative-oriented and socially inclusion-driven by developing a smart strategy that embeds the attributes of urban sustainability.

Understanding how cities can design and implement the future relies on considering the relationships between social, technological, and organizational infrastructure as a source to address social and economic growth for urban value creation.

Cities tend to drive urban, social, and economic development and select a pathway for sustainability by following a smart approach. Thus, cities should evolve as smart communities understanding the potential of information technology to support collaboration between public and private organizations to improve urban competitiveness, support frameworks for innovation and contribute to ensuring a high quality of life. Cities of the future should face and win the

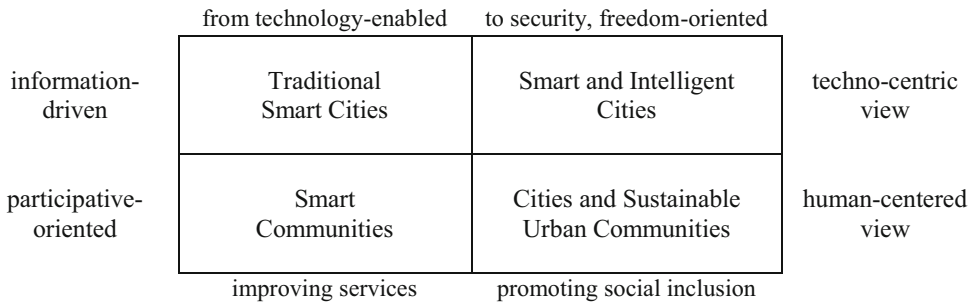


Fig. 23.1 Towards sustainable cities: a framework of analysis

challenge of sustainability as a source for creating public value and benefit from economic and urban development.

Technological advancements are leading cities into rediscovering the importance of urban and inclusive citizenship and sustaining smart cities by developing service platforms. As smart communities, cities should sustain democratic and participatory cooperation and collaborative interaction between private and public organizations involving individuals and groups. As smart and sustainable communities, cities should acquire and develop human capital and knowledge sources, helping organizational and individual learning to promote urban value creation. Cities tend to rediscover the community as a means to develop sources for innovation, knowledge creation, social inclusion and development by involving the stakeholders within urban ecosystems. Cities as communities plan, develop and implement a sustainable and smart future within urban spaces as engines of value creation processes. The main contribution of this study is to provide an interpretive framework to identify the trajectories of development that drive cities to evolve as smart, intelligent, and inclusive communities to develop urban sustainability as a source for continuous innovation and change.

In the framework shown in Fig. 23.1 it is identified as a pathway to driving cities to rethink, plan, develop and design a sustainable city enabling sources for urban, economic and social growth.

Cities identify with a sustainability-oriented pathway by following a smart vision along four axes: promoting new services that move from a

technology-enabled approach to a security and freedom-oriented vision. This vision protects the security and rights of people from intrusive techno-applications; adopts a human-centered or techno-centric view to urban smart development and social growth; and privileges an information-driven or participative-oriented vision in the co-construction and co-innovation of a smart and sustainable urban pathway. Furthermore, cities using technology to develop urban smartness are rethinking their ethical vision about how to better ensure the freedom and security of personal data and the information of people using smart services. Smart urban communities are improving services and contributing to innovation and value creation by strengthening participative, cooperative and collaborative processes. This is being done by adopting a human- and community-centered view. Sustainable urban communities and cities adopting a human-centered view and participative-oriented approach to urban development and growth rely on freedom, security and protection of the human rights of people when dealing with technology. Furthermore, these cities use the potential of information technology to make a city a better place for value creation, social and economic innovation, and developing appropriate strategies and patterns for enhancing and fostering social inclusion processes as a source that enables a virtuous pathway by evolving into a smart and sustainable community.

Cities using technology for knowledge creation and development should evolve and proceed from being smart cities to becoming smart communities. Smart and sustainable cities should evolve from merely ensuring and providing

efficient and effective services to developing technology-enabled and knowledge-driven sources for urban innovation and growth as technology-enabled and knowledge-driven strategic design.

23.7 Conclusions

Sustainable cities should continuously develop the city as a future-oriented and innovation-driven community. Designing sustainable cities of the future relies on developing a smart approach for enabling social and public value creation, social inclusion, and innovation to drive urban development over time. Cities as smart communities understand the potential of information technology. Designing a smart development is only the first stage that is leading cities to become smart communities when proceeding towards sustainability. Developing sustainable cities and communities requires that cities should evolve and change using technology and sustaining human capital to create and use knowledge sources in transition from ensuring services to developing innovation for growth by involving public and private organizations to promote innovation, value creation and learning.

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Public Usable Space as a Catalyst for Quality of Life Improvement: The Case of Cape Town's Social Farming Projects

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24.1 Introduction: Quality of Life and Its Link to Public Space

In the context of a search for what is depicting the quality of life in cities—both in academia as well as in the global policy agenda (e.g. Agenda 2030

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with the Sustainable Development Goals)—there is a greater recognition for the need to understand dimensions that contribute to well-being and quality of life in cities beyond economic and growth indicators. This general normative shift away from a material-economic focus emerged due to empirical research that confirmed a low correlation between quality of life and economic/material factors (e.g. Kahneman and Krueger 2006; Stiglitz et al. 2009).

Ultimately, a more comprehensive understanding of quality of life decoupled from economic growth and material well-being is meant to be less resource intensive and less demanding on the environment. The international debate on prosperity beyond growth focuses on aspects such as lifestyle, behaviour and space appropriation as a possible expression of sufficiency (Jackson 2009; Schneidewind and Zahrt 2014; Skidelsky and Skidelsky 2012; Ura et al. 2012; OECD 2011).

In planning and development policy the key message promoted is as follows: Prosperity can be enhanced without further stress on the global ecological system by focusing on those dimensions that are not resource-intensive such as education, health, safety/security and enhancing the quality of public spaces and support placemaking (UN-Habitat 2013, p. 11). Obviously, at least one of the factors is related to space; not in the one-dimensional sense that

quality of life is deducible from spatial factors, but in the sense that (a) the creation of recreational and activity spaces as well as (b) the spatial enablement of social contact is a precondition for quality of life. Whereas the first aspect is linked to urban health concerns, as the availability of green spaces has an effect, for instance, on blood pressure and reduces aggression, the second aspect rather relates to urban spaces as social spaces and to the enablement of social capital, social cohesion, identity and local engagement.

24.2 What Is Public Space? The Usability Perspective

Before shedding more light on the contribution of public space towards a better quality of life in cities, let us reveal the reading of public space. There is an ongoing discourse in social science as well as planning about the meanings of public space, with no applicable universal definition. We here do not follow the legal definition of what is public or privately-owned space. This classification is still effective when designing spaces (with in-between notions of semi-public spaces or collectively owned spaces) with the failure that one cannot ascribe one particular activity to a space category.

Space and particularly public spaces are recently regaining interest—as a product of physical design and social relations as well as a space that is impacting social practice and relations (e.g. UN-Habitat 2016).¹ “Space has... a major role in the integration and segregation of urban society. It is a manifestation of social relationships while affecting and shaping the geometry of these relationships.” (Madanipour 1998, p. 181).

Bearing this conceptual reciprocity in mind, in the realm of urban studies there is on the one hand a tradition of spatial-centred research of analysing

morphological characteristics of public space and, on the other hand, an agency-perspective that focuses on the usability and production of space.

From an urban design perspective, the aesthetic quality of open space and the built environment is of importance for enhancing urban health and for creating identity and thereby collective memory. This is used for instance for city marketing or cultural activities in public spaces. However, the direct identification of users with the spaces is rather created through its usability (Tessin 2004).

In terms of spaces of social interaction, of enablement of incidental social contact, Selle (PT 2017) and Carmona et al. (2003) use a definition of public *usable* space. This can entail privately-owned spaces that are open for public use and accessible in principle (not necessarily in practice as private parks for instance can have selective access policies).

The study combines both perspectives by focusing on the dimension of quality of public space and placemaking outlined by UN-Habitat (2013). It takes as its basis a conceptual framework that seeks to analyse both factors enhancing spatial qualities as well as factors for the enablement of social contact. The paper seeks to give a more contextual understanding as opposed to generic notions of the dimension of public space and placemaking by unravelling the role of urban agriculture in activating public usable space and public life (social cohesion) in the context of the Global South. The aim is to outline its potentials and limitations for urban development and to identify key characteristics that could ultimately influence planning and policy-making.

The methodology used in this chapter was, first, to examine the notions of quality of life and public space in the academic discourse as well as through policy documents. The second aspect of the explorative study was to gather more qualitative data on one dimension of quality of life: that is public space and placemaking. Selected urban agricultural projects in Cape Town served here as case studies as (a) they reflect the dimension of spatial characteristics and agency and (b) offer insights into neighbourhoods with different socio-economic

¹ Particularly for informal settlements, it has been noted that public space serves as a ‘living room’ and strengthens social interaction, identity and belonging with related social and economic benefits for respective communities (UN-Habitat 2016, p. vii).

backgrounds. The selection was directed through partners in local government as well as in civil society associations who also enabled access to the field. In the empirical study, the following methods were used: five field visits to urban agriculture projects in public useable spaces, each with a duration of one day. The visits were documented by photographs and sketches. Besides, several interviews were carried with key stakeholders in September and October 2018, supplemented by follow-up interviews in July 2019.

24.3 Cape Town's Fertile Ground for Urban Agriculture in Public Space

In order to give an understanding of the role of urban agriculture for placemaking, the paper will discuss different examples in Cape Town, South Africa. 25 years after the end of apartheid, Cape Town continues to be a divided city. According to UN-Habitat, South African cities rank as the most unequal cities in a worldwide comparison (UN-Habitat 2010).

The city and various civil society organisations are concerned about the continuous social polarisation and fragmentation as well as the need to foster more climate- and environmentally sensitive approaches to address the unsustainable sprawl characteristic for many cities in the Global South. Here, urban agriculture on public usable land is seen to play a catalytic role. Already during the struggle against apartheid in the 1980s, urban agriculture was a practice to strengthen livelihood and ultimately empower disadvantaged communities. Today recent approaches are building on this experience but extending the strategy by locating projects throughout the city to activate public space and foster environmental awareness.

The examples that will be presented reflect this diversity. They are located in different parts of the city, use different sizes of land and have a distinct starting point, but are united around the fact that they are representative for more bottom-up initiatives. The cases comprise (Fig. 24.1):

- The Oranjezicht City Farm that was initiated to strengthen social cohesion and environmental awareness in an otherwise exclusionary and well-off neighbourhood
- The Good Hope Seminary Junior School (GHSJS) in Vredehoek that seeks to apply urban agriculture for learning and to overcome social divisions
- The Manzi garden in the context of the "Violence Prevention by Urban Upgrading programme" (VPUU) in the township Khayelitsha that was initiated to foster the maintenance of otherwise a run-down public space
- The Abalimi's Harvest of Hope with the "Moya we Khaya" garden that seeks to address food security and poverty-reduction
- The Streetscapes Roeland Garden where farming is meant to dignify and empower homeless people

24.4 Cape Town's Urban Agricultural Policy: Intention Versus Reality

Urban agriculture has been advocated for by NGOs and academia in recent years as a promise towards, inter alia, social cohesion, food security (Haysom and Battersby 2016) and poverty alleviation. In 2007, the city's municipality formulated the "Urban Agricultural Policy for the City of Cape Town", presenting it as an integrated and holistic approach, and formally recognising "carrying out agricultural activities in an urban set up" (City of Cape Town 2007, p. 3) for the local population. Four strategic goals aimed at the creation of economic opportunities, food security, compensation of imbalances through enabling vulnerable population groups and individuals, building local capacities, and human resources (City of Cape Town 2007). An Urban Agricultural Unit (UAU) was to be set up (City of Cape Town 2007), steering the related processes and activities.



Fig. 24.1 Location of case study urban agriculture projects in Cape Town (Source: authors)

Since its initiation, Cape Town's good intentioned policy has been monitored by civil society and academia, challenging its holistic approach and concluding that the formulated policy "does not provide an adequate response to the urban challenge" (Battersby et al. 2015, p. 2; Battersby and Watson 2018, p. 9) and disregards influential local factors fostering a multifunctional and symbiotic quality of urban agriculture (Battersby and Marshak 2013) for the city's inhabitants, as well as personal and social benefits (Olivier and Heinecken 2017). Besides remaining top-down (Frayne et al. 2009) and reactionary (Haysom and Battersby 2016), the policy misses to provide incentives for lower income groups to pursue urban agriculture. Moreover, compensation of imbalances still lags behind, as enabling mechanisms are market driven and keep excluding lower income community groups (Städtebau-Institut 2018) from benefiting from the policy. Additionally, the city's strategy to provide infrastructure, water and flexible land access (City of Cape Town 2007) is confined to Cape Town's urban boundaries, and persistently few agricultural products from small-scale farm initiatives succeed to enter the existing local (formal) food economy and retail market (Battersby and Marshak 2013). This results in a continuing feeling of uncertainty (Städtebau-Institut 2018), illustrated in a 2017 study revealing a merely 5% of households in informal areas undertaking urban agriculture (Olivier and Heinecken 2017).

Hence, scholars not only suggest the additional consideration of 'peri-urban areas' (Halder et al. 2018; Mougeot 2000; Städtebau-Institut 2018) and its inhabitants, but also call for a stronger involvement of civil society (i.e. NGOs) as collaborators in the process, fostering a sense of community, overall well-being and relevance (Olivier and Heinecken 2017). Moreover, food security will require a more comprehensive approach beyond the tool of urban agriculture to include a multidisciplinary and multi-scalar urban management approach (Battersby and Haysom 2018) that considers related social, environmental, and economic frame conditions and potentials.

Above all, by linking closer to persisting urbanisation challenges, and particularly climate change impacts (Frayne et al. 2009), manifested through recurring water scarcity and droughts in 2015 and 2017, a comprehensive policy could not only gain a meaningful, synergetic, diverse and innovative perspective on urban agriculture (Frayne et al. 2009) but be a true tool for sustainable and systemic change.

24.5 Case Study: Oranjezicht City Farm—Expanding Environmental Awareness and Social Networks Through Urban Gardening

Oranjezicht City Farm (OZCF) was founded in 2012² as a neighbourhood non-profit initiative with the vision to "improve under-utilised public green spaces by creating demonstration gardens for hands-on community-wide food gardening education" (OZCF 2019). An official agreement was then signed with the Cape Town Parks Department to establish a farm on the grounds of a neglected bowling green in the heart of Oranjezicht, an inner-city neighbourhood of Cape Town.

The 0.25 ha site itself has a huge historical significance for the city of Cape Town as it is the last remaining witness of what used to be the largest farm in the Upper Table Valley, which continued to supply sailors and the surrounding settlements from the seventeenth until the end of the nineteenth century (OZCF 2014). The rapid urban expansion of the city, coupled with the decrease in water resources had led to the closure of the farm and subsequently its conversion into an upper-middle class, predominantly white settlement. The only remaining homestead belonging to that era was demolished in 1955 to give room to a bowling green, which ended up being a

² In December 2017, OZCF was voluntarily liquidated as an independent legal entity to become part of the SA Urban Food and Farming Trust, which shares the same founders and establishment date as OZCF, created as a sister organisation pursuing a more expansive vision.

problematic space for the community due to its dilapidated condition and lack of maintenance.

A group of Oranjezicht residents and volunteers saw in the greenfield an opportunity to bring the community together around a common urban farming project by using this under-utilised public space as a vehicle to build new connections with communities and projects beyond Oranjezicht. In order to achieve this goal, urban agriculture was used as a placemaking and educational tool to promote a sustainable lifestyle and community engagement.

Aspects such as heritage conservation, education, environmental protection, and social cohesion were essential elements in the design concept of OZCF, and allowed the farm to build a multi-dimensional project that tackles a variety of urban issues that Cape Town has been struggling with.

24.5.1 Spatial Components

After the agreement with the city of Cape Town was reached, a new layout of the farm was designed to reflect the legacy of the site and provide a productive and multifunctional public space that serves the community and sets an example for other urban agriculture projects in Cape Town (Images 24.1 and 24.2).

The layout proposed by the City's heritage authorities refers to the European classical garden style, and sought to provide spaces where the visitor can be exposed to the historical heritage of the area and be reminded of its role in feeding the city for centuries.

This has made the farm an ideal space for both recreation and education. Parents would bring their children to learn about plants and gardening, but also about the story of their neighbourhood and the city as a whole.

The farm is equally accessible to school groups, several of which are from disadvantaged communities. They usually participate in educational tours in the garden revolving around healthy food production, gardening techniques, recycling, and water management.

In the early years following the founding of OZCF, the garden was hosting a weekly organic

food market, which served as a selling point of the farm's produce and a space of encounter for the local community and people from around the city. However, and due to several restrictions put by Heritage Western Cape regarding the construction of temporary structures and other changes to the site, the organic food market had to be relocated to Granger Bay within the V&A Waterfront precinct. The relocation of the market has reduced the number of visitors substantially, and made it harder to attract volunteers or achieve the same levels of awareness and support as before.

24.5.2 Social Components

While urban agriculture is a fundamental part of the OZCF project, its main objective goes beyond the mere production of organic food to reach deep social and environmental issues that characterise the context of Cape Town.

In one of the most unequal and vulnerable cities in the world, the OZCF project seeks to "build socially, ecologically, and economically resilient communities" (OZCF 2014). Therefore, the project invested in training and providing jobs for the most vulnerable, raising awareness among local residents about sustainable consumption and production patterns, and supporting other community urban farm projects and local businesses in Cape Town.

Since its inception, OZCF was able to attract several local residents to participate actively in the garden, either as donors, volunteers in hands-on farming, or organizers. Others have become regular customers of the farm. However, the real challenge is to reach out to those who are not able to participate or have no interest in farming. The Bokashi composting program was designed exactly for this purpose. It aimed to encourage households to compost their kitchen waste using a Bokashi system provided by the farm. This has served as a way to make the residents conscious about their consumption patterns and the amount of waste they produce while keeping them connected to the farm as they have to bring the full buckets back to the garden and exchange them for empty ones. There are currently more

Image 24.1 Impressions from OZCF (Source: Coco van Oppens)



Image 24.2 General view of OZCF (Source: Y. Moustanjidi 2018)

than 200 households participating in the Bokashi Brigade programme.

The farm also encourages people to bring other compost materials such as grass clippings and dry leaves to use for composting on-site.

It has also served as an educational space for the residents, exposing them to the world of

farming and inspiring them to follow a healthy and sustainable lifestyle, either through hands-on training workshops or casual visits to the farm.

Beside the immediate impact on the neighbourhood, OZCF was able to reach other communities and individuals in several ways, one of which is the OZCF weekly market. Instead

of only serving the farm, the market was used to provide access and support to small-scale organic farmers from around Cape Town who would otherwise face difficulties to sell their products in the city. This has expanded the network of organic traders and gave the chance for small local businesses to grow. Although the market is now operating as an independent private company, it is still closely connected to the farm and continues to support small traders by keeping the stallholders' costs affordable. Through the engagement of the local urban agriculture community, the market is able to register 60 million Rand per annum in trading activity, support 80 small businesses with 300 jobs, and buy produce from 40 small scale farms. The success of the OZCF Market is now recognized internationally as one of the top 20 organic markets in the world.

Another way to achieve a wider outreach is through assisting and building partnerships with other urban farming projects in Cape Town and beyond. In this regard, OZCF has been providing training, networking, mentoring, and market access to several local micro-farmers and urban agriculture projects (Philippi, Stellenbosch, Company's Gardens, Elgin, etc.).

Through the activation of a once under-utilised public space, OZCF has demonstrated how a collective action around a common project can make an impact that reaches beyond the immediate vicinity of the site. Urban agriculture was used as a multifunctional tool to respond to wider environmental, social, and economic issues. The snow-ball effect of such a small-scale project is revealing the unlimited potentials that public space, combined with an engaged community and supporting institutional environment can bring to the city.

The water crisis that Cape Town faced in 2018 has brought the issues of sustainable development and inequality of access to resources to the surface. Therefore, initiatives such as OZCF should serve as an inspiration on how to use context sensitive spatial interventions to educate, engage, and inspire change among communities.

24.6 Case Study: Good Hope Seminary Junior School (GHSJS) in Vredehoek: School Grounds for Bridging Divides

The South African Urban Food and Farming Trust (SAUFFT) sought to capitalise on the educational aspect of Oranjezicht City Farm (OZCF, see the previous case study) by proposing to introduce an urban agriculture project on the grounds of the adjacent Good Hope Seminary Junior School. The primary school is located in Vredehoek district, which is formerly a white neighbourhood for upper- and middle-class residents. However, it hosts pupils from predominantly disadvantaged communities far outside of Oranjezicht.

Although there is a discontinuity between the school and the surrounding community, the school offers multiple opportunities and potential for integrative community development, namely: the school's land resources and human capital. As such the school intends to be not just a place for education, but also an urban space for integration.

Vredehoek is one of the youngest neighbourhoods of Cape Town and is classified as a formerly white neighbourhood. With the end of apartheid in the 1990s, like many other public schools, the primary school opened its doors to Black pupils from far off townships and underprivileged areas. Due to a plethora of different reasons, the school was abandoned by its local White pupils who left to join private schools. Shortly after this collapse, the school premises were taken over by the Good Hope Seminary staff and were named as it is known nowadays "Good Hope Seminary Junior School". The new school welcomed a mixture of Black and Coloured pupils. It is worth mentioning that the school was originally called "Vredehoek Primary School".

Nowadays, more than two decades later, almost 90% of the pupils registered in the school come from remote townships. The neighbourhood itself hosts a mix of public schools (for Coloured and Black South Africans) and private ones (for White

South Africans) with unique dynamics (Lemon and Battersby-Lennard 2010).

As a public school, GHSJS offers relatively good facilities and quality education at low fees. It also offers some social programmes. Its appeal is enhanced by the expansive, green premises and the physical safety of the surrounding area (no gangs, etc.). The school's total area of 5 ha includes an unused open space, which has great potential for development and is a very important resource for inclusive neighbourhood programmes. However, its availability, accessibility and suitability for urban agriculture is of particular concern to urban farmers and will need to be tackled once the project is underway.

24.6.1 The Relationship Between Schools and Their Surrounding Communities

The relationship between schools and their surrounding communities has been discussed in the literature. Many scholars highlight the important role of schools, their impact on the viability of communities, and how schools can contribute to the livelihood of communities. Keith argued that schools should develop horizontal ties with the community to foster "social networks, educational, and economic opportunities and cultural richness" that are central to the social and economic growth of cities (Keith 1996). In turn, Combs and Bailey (1992 in Sanders 2003) also mentioned that schools can use the community as a learning resource, where exchange in curricula is possible. Additionally, Miller (1995) emphasised that if community development efforts are to be successful, they must build social capital, and this requires developing strong links between the community and the school.

A clear and defined call in South Africa's Education White Paper 6, 2001 highlights the importance of community mobilisation and parent participation so that all social partners and role players can become part of the developmental process. With this understanding, schools are public spaces that have the potential to open areas of integration with the surrounding

community. Recently, the "Reclaim the City"³ campaign addressed several issues such as segregation and land use of public land that was earmarked for affordable housing but was sold to private investors.

Plots of land such as the greenfields around GHSJS have high real estate value, and while the City of Cape Town wants to exploit this land to its full potential by selling it to private investors, the "Reclaim the City" campaign is demanding the use of such vacant lots for public use or housing projects. Today and after almost three decades of calls for reformations towards more inclusive, less segregated cities, the urban agriculture project in GHSJS could be a showcase model that will achieve both public school reform as well as a new format of public interactive use of vacant greenfields.

24.6.2 Social-Centred Aspects

Through a participatory workshop, observations and personal communication with pupils during the GHSJS visit in October 2018 showed pronounced interest and willingness to come to school as well as a strong sense of belonging to their school. However, due to their very long commute time they had to endure every day in order to reach the school from home as well as its additional financial burden, participating in extra-curricular activities (such as one carried out during the summer 2018) is a challenge for the pupils. Consequently, implementing and regulating such programmes would be also a challenge. Furthermore, although the white paper recommended that the school should be a resource for the households and families and vice versa (refer to the white paper: see the previous section), the pupils' households and families find

³ Reclaim The City (supported by Ndifuna Ukwazi) is a campaign, which was started in 2016 to tackle spatial apartheid within inner city Cape Town by campaigning for desegregation and affordable housing developments. It began as a mobilisation to stop the sale of the Tafelberg site within the city. (<https://www.lessonsforchange.org/reclaim-the-city/>).



Fig. 24.2 Greenfield plot as potential site within school perimeters (Source: M. El-Shahat 2018)

it difficult to participate due to the distance and the costs.

Most of the commercial services in the neighbourhood address the middle and upper class that form the area's main residents, whereas the pupils stay within the school boundaries throughout the school day. Thus, no interaction with the surrounding community exists and the school is effectively an isolated island within Vredehoek. In other words, the school's isolation is not only physical with the spatial separation between the residential buildings and the school, but also social. There is no information available about any sort of institutional cooperation between the school and the other primary schools in the same area. Currently in our case, if an urban agriculture (farming) programme be implemented successfully, the pupils of GHSJS should be encouraged to venture beyond their school and into the surrounding community (Fig. 24.2).

24.6.3 Spatial-Centred Aspects

Walking around the school, one can see that it is surrounded by a 2 m high metal grid fence and some overgrown greenery. On its south side, the school lies on a corner nestled between Vredehoek Ave and Chelsea Ave. On the northern part of the school lies a large, vacant plot of land, which belongs to the school but has so far been unused. This greenfield is visible from between the residential buildings on the northern end of the school, where there is a "school ahead" traffic sign indicating physical access to the school from the north, from Bedford Street. Although this huge vacant unused plot of land can be perceived as a barrier of separation and segregation between the school and the district, it also has the potential for further community development.

24.6.4 Vredehoek and Good Hope Seminary Junior School as an Opportunity for Development

Based on the success of the Oranjezicht City Farm (see the previous section), the South African Urban Food and Farming Trust selected Good Hope Seminary Junior School as the new location for a prototype project with 0.75 ha of available land within the school. The location, the vacant land and the need for more inclusive cities, provide a chance for growing urban agriculture programmes, which offer collective action and interaction with the surrounding local community.

Urban Agriculture (UA) can provide a platform to establish a secure network to improve the school's fragile community relationship. Urban farming and agriculture, including an open market for the district's residents, can place people into a new dialogue, and in best-case scenarios, establish partnerships and further integrative projects. This platform offers sharing knowledge used in farming that is transmitted through the activities, maximizing resources and the effectiveness of urban agriculture practice, and consequently the integration of the school into the urban fabric of the neighbourhood and vice versa. To extend the effectiveness and the sustainability of the practices, multiple stakeholders and experts are to be included (ETC⁴—Urban Agriculture, edited by René van Veenhuizen 2006).

The idea is to develop a similar urban farming project as a model within schools, which could consequently give the concept momentum at various scales (schools, neighbourhoods, cities levels). For instance, the farm is intended to help deepen and broaden the school's role in the community as a sense of belonging for Black residents in general and the school's Black and Coloured pupils in the school in specific and a site to sustain their presence in Vredehoek neighbourhood. The site is not viable for the kind of housing that

Reclaim the City has prioritized, yet the farm and the school together can be aligned to similar principles of inclusivity and access. Another aspect is that the farm at Good Hope could be implemented using a set of design principles for social UA that strengthen community resilience, using a set of indicators to monitor the outcomes and impacts resulting from the farm and its programmes. This could consequently be a further refinement of the design principles as part of the SAUFF Trust's intention to find ways to scale the beneficial impacts of social UA across urban communities in Cape Town and beyond.

24.7 Case Study: Manzi Garden at Monwabisi Park Centre—Capacity Building and Farming for Activating Public Space

Sheet metal shelters, unpaved roads, and sometimes 40 households and more sharing one water tap: The term “Monwabisi Park” euphemistically describes one of the most precarious informal settlements of the Cape Flats. Located at the southwestern fringe of Khayelitsha, Cape Town's largest and fastest-growing township, is home to around 25,000 inhabitants in more than 6700 dwellings (van Donk 2017). The settlement in Monwabisi Park's 64-ha area started in 1996, when people—leaving the backyards of overcrowded townships or Eastern Cape Province villages—moved into a sandy natural reserve to claim the land and build an informal settlement (Schreiber and Berry 2017) (Fig. 24.3).

Today, the settlement is densely populated with irregular spatial patterns of shelters that span over an undulating sand dunes topography. Only a few dirt roads and footpaths provide access to the plots, which are mostly served with electricity, but lack individual connection to freshwater supply and sewage system (Brown-Luthango et al. 2016). Moreover, substantial parts of the Monwabisi Park area are prone to flooding in case of heavy rainfalls, and occasional shack fires are an inherent threat (Lefulebe et al. 2014).

⁴ ETC is a Netherlands based, not-for-profit organisation working worldwide to strengthen resilience in support of people-centred development in rural and urban settings.

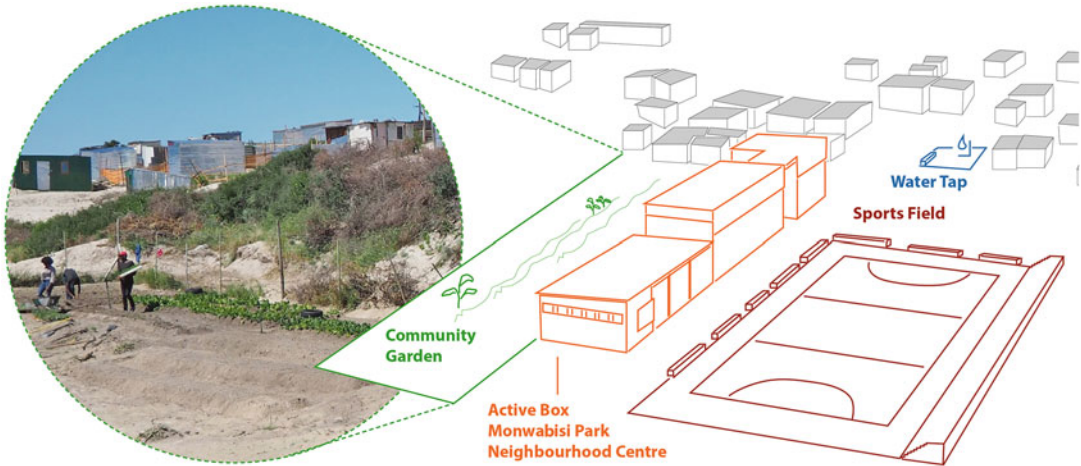


Fig. 24.3 The “Manzi Garden” at the Monwabisi Park Neighbourhood Centre (Source: S. Busch and Y. Moustajidi 2018)

The socio-economic situation of Monwabisi Park’s inhabitants is as difficult as the spatial one: Around 84% of the community members are faced with the challenge of sustaining themselves and their families with an income below the poverty line (Brown-Luthango et al. 2016). Many inhabitants have only limited access to jobs and suffer from social and economic marginalisation. Under these arduous circumstances, food security is one important issue that needs to be addressed.

Other important issues are violence and crime-related problems, which are common threats in the context of abject poverty. Against the backdrop of this situation, the programme Violence Prevention through Urban Upgrading (VPUU) has been implemented in Monwabisi Park since 2009 (KFW 2010). This programme aims at combating crime by improving the quality of life for the urban poor and by promoting social cohesion with the help of incremental spatial interventions. A key element of this program is the creation of “Safe Node Areas (SNA)”. An SNA typically consist of a network of well-lit walkways along key pedestrian routes that link neighbourhood facilities like sports fields, creches and water taps with public amenities and business buildings (Uğur 2014). This network is supplemented by so-called “Active Boxes” which are two- to three-storey multifunctional community buildings also

acting as orientation landmarks. All Safe Node interventions are co-created by the local communities who are also actively involved in operating and sustaining them and who are supporting safety in the SNA through Neighbourhood Watch Groups (VPUU 2017a).

In Monwabisi Park, the Active Box “Monwabisi Park Neighbourhood Centre” was opened in May 2017, giving the local community a place to meet and the team of the VPUU programme a permanent home to their enumeration and registration office. It is complemented by a sports field and a public water tap as well as by a community garden also known by the name “Manzi Garden”.

The Manzi Garden is located directly adjacent to the neighbourhood centre, on an approximately 1000 m² plot between the back wall of the building and a slope adjoining the building. The implementation was also enabled by the VPUU programme, which provided the budget for financing the basic equipment of the garden and for commissioning of professionals from Abamili Bezekhaya (see following case study on Abalimi). With the help of the Abalimi specialists, around 40 local inhabitants were trained to become either community gardeners in the shared Manzi Garden or home gardeners on their own plots (Abalimi 2018a). The training included basic agricultural knowledge about how



Image 24.3 Drainage trench and crops at Monwabisi Park neighbourhood garden (Source: S. Busch 2018)

to successfully grow vegetables in sandy soil, a task that requires special planting and fertilisation methods.

The motivation to start this community garden project was based on several aspects: One the one hand, it provided additional ground-floor activities for the Active Box throughout the day. Through the community garden, an otherwise neglected, leftover area becomes a valuable space for social encounter, which also has a positive effect on social control and social cohesion. One the other hand, it aimed at capacity-building among local inhabitants. The development of the skills needed to maintain urban food gardens and manage food waste could lead to improved food security as well as a healthier diet (VPUU 2019a).

Additionally, economic aspects are linked with the community garden project (Image 24.3). A successful harvest can cut down expenditures for food and fosters entrepreneurship if the crops are sold to local stores (VPUU 2019a). The community garden is now run by the Manzi Urban Gardening Project, a social enterprise that was originally founded by three local community members. Besides maintaining the community garden, they also started to produce and commercialize an organic fertilizer⁵ that is now sold at a weekly market (VPUU 2019b).

⁵ This organic fertilizer—named “Zenzele Bokashi”—consists of fermented and processed organic (food) waste that is dried and packaged.

24.7.1 Spatial Aspects

The focus of the Manzi Garden clearly lies in the cultivation of crops and the activation of an otherwise unused public area in the back of the neighbourhood centre. The area itself is protected by a light metal fence that also defines its boundary towards the fast-growing informal settlement. So far, it doesn’t offer any additional recreational facilities or ornamental garden greening to enhance its amenity value, but this is more than compensated by the attractiveness of the nearby sports field with its seating areas and by the neighbourhood centre itself.

24.7.2 Social-Centred Aspects

The community garden project is closely interlinked with other activities of the VPUU program, including the VPUU’s Early Childhood Development (ECD) programme. The latter aims to give children without access to childcare the opportunity to play in safe settings under the supervision of community members, who stimulate them and thereby help them to develop their cognitive skills (VPUU 2017b). Activists from the ECD program make use of the community garden to teach children how to grow vegetables and produce fertilizer.

Networking with the ECD program at the same time strengthens the connection of the

Manzi Garden Project with wider parts of the local community. Through their children, the parents get aware of the community garden and bring their food waste to contribute to the successful production of the fertilizer. The community garden again helps to provide the ECD program with fresh vegetables to feed the children (VPUU 2019a).

Furthermore, the community garden acts as a valuable demonstration space for urban gardening. It continues to be supported by the Abalimi team, which conducts monthly mentoring visits and follow up support (Abalimi 2018a). Community members who are interested in urban agriculture can receive training as well as a starter kit with seedlings to start their own garden—an initiative that creates an extensive impact on the neighbourhood.

In light of all these activities, the Manzi Community Garden Project is a successful example of civic engagement in informal settlements that “kickstarted a small urban gardening revolution in Monwabisi Park” (VPUU 2019a). The project has fully accomplished the initial objectives of upgrading and reprogramming a leftover public space together with the local community. It is now characterized by intensive use and dedicated management by the community members and has made a significant contribution to improving the quality of life in Monwabisi Park with a view to increasing safety, enabling social contacts and thus promotes social cohesion.

24.8 Case Study: Abalimi’s Harvest of Hope—Farming for Food Security and Poverty Reduction

Abalimi Bezekhaya (which in the Xhosa language means “farmers of the home”) is an NGO founded in 1982. Since then it has been carrying on innovative urban agriculture projects within Greater Cape Town (an area known as Cape Flats). Its aim is fighting poverty and guaranteeing healthy organic food, as well as creating safe social meeting places especially for women and children in the poorest areas of the

city. Abalimi supports directly, or indirectly, the work operations of circa 500 community gardens, mainly situated in the very densely populated areas of Khayelitsha and Nyanga. In each of these two vicinities, Abalimi has also developed strategic partnerships with community garden centres which function through providing low-cost subsidised resources such as seedlings, manure, tools and pest control, and through providing demonstration gardens used for training purposes. The centres are run by fieldworkers from the community where they are situated, thus achieving strong links and acceptance from the inhabitants. Up to 300 people annually attended the previous workshops organized by Abalimi and in 2017–2018 about 2100 micro-farmers (mainly female) were supported by the organisation in the production of their crops on small pockets of land (Abalimi 2018b). Most of them run home-based gardens, while 1/5 of them are organised within community gardens. The extreme drought of the last few years had dramatic consequences for the farmers as well. Many gardens were closed or the production of food was reduced extremely and the recovery is still in process. This shows how vulnerable this concept and network is to external factors.

To understand the importance of the role played by Abalimi within these contexts, we have to consider that the unemployment rates in the township areas were more than 45% as of 2011 and that more than 80% of the households suffer from moderate to severe food insecurity. In Khayelitsha, it has been shown that about two-thirds of the population is living in informal settlements and that the food insecurity rate there is as high as 89% (Battersby 2011).

By providing the farmers with material and educational support, Abalimi has been strongly encouraging the local, poor population to establish and grow their own vegetables. In addition to providing a significant means of income generation, such activity offers also an important mechanism for introducing greater nutritional variation within the farmers’ own diets. Diabetes is in fact one of the most widespread non-communicable diseases in socially disadvantaged neighbourhoods.

In order to enhance its positive impacts, in 2008 Abalimi created its own independent unit called Harvest of Hope (HoH),⁶ with the assistance from the South African Institute of Entrepreneurship (SAIE) and The Business Place Philippi. HoH operates in the form of a community-supported agriculture system (CSA Model). This social enterprise connects the producers (the micro-farmers of Abalimi who are mostly organised within community gardens) and the consumers through facilitating the purchase of fresh organic vegetable boxes according to a predetermined template, thus sharing the risks of farming and fostering a constant income for the micro-farmers.

The calculated income per producer has been estimated to be up to Rs. 3000 a month on an average plot of 500 m² (Hoekstra and Small 2010). This is not insignificant given the aforementioned high rates of unemployment.

In practice, the Harvest of Hope staff is taking care of the collecting and packing of the organic vegetables produced by the farmers around Khayelitsha and Nyanga. Clients of HoH include business customers (e.g. schools, restaurants) but also many private households. The scheme has been up and running since February 2009, with average sales of 86 boxes per week, and reaching a level of 294 boxes a week in 2017 (Abalimi 2018b). Standard vegetables in the box represent a seasonal range of different vegetable varieties, depending upon cultivation, harvest and season.

The variable box contents could make farmers more independent of the need to meet required harvest volumes while also promoting stable output targets. In reality, HoH enables around 130 farmers from 18 community gardens to reach burgeoning new urban customers with their vegetables. It also helps them to respond to a sophisticated and growing market demand for organically grown, fresh products; a demand which they would never be able to match on their own. Abalimi has calculated that for every

100 boxes produced, 8415 m² of land is required (Abalimi 2009). HoH supplies seedlings and seed to farmers, the full cost of which is offset against vegetable sales. The only input that is not included in the cost breakdown is manure, although this is a key input which is required for any meaningful vegetable production in Cape Town, where soils are generally very sandy. Abalimi will continue to subsidize the cost of manure until the farmers' businesses can absorb this cost.

This system showed its fragility during the serious drought in 2018. During that period the most of the production for the boxes was suspended and only a small cultivation of vegetables for self-supply and some production for restaurants could be maintained.

24.8.1 The Farmers' Development Chain

HoH operates as an extension of the services offered by Abalimi and should be considered as its mechanism to "pull" survival and subsistence phase farmers along the Farmers' Development Chain, into the Livelihood level. The concept behind it is a detailed strategy with different training phases organized as a clear step by step concept to develop farming and business competencies from the survival stage up to commercial phases. The development continuum takes into account the difficult social and living situations of the farmers and allows sufficient time for every phase. Even if only a few farmers go through the entire program, the influence and added benefits for those individuals and the local community cannot be overestimated. In addition to creating jobs, generating income and improving the nutritional situation of local people, the improvement of social cohesion in the community plays an important role. The cooperation of the farmers strengthens social contact and interactions on local the level. In addition, it helps to build larger networks and improved access to civil society and markets beyond the Cape Flats (Olivier 2017) (Fig. 24.4).

⁶ After writing this article, by the end of 2019, Abalimi stopped operating Harvest of Hope in order to focus on supporting farmers to enhance food security.

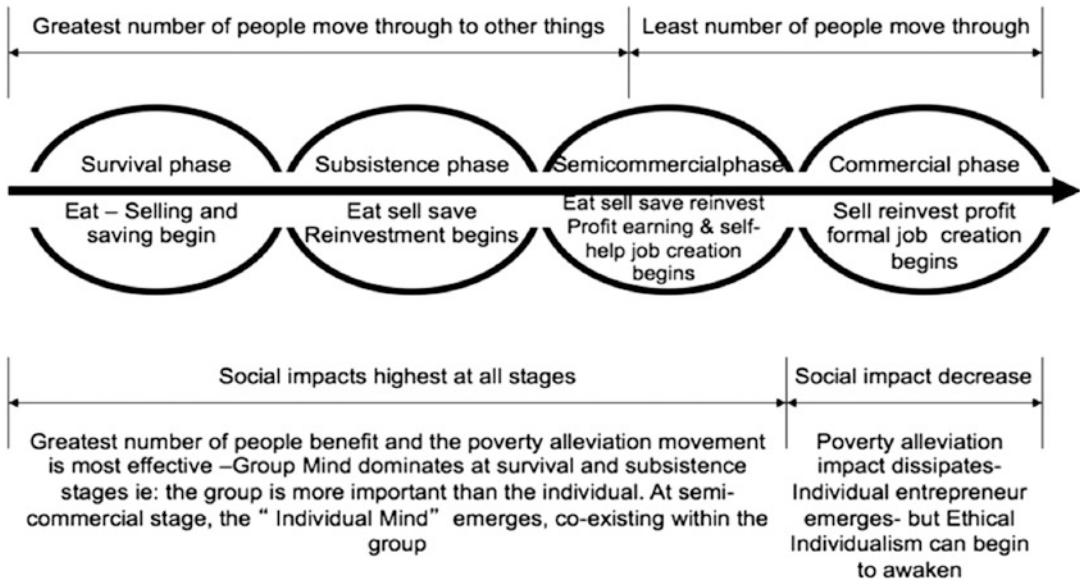


Fig. 24.4 The farmers' development chain for organic micro farming projects (Source: R. Small 2006)

24.8.2 Spatial Aspects

The largest community garden of the Harvest of Hope project is the Moya we Khaya Garden in Khayelitsha which is over 1 ha and involves around 30 active farmers. The neighborhood is one of the “better-off” in Khayelitsha and boasts predominantly legal housing, albeit with marginal supply infrastructure. The garden was founded by Kristina Kaba, a longtime board member of Abalimi, and a group of active farmers from the surrounding community. A greater vision lies behind the project from Kristina Kaba: this involves creating a commonplace which provides space for gardening, cultural exchange and for the celebration of African traditions. Significantly, this vision promotes the concept of people working together on a community project which bridges the generations (Abalimi 2014). The farmers are also well networked via social media and the location serves as a meeting point for social interactions despite the limited space available. The Moya we Khaya garden as a multifunctional gathering point can moreover take advantage of the proximity to one of the few

public parks of Khayelitsha. Between the two urban spaces a clear synergy is established. The open park acts as a social attractor and the surveyed garden as a protected more intimate space. This creates more publicity and offers a place for overarching social relations and cultural activities (Image 24.4).

24.8.3 Women's Employment

An interview with Dave Golding, from the Abalimi field team, about the social situation of the Abalimi farmers, revealed that at HoH farm work is dominated mostly by the older generation of women. Most of them come from the Eastern Cape, where farming has been traditionally practiced. The fact that older women cannot work as hard as younger people is compensated by their enhanced social skills. They help each other, care for their families, and contribute to the improvement of the income situation and to a better nutrition by promoting organic food production. They pass on their acquired skills to younger family members and it often happens

Image 24.4 The Moya we Khaya Community Garden in Khayelitsha (Source: S. Beretta 2018)



that the youth in the home, gets involved in the garden work by supporting their aged parents. Overall, women contribute to improving family stability with gardening and common social interactions.

In the last years, the situation shifted and more men and community members in their 40s and 50s participate in gardening work. Generally, it is evident that there is a huge growth of food gardens in the city, from the early 90s till the present day, and that they are still growing.

Urban agriculture in the Cape Flats supported by Abalimi has proved to be an effective tool to promote social cohesion and a healthier lifestyle and to improve critical living environments. However, its intrinsic fragility is clear: linked mainly to the economic and management support of Abalimi, local farmers rarely manage to move from a level of satisfying their domestic needs to a properly commercial one. To this end, it is important to highlight the importance of networks, on a metropolitan scale, and between different social groups, capable of establishing synergies in both the production and distribution chains, contributing to food security in the city.

24.9 Case Study: Streetscapes Roeland Garden Farming to Dignify and Empower People

In the city centre of Cape Town, Streetscapes Roeland Garden provides an individual perspective for homeless people to get off the streets and to regain their dignity. The basic idea of the approach is that meaningful employment is one of the most important actions to empower people.

In 2014 the existing social interventions around the homeless were not succeeding and each month more than 200 people were being arrested for petty crimes and bylaw offences like aggressive begging in the city centre of Cape Town. Typically the same individuals were rotating through court and being caught in a destructive and demoralizing cycle.

The court was struggling to handle the vast numbers of arrests of homeless people as there were no services available for chronic homeless with concurrent substance use or mental health problems. Based on the consultation on what people living on the street wanted, the first Streetscapes project aimed to fill this gap. Six months of consultative meetings and interviews

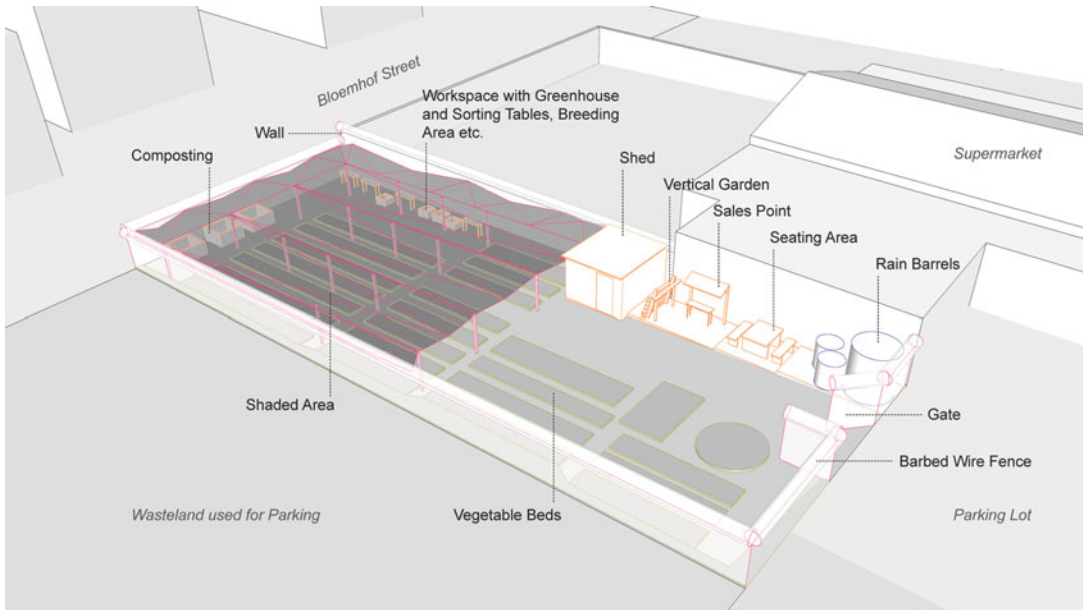


Fig. 24.5 Streetscapes Garden (Source: J. Dieterle 2018)

with the people living on the streets revealed that they don't want handouts but a job. The beneficiaries all said they need a work opportunity to help themselves back on their feet.

With this in mind, the Streetscapes project started in 2014 with 40 individuals living on the street with a project manager and the help of a social worker. Khulisa Social Solutions sponsored the salary of the project manager for the first 6 months and the city of Cape Town provided funding with the Expanded Public Works Programme (EPWP) for a group of 40 beneficiaries for 6 months (Khulisa 2019). Through its Streetscapes project, Khulisa Social Solutions helps to reintegrate homeless people into society by Khulisa Social Solutions is a non-profit organisation (NPO) addressing social vulnerabilities and providing chronic homeless with a rehabilitation opportunity through a work programme combined with psychosocial support and personal development programmes (Fig. 24.5).

Streetscapes' vision is to create a "world that spends on solutions not problems related to homelessness" (Interview with Manager of Strategic Partnerships at Khulisa). The mission is "to

empower the homeless as valued community members, providers of services—and thereby reduce the harms associated with homelessness for all" (ibid.). The Streetscapes projects include a range of "community facilities—organic gardens, cleaning and recycling programmes, social housing and psychosocial services—that provide opportunities for both homeless people and homeowners to improve their lives" (ibid.).

The first garden was initially created on Roeland Street to provide an opportunity to work by growing healthy food. Streetscapes Roeland Garden was established as a pilot project to see if the approach was viable. After the first 6 months, 77% of the participants had already moved off the streets and 68% had addressed their substance abuse problems.

The garden is located on a previously uncultivated, rubble-covered site behind a supermarket specialising in fresh produce. The property is owned by the City of Cape Town and leased from the Food Lovers Market. Streetscapes has an agreement with Food Lovers to use the land free of charge. On the opposite side there is a wasteland which is used as a parking lot.



Image 24.5 Crop growing at Streetscapes Garden (Source: J. Dieterle 2018)

At first, the workers cultivated the barren land and gradually built beds and boxes of herbs and vegetables as well as basic installations within the fenced area. It was the first garden in the country to be built by homeless people. Partners such as Soil for Life and the Oranjezicht City Farm as well as other volunteers helped to provide basic knowledge about farming in setting up the first garden (Image 24.5).

The garden is open to the public 6 days a week, usually in the morning and afternoon. The garden can be reached across the parking lot of the supermarket and the entry is near the entrance of the supermarket. The entrance gate is decorated with coloured bottle caps that form the Streetscapes lettering.

The 350 m² urban farm is located on previously infertile, rubble-strewn ground. Now the garden protected by a 1.8 m height barbed wire fence and divided into more than 20 rectangle vegetable beds. More than half of the garden is shaded by a net. The east side of the garden is bordered by a wall with a series of facilities: The rainwater is collected for irrigation in a rain barrel at the highest point of the site at the entrance. Also, at the entrance, visitors will find a small sitting area and a sales point. A small vertical garden with leafy greens and shed for storage follows. A workspace with a greenhouse and sorting tables is located in the rear in a shaded part of the garden.

Locals and visitors can buy seasonal produce directly from the farmers or volunteer with time, e.g. with skills-based donation of their time. They can also simply explore the gardens, see how healthy food is grown in the city centre and

watch the workers irrigate, fertilise and harvest. However, the main value of the garden is to create work for people and be a place of social interaction.

Streetscapes Roeland Garden is a social enterprise supervised by an auxiliary social worker who is responsible for the operation, but also for the care and support of the beneficiaries. The auxiliary social worker is also in charge of organising the team, making the plans for the sites, harvesting, and other activities. The person in charge is supported by an advisory team (two social workers, head coach) as well as an operation manager and project coordinator.

The produce of the garden is sold and pays a small wage to the workers. The main customers are local residents, restaurants (House of H, Janse & Co, Doppio Zero) and a weekly market (Oranjezicht City Farm Market).

The sales provide 6 homeless people with an income to rebuild their lives. The gardens still rely strongly on volunteers to help out and Streetscapes still subsidises the payments from donations it receives from residents and businesses. The overall operational costs are not covered by sales from the gardens or small donations. They are funded mainly by the Central City Improvement District, a private-public partnership to promote a safe, clean, and caring city, and the Ackerman Pick n' Pay Foundation.

The garden has made it possible for residents and the homeless to engage with each other on a more equal basis. Also, the benefits have been felt by the supermarket providing the land, especially when the garden has informal open days that attract people into the city centre at weekends

that then pop into the store to pick up their groceries. In addition, the garden serves as a showcase to learn how to grow healthy food in the city.

However, the primary goal of the project is not to upgrade the neighbourhood, but to provide homeless people with an individual perspective and give them back their dignity. The basic idea is that meaningful employment is one of the most important steps to empower people. This enables them to make their own decisions and organise themselves. The Streetscapes Roeland Garden is one of the actions to move people off the street. The dropout rate was only 8% compared to 2018 and the success rate in helping people get off the streets is 70%.

Following the success of the pilot project, more projects were implemented. Since 2014, Streetscapes has been fundraising itself and now runs a budget of three million Rand that covers the costs of 12 social enterprises that provide opportunities for beneficiaries, 17 staff members mainly in counselling and supervision team, and the 65 beneficiaries.

Like Streetscapes Roeland Garden, each social enterprise is supervised by an auxiliary social worker who is responsible for the operation and takes care of the beneficiaries. They are also supported by an advisory team (two social workers, head coach) as well as an operation manager and project coordinator. Streetscape currently runs four urban gardens, five agricultural greenhouses, five cleaning project sites and one public toilet, but Streetscapes has plans to create even more projects to spread the word.

Streetscapes Roeland Garden offers an effective way to provide a real opportunity for a vulnerable population to rebuild their lives and at the same time reducing crime in the city centre. Thereby it contributes to the overall safety of public spaces in the city centre. In addition, it leads to a new appreciation of a formerly neglected public space through maintenance and social control. The project combines the valorisation of public space and the environment with the possibility of growing healthy food to enable healthier nutrition and job creation. Work provides not only an income, but also routine and

structure. The participants can be useful again and regain their dignity. Streetscapes describes the project appropriately as Hand-up, not as Handout. A key success factor was the involvement of the homeless from the very beginning to help themselves. The implementation as a prototype turned the garden into a real-world experiment that made it possible to evaluate the success of the approach. All in all, Streetscapes Roeland Garden is an inspiring initiative to change people's lives.

24.10 Synthesis

The case studies are centred around different initiatives to enhance public useable space by urban agricultural activities. Throughout the case studies it became apparent that one underlying motive was beyond food security as more focus is on the aspect of a more socially cohesive and responsive space. Still, the motivations of starting a project as well as the drivers vary amongst the outlined projects. Besides, the two interrelated aspects of the spatial and social dimensions had different focus and emphasis (see Table 24.1). Whereas projects such as OZCF and Good Hope Junior School take their starting point by strengthening the social contact as a response to the lack of social cohesion in their neighbourhoods, projects such as Manzi Garden, Moyo We Khaya and Roeland Garden seek to improve the immediate livelihood needs and thereby empowerment. Therefore, urban agriculture links and is shaped by its location and its context-specific needs. This in the end influences the size of land needed and the kind and degree of multifunctional design.

The analysed case studies on public useable space activated by social farming practices also indicate contradictions and dilemmas for planning.

24.11 Access Versus Social Control

One of the core functions of public space is to strengthen social cohesion amongst socially diverse groups. This requires from planning to

Table 24.1 Overview of spatial and social aspects of urban agricultural case study projects in Cape Town

Case	Spatial dimension	Social dimension
Oranjezicht City Farm initiated in 2012 by local residents and formalized by South African Urban Food and Farming Trust, primary motivation: bring community together	Inner city location Size: 0.25 ha Layout gives tribute to heritage legacy Multifunctional space (recreation, education) Open access	Educational tours for school children Production of organic food Training and providing jobs Awareness-raising for sustainable consumption and production Bokashi composting as means to activate residents Weekly market as outreach initiative Allotments for gardening for personal consumption Workshop programme on diverse topics of interest Assistance to other urban agriculture projects
School ground of Good Hope Junior School, initiated by school and SAUFFT, primary motivation: educational use for school children	Inner city neighbourhood Size: 2 ha Multifunctional use (education and community interaction space) Open access or control to be determined	Extracurricular activities Sense of belonging Awareness-raising
Manzi Garden, initiated by VPUU with support by Abalimi Bezekhaya, primary motivation: need for ground floor activities for centre	Location on periphery, township Size: 1000 m ² Cultivation of crops Protected by metal fence	Training and capacity-building of local residents Social encounter Social control through ground floor activity and thereby strengthening the concept of Safe Nodes Social cohesion Food security Linked to other VPUU activities, early learning programme
Moya we Khaya Garden by Abalimi Bezekhaya's Harvest of Hope	Peripheral location, township Size: 1 ha	Healthy lifestyle promotion through production of organic food Food Security Farming for personal consumption Jobs providing and income generation Training for young farmers Women employment and protection Social control and cohesion
Roeland Garden by Streetscapes	Inner city location Size: 350 m ² (0.035 ha)	Empower people Provide meaningful employment Enable individual perspectives Enable contact on eye-level

Source: authors

enhance the accessibility of public space by diverse user groups. Besides, there is a strong need for safety and security in environments that are perceived as unsafe. This condition often calls for stronger control of access leading to fencing off public usable space from the general public.

School grounds are often a case in point for the careful considerations that need to be taken between enhancing accessibility, not detrimental to safety. Today school grounds and properties are seen as leverage points to enhance social cohesion in diverse neighbourhoods. With the

Good Hope Junior School project, local government, school teachers, principals, and school children and civil society initiatives in Vredehoek were to determine options for enhancing the role of its school ground within the neighbourhood. One of the greatest dilemmas is the strong need for spatial options for exchange and activities in the neighbourhood versus the need for safety and security for school children expressed by those in charge of the school.

24.12 Flexibility Versus Regulation by the City

The case studies share a high degree of multifunctional and flexible use of spaces. Urban agriculture projects are training sites, educational sites for school children, markets, income-generating practices, allow for composting, become sites for tourist tours, and spaces of gatherings and encounters. Many projects start bottom-up as temporary uses and sometimes later go into agreements with the City in order to secure tenure or receive different forms of financial support. This goes hand-in-hand with having to conform to regulations that do not foresee this flexibility and instead see urban agriculture as one monofunctional activity.

The creativity and flexibility of uses and spaces that urban agriculture allows usually collide with rigid regulations and conservative understanding of planning and public space. The case of Oranjezicht City Farm is revealing of the inflicted fragility on such bottom-up projects that derives from the discrepancies between, on the one hand, the technical approach to land use and spatial planning, and on the other hand, a more flexible approach that responds to the social and environmental conditions of the site.

However, and despite the conflicts between these two systems, the establishment of a space of negotiation between the city's authority and OZCF is a sending a promising sign that the gaps are narrowing, allowing for the creation of soft spaces where new spatial typologies of public space could emerge.

24.13 Conclusions

The chapter discussed the role of urban agriculture to activate public usable space and public life (social cohesion) in the context of Cape Town, South Africa. If the spatial enablement of social contact is one precondition for quality of life, then—so the assumption—urban agriculture could serve a catalytic role to enable spaces for social capital, social cohesion, identity and local engagement. The analysed cases give indications to what can be considered as perspectives for the promotion of quality of life.

Firstly, placemaking through urban agriculture contributes obviously to non-resource intensive factors: social cohesion, participation, and local engagement are all elements that have been in one way or the other mentioned in the case studies. Moreover, resources are preserved through social innovations around sustainable consumption and production.

Secondly, placemaking through urban agriculture promotes the human scale and appropriation of space. The usability aspect might not always correspond with the aesthetic demands of architects and urban designers. Projects such as urban gardening and other temporary uses are first of all places of encounter, and these social processes are seen as the qualities of these spaces. With this notion, iconic urban design and architecture projects in the context of informality have to be re-evaluated. Often projects such as the Metrocable in Medellin have managed to produce images that travel worldwide. The extent to which they allow for temporary uses and placemaking is less paid attention to.

Thirdly, the projects in the case studies support one another in various ways. If this is interpreted as a norm or pattern for urban agriculture, then the more of these kinds of projects there are in an urban area the more support they should find from their peers and the less fragile they should be. It would also encourage more 'start-up' projects of a similar nature, one would think. A precondition for this kind of scaling-up would be that urban land use needs to be oriented at common interest.

As a fourth aspect, in the under-resourced Global South, and particularly in cities where inequality is a great concern, one can also understand the use of public spaces for urban agriculture as a way to draw on resources for a social and environmental benefit that otherwise would go to other purposes (e.g., volunteer time, donated funds and services, attention and affinity, etc.). Support of urban agriculture in these spaces could be understood as a way for municipalities to tap into the latent energies and resources of more privileged communities in order to maintain or enhance public spaces and to see them used for broader community benefit and for the strengthening of local identity that can increase responsibility for a neighbourhood.

The chapter also brought forward the related challenges and controversies around urban agriculture activities on public useable space.

First of all, public usable space experiences a competition of diverse uses. Urban agriculture activities transform public usable spaces throughout the city. The idea is to showcase alternatives that would enhance urban quality of life. Although these examples are celebrated as ‘culture of experimentation’ and the stakeholders as ‘pioneers for change’, one needs to also critically question to what extent the co-production actors are representative of the general public and to what extent their user interest is representative and therefore democratic. At the end of the day, from both planning as well as social science perspective, the question arises of the extent to which a public space and its design follow whose claims and whose user interests. Which specific functions does it realise (and which not)?

Secondly, the question which is left unaddressed is: how can quality of life be measured in these fields? Whereas there was traditionally a focus on morphological features of public space in urban design, this has shifted to studies interested in agency and production of space. In the context of the SDGs and aligned monitoring processes, the role of public space is recognised on the policy level, but then evaluated only in terms of square meter per person. Pure area surveys have limited meaning. The perception and appropriation of space and suitability of uses can only

be raised and interpreted with qualitative methods involving citizens. Here the built environment discipline needs to advocate for a broader understanding to make a meaningful contribution to the SDG process.

In summary, by recognising placemaking by diverse actors, more co-productive processes can gain recognition. Eventually, broad usability is the key factor for social cohesion, creativity, and a sense of identity. The case studies discussed in this chapter show the success of these projects in mobilizing resources and different stakeholders through elaborate participatory processes. Such has proven to be crucial in the expansion of these projects and their ability to expand their social networks. These initiatives are able to create spaces of dialogue and learning, and the design scope of the government would be to support them while ensuring that all users’ interests are acknowledged.

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The Potentials and Risks of Wadis in Cities in the Gulf Region

25

Wolfgang Scholz, Mathias Kaiser, and Matthias Pallasch

25.1 Aspects of Quality of Life in Cities in the Gulf Region

Quality of life has always been strongly connected with the access to water in its different forms and scales. The availability of freshwater, as an elementary source of life, has had a crucial impact on the settlements of humankind throughout all of history. In the Middle East, settlements and urban structures often started at the locations of oases and fountains (Nagieb et al. 2004). With ongoing civilisation, the access to water as thoroughfares also gained importance. Cities along rivers and coastlines grew in physical, cultural and financial terms due to the benefits of their trading capabilities. Gulf states, e.g. Oman, were able to create cities of great quality based on complex water-delivery systems such as the Falaj Irrigation System (Nagieb et al. 2004; Al-Ghafri 2008).

But urban growth and prosperity were also always connected to water-related problems such as wastewater and water scarcity. Within cities, the natural water balance of infiltration, runoff and evaporation has always been—and still is—disturbed when buildings, streets and other infrastructure lead to more impervious

surfaces (Haase 2009). Not least, the quality of urban spaces get more and more affected in a negative way as consequence of ongoing sealing and an increasing lack of green spaces (Barnes et al. 2001; Nie and Xu 2015; Kevern et al. 2012). Furthermore, the ongoing growth of urban areas, either as consequence of densification or of urban sprawl, often leads to increased flood problems: lack of awareness, in combination with a strong belief in technical systems, causes cities to build more and more settlement areas within recent and natural flow paths (Sheng and Wilson 2009; Du et al. 2012).

On the other hand, city growth also reduces the quality of life for the city inhabitants due to the lack of green open spaces. Nowadays, open spaces for outdoor activities are often nothing more than dusty gravel areas of highly reduced quality and lacking in any aesthetic qualities, despite the fact that—as was revealed by the empirical fieldwork of the authors in Muscat, Oman—well-designed green open spaces are very much appreciated by residents for various outdoor activities.

The strong connection existing between urban water management, urban green structures, and the quality of urban areas—and, thus, urban life—is recognised and accepted in cities all around the world. Cities in different types of climate zones may be faced with different problems, but the general abundancy, manner of urban growth, and planning culture make it especially difficult for cities in the Gulf region to

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improve their quality of life with enhanced water strategies (Missimer et al. 2012). This highlights the significance of the few natural water structures of those arid regions, of which the wadis are one of the most common and thus most important (Batayneh et al. 2012; Sorman et al. 1997).

The region of the Gulf countries is one of the most urbanised areas in the world, with over 70% of the population living in urban areas (Kuwait and Qatar are almost 100% urbanised). Urban expansion in the region has been fuelled by both internal migration and expatriate workers attracted by the region's employment opportunities (UN-Habitat 2012).

Historically, most settlements in the GCC (Gulf Cooperation Council) region were just small fishing and trading spots. Since the discovery of oil in the Gulf region, however, the GCC countries have experienced a sustained growth in per capita income and wealth that has contributed to rapid urbanisation and the associated urban lifestyles. The economic GDP per capita of the GCC countries are now among the highest in the world. The economic development transformed the mud-walled towns into commercial capitals integrated into the global economy. The direct impact on urban settlement in the Gulf region was the application of Western modernist planning ideals popular in the 1960s and 1970s, leading to the neglect of the traditional medina in favour of the functional spatial segregation of the urban grid. Today, cities in the GCC region aim to embody the image of the global city, with skyscrapers in central business districts, multi-story residential buildings, large shopping malls, and wide urban boulevards. Modern villas and developments on the outskirts have replaced the traditional courtyard-based housing as the preferred lifestyle. The resultant horizontal urban sprawl has created car-dependent and pedestrian-unfriendly cities where almost all mobility is motorised. The new neighbourhoods lack open spaces and outdoor recreational facilities, while meeting points are in air-conditioned shopping malls (UN-Habitat 2012). As part of ongoing efforts to diversify their economies and attract investment, however,

Gulf cities are now actively trying to improve their urban liveability and quality of life.

25.2 Climate Change in Arid Regions, Precipitation Rate, Flooding and Erosion, Shrinking Water Resources

Within Arabian countries, superficial water runoff occurs naturally in three forms: perennial streams, ephemeral streams, and wadis. The last are dry waterbeds that commonly discharge water only for a short period of the year in connection with stormwater events. Rainfall in Arab countries is rare and characterised by high variability. Arab regions make up 10% of the world's landmass but only receive around 2% of the world's average annual precipitation (Ahmed Khater et al. 2013). Average annual precipitation rates vary from around 50 mm (e.g., Libya, Egypt, Algeria) to around 350 mm (e.g., Morocco, Palestine). Exceptions are the countries of Lebanon and Comoros, with precipitation rates of over 800 mm (AbuZeid and Elrawady 2012). Evaporation rates, on the other hand, can easily reach up to 1000–2000 mm per year (AbuZeid and Elrawady 2012).

Although the annual rainfall of arid regions differs significantly from those in temperate latitudes, there are surprisingly large similarities in the precipitation intensities of both regions. IDF (intensity-duration-frequency) curves of exemplary rain gauges in Saudi Arabia (Al-Amri and Subyani 2017), Namibia (Awadallah and Awadallah 2013) and Germany even reveal that precipitation heights of extraordinary rainfall events ($T = 100$ -y $D = 60$) in Saudi Arabia and Namibia are lower than in Germany (Figs. 25.1, 25.2 and 25.3).

Characteristic for arid regions is a temporally as well as spatially highly variable and almost incalculable precipitation distribution (Al-Amri and Subyani 2017). Such precipitation leads to flash floods in rivers, but especially in wadis, which can cause enormous damage wherever human settlement or infrastructure are located within the wadi floodplains.

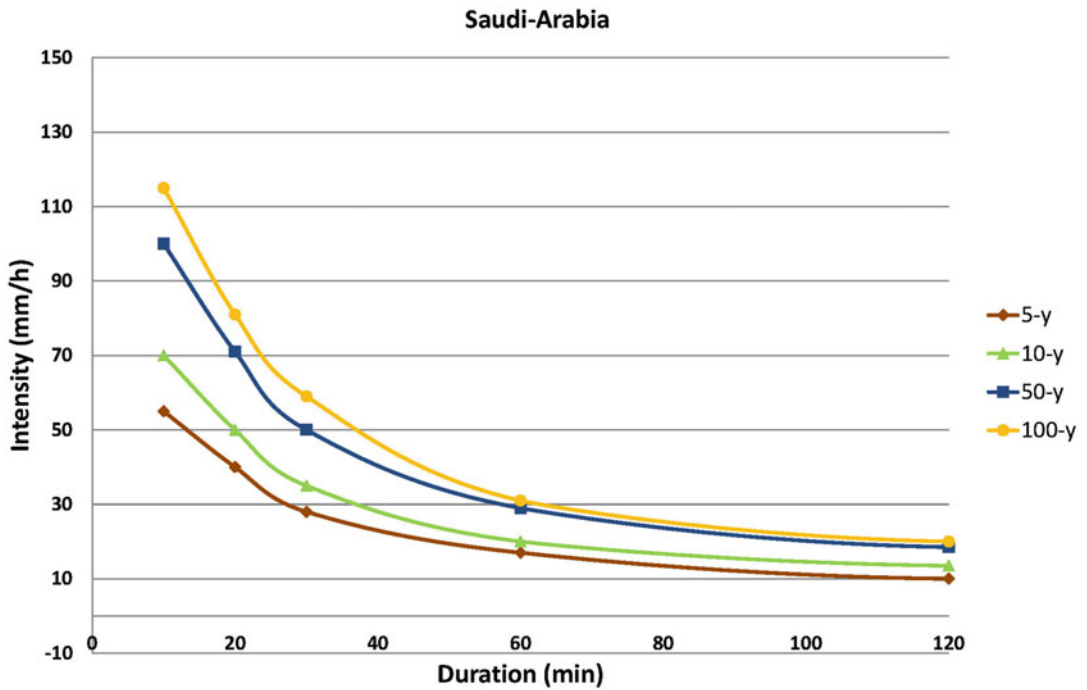


Fig. 25.1 Exemplary IDF curve of Saudi Arabia (Source: own representation based on Al-Amri and Subyani 2017)

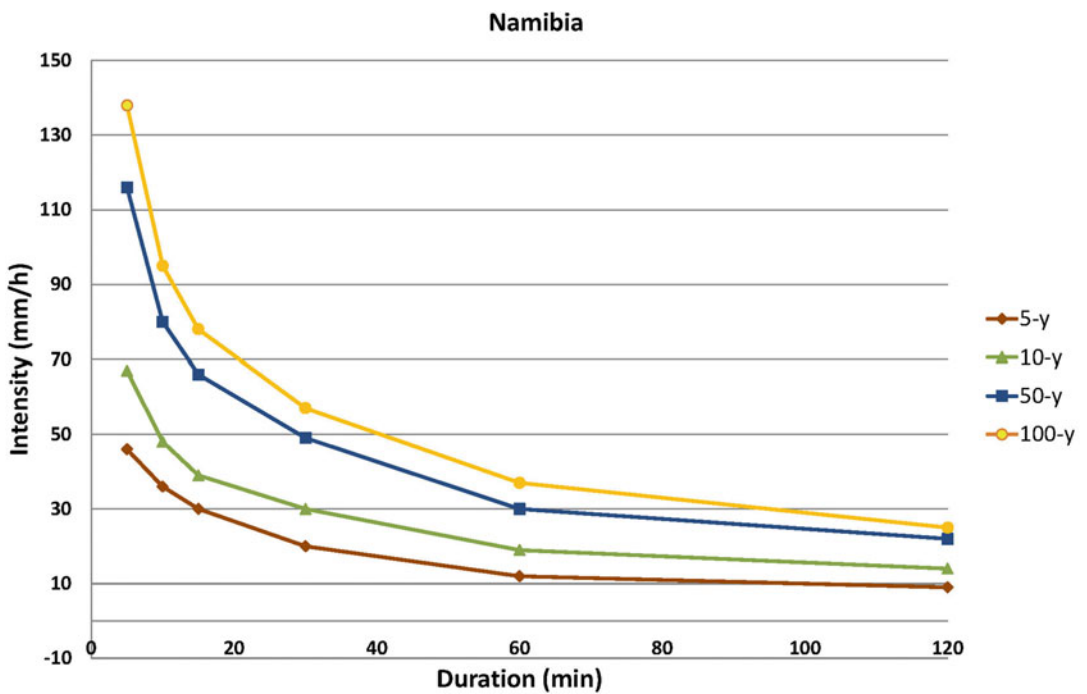


Fig. 25.2 Exemplary IDF curve of Namibia (Source: own representation based on Awadallah and Awadallah 2013)

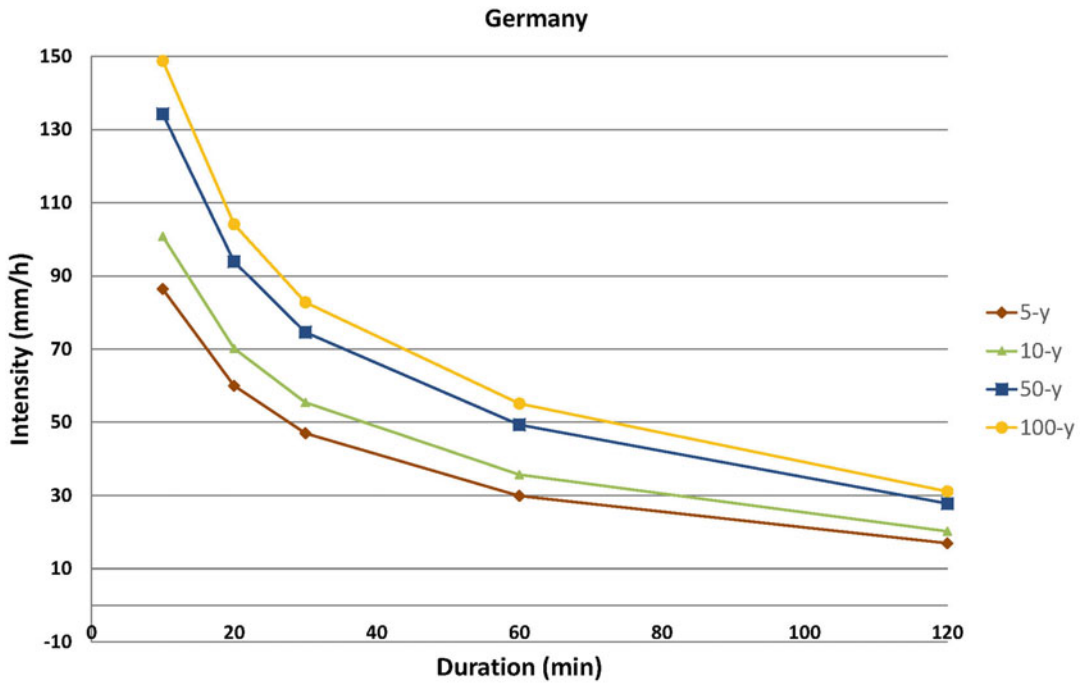


Fig. 25.3 Exemplary IDF curve of Germany (Source: own representation based on DWD 2010)

Even though wadis display dry river beds for most of the year, the spatial extent of wadis, as well as the amount of water they carry, can reach enormous dimensions. This phenomenon is caused by one driving factor: the widespread abundance of a vegetation layer and organic soil layer successively lead to little retention of water within top soils. If not percolated into porous bedrock, stormwater quickly transforms into a superficial overland flow, which leads to high peak flows within wadis. Obviously, the shape and size of wadis have a great impact on the urban fabric and, thus, the quality of life.

An exemplary listing of cities of the Middle East that were hit by wadi flash floods illustrates the ubiquity of the problem:

- Jeddah (Saudi Arabia)—November 2009
- Morocco—November 2014
- Oman—2007, 2015, 2019

As result of these floods, both massive property damage and deaths were to be bemoaned. An important example of the devastating effect of

flash floods in wadis is the Sultanate of Oman. Flash floods in Oman occur not only from periodically returning convective rains, but also from the occurrence of cyclones that develop in the Bay of Bengal or the Arabian Sea (Fritz et al. 2010). For example, the cyclone Gonu caused severe storm surges with coastal as well as wadi floods in Oman in 2007, especially from the heavy rainfall in mountain areas (Fritz et al. 2010).

The role of cyclones is disconcerting, as climate-change impact scenarios indicate an increasing frequency of extremely severe cyclonic storms over the Arabian Sea (Murakami et al. 2017). With global climate change, however, the Gulf countries of the Gulf Cooperation Council (GCC) are faced not only with the threat of flooding. Climate models generally point to higher average temperatures and a combination of lower and increased rainfall and flooding in the GCC region, depending on the area. Climate change will reduce long-term water supplies, increase the reliance on desalination (with the

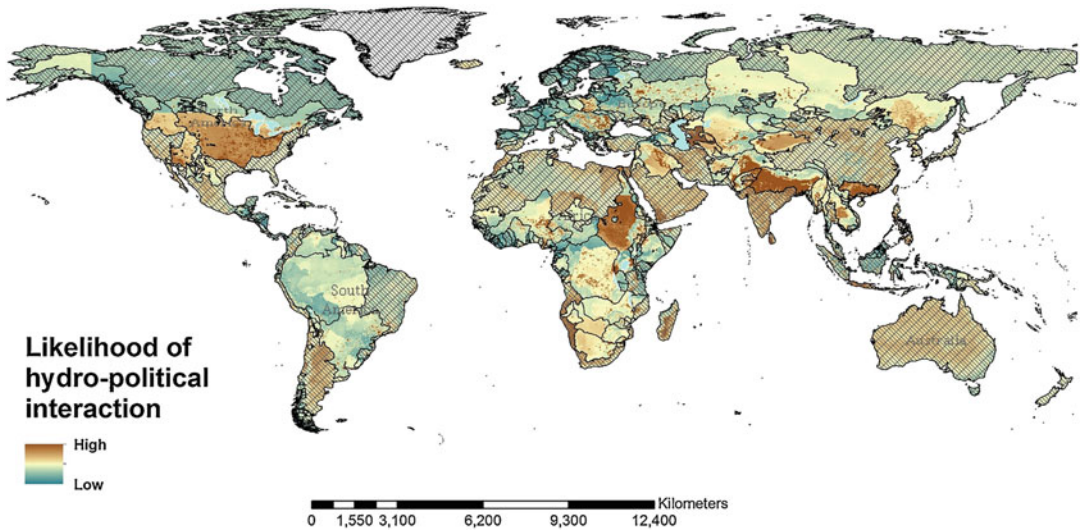


Fig. 25.4 Likelihood of hydro-political interaction (Source: Farinosi et al. 2018)

subsequent energy costs), reduce available water for agriculture, and lead to more heat waves.

By 2030, the effects of climate change will have reduced renewable water resources by another 20 per cent through declining precipitation, rising water demand as temperatures mount, and expanding seawater intrusion into coastal aquifers as sea levels rise and groundwater overexploitation continues (Khater et al. 2013, p. 2).

This development will have a crucial impact on quality of life at different scales. For example, the potential hydro-political risk at the national and international scale increases with growing water management problems, especially water scarcity. This also applies for many states of the GCC (Fig. 25.4).

With its arid climate and rapidly growing population, the Gulf is one of the most water-scarce regions in the world. On the urban scale, quality of life can be extremely limited by water-related problems. Both heat waves and floods can be physical threats for inhabitants. Scarcity and pollution limit the usability of freshwater. The region's limited water resources include shallow aquifers, which are replenished by the winter rains, and larger supplies of non-renewable fossil water in deep aquifers formed millions of years ago. Since 1960, the population in the GCC

region has grown sevenfold; in turn, water consumption per capita rose by 336% in Kuwait from 1992 to 2010; by 125% in the UAE from 2006 to 2008; by 120% in Muscat from 2005 to 2009; and by 120% in Bahrain from 2000 to 2008 (Bahrain Central Informatics Organisation 2008).

Various states of the GCC have average per capita water availability rates below the World Health Organization threshold for severe scarcity (Khater et al. 2013). Increased efforts to build and maintain water infrastructure invariably lead to increased costs. Free access to freshwater can become a major issue, especially for poor and rural regions. These findings clarify the need for water-sensitive urban design in the GCC region. Wadis, as major flow paths for freshwater in arid countries, play a crucial role in water-sensitive urban design. They can be a key point for adaptation strategies regarding urban flooding. At the same time, they can have a great impact on the mitigation of water-related problems such as water scarcity. The recharge of underground aquifers, for example, can benefit from measures for water retention in wadis.

To meet the demand, the GCC countries have overexploited existing resources and have begun to invest heavily in desalination facilities. The growing consumption of water has also had a

positive outcome, as treated wastewater is now available for the irrigation of parks and for agriculture (Authors' fieldwork 2018).

But water-sensitive urban design (see Sect. 25.4) is faced by the heavy constraints that arise from the rapid urban growth in cities of the Gulf region.

As described, the supply of drinking water is already limited due to the low precipitation rates and high evaporation rates in Arab countries. The high population growth rates, as well as the accelerating growth of drinking water consumption per capita as a result of economic growth, increase pressure on available water resources.

As in other Arab countries, energy-intensive seawater desalination is used in Oman to satisfy the demand for potable water. In the context of climate change, however, this is not a sustainable and responsible solution. It is therefore necessary to minimise the need for potable water and, wherever possible, to draw on sustainable sources.

Due to the low precipitation rates in Arab countries, efforts are focused on the treatment and reuse of wastewater. This technique could be implemented at the building, district, and city level. Such a system of wastewater collection and treatment is currently being implemented in Oman, where wastewater is treated at the sewage treatment plant and then diverted unused into the sea. But this offers the possibility of a further use, for example for irrigation of public greens. This potential should be developed in the future.

25.3 Flood-Risk Management and Reduction, with Special Focus on Wadis

Climatic evolution in the GCC region, with its trend of heavy rainfall, exacerbates the likelihood of flooding. Especially in urban areas, this development is further accelerated by increasing impervious surfaces and the loss of natural retention areas. Roads, buildings and open channels, sometimes even centralised sewer systems, provide rapid discharge of rainwater and sewer overflow in the wadis. The limited hydraulic capacity of the grey and blue infrastructure leads to

widespread flooding, even beyond the actual flood areas, in cases of heavy precipitation.

In the course of settlement development, however, not only the probability of flooding but also the potential damage increases. On the one hand, this affects damage to the infrastructure, such as roads, bridges or canals. On the other, the number of goods, primarily motorised private transport, and thus also the potential extent of damage, increases.

The combination of the two components, *likelihood* and *damage potential*, is summarised under the term *Flood Risk* (Fig. 25.5).

Using the concept of flood risk management, urban planning can influence either the reduction of damage potential or the reduction of urban flooding likelihood. In arid regions, measures *within the catchment* of wadis, measures *inside wadis*, and measures *within the floodplain* of wadis play a crucial role for the implementation of flood risk management.

The quality and effectiveness of measures depend significantly on the basic data. In this sense, the procurement of robust geo-information, especially digital elevation models (DEM) and land-use data, is an important and priority measure.

Nowadays, most providers of geographic information systems (GIS), both commercial and open source, offer analytical tools to determine flow paths and sinks based on DEMs (Fig. 25.6).

More-sophisticated models allow the simulation of dynamic stormwater runoff with temporal and spatial resolution of water depth and water distribution (Fig. 25.7). For urban planning, GIS analyses are of great value. Flow path analyses clarify which neighbourhoods can benefit from potential retention measures, and are also a good indicator of the likelihood of flooding and flooding damage. Flow path analyses always have a high value where there are no defined runoff paths, e.g., in the form of a wadi river bed. Where regular runoff events have led to natural or artificial watercourses, the hydraulic modelling of surface runoffs is decisive. The spatial distribution of potential flooding under defined runoff conditions (likelihood) is an essential criterion for the detailed planning of

Fig. 25.5 Definition of flood risk (Source: own representation)

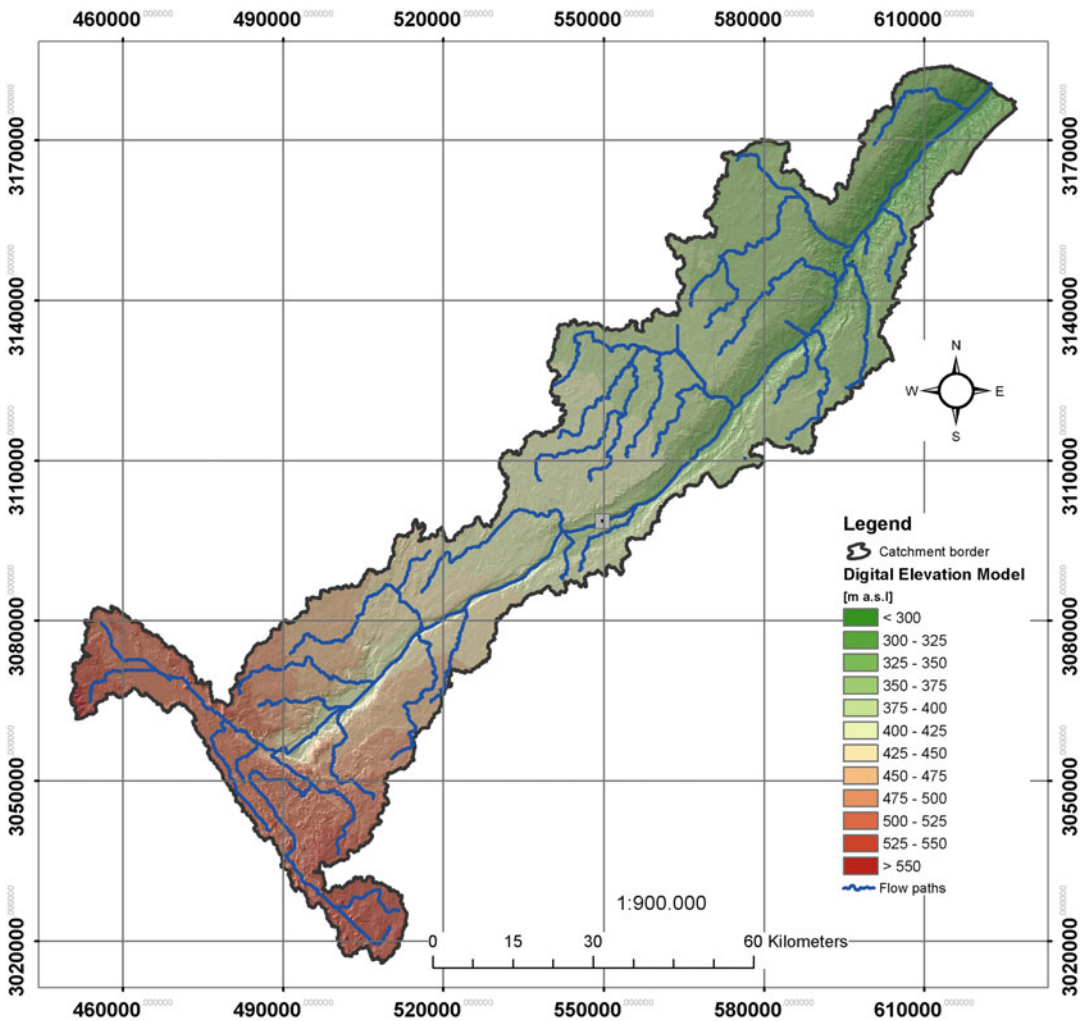
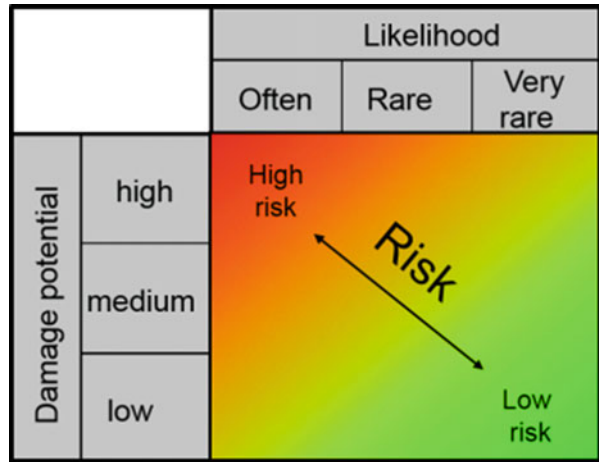
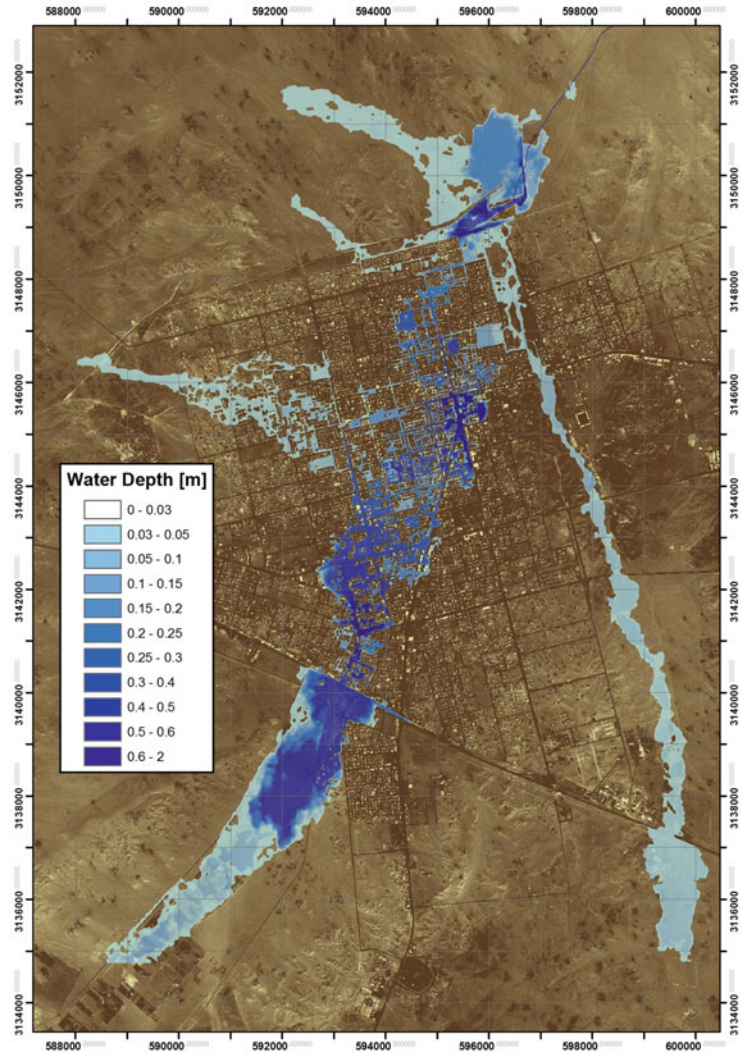


Fig. 25.6 Catchment of Wadi al Batin (KSA) and its flow path system based on GIS-DEM analysis (Source: Ingenieuresellschaft Sieker)

Fig. 25.7 Results of the flood simulation for Hafar al-Batin (Source: Heinrich et al. 2015)



residential areas. Precautionary flood protection should generally avoid the development of residential areas within floodplains! If this is not possible due to urban planning reasons, object-related precautionary measures must be taken.

The modification of road profiles is recognised as one such property-protection measure. Through the intelligent aligning of road slopes, floods can be led to areas of low damage potential (e.g., parks) or managed and stored. This strategy has its greatest benefits in very dense urban areas.

The storage of floodwater is decentralised into the urban area itself, and thus the amount of water

that has to be discharged is decreased. This contributes the opportunity to minimise the size of open channels, and/or to combine them with or integrate them into other infrastructural elements like streets and open spaces. On the downside, open channels, having a large catchment of not-retained floodwater, act as barriers in the urban area and mitigate the connectivity and quality of life. To minimise the associated negative effects (traffic barriers, inaccessibility in general, etc.), conventional underground tubes are generally built.

Although they do not demand above-ground space and do not act as a barrier on the surface, they include essential disadvantages. On the one hand, conventional tubes just for flooding events are very costly; and on the other, the flexibility in relation to changing conditions (e.g., growing percentage of sealed surfaces in the catchment area, changing precipitation rates, etc.) is not given. To increase the discharge capacity of a tube, the whole pipe has to be rebuilt with a larger profile or larger storage volumes have to be built into the underground system.

In contrast to that, the capacity of decentralised flood pathways integrated into the surface of urban areas can be increased more easily through small modifications to the terrain's profile and, if necessary, to the amount of decentralised storage capacity on the surface.

In less dense urban areas (e.g., areas of urban sprawl), the construction of open channels is common practice. From an urban development point of view, however, the construction of conventional channels, which serve exclusively for the rapid discharge of water, is questionable (Fig. 25.8).

The conception and detailed planning of retention measures, as well as measures to improve hydraulic performance of existing flow paths, require flood simulations. Flood simulation has become an essential tool for decision makers who care about flood-mitigation strategies, risk control and disaster reduction in urban areas (Xie et al. 2017). Overland flow simulations have evolved from primitive approaches to more-complex simulation techniques (Teng et al. 2017). New methods mainly rely on temporal and spatial resolutions of the urban surfaces, solving the equations within the generated mesh. The methods differ in their complexity according to the number of directions in which the equations are solved, as described below.

The flow simulation in 1-D models is carried out by solving the simplified or complete form (kinematic, diffusive or hydrodynamic) of the shallow-water equations, namely Saint-Venant equations, in only one direction (longitudinal direction of the channel) with cross sections of one averaged velocity to represent the velocity

fluctuations among floodplains (RainGain 2013; Teng et al. 2017).

A simplified or complete form of Saint-Venant equation can also be solved in a 2-D manner. Urban surfaces are discretised continuously as a structured or unstructured (regular or irregular) grid or mesh usually based on DEM. The overland flow is simulated in two horizontal directions, with the assumption that the water depth in the vertical is shallow and can be neglected. Possible coupling of 2-D models of overland flow with 1-D models of sewer lines or rivers can be used to describe the interaction between the two systems (RainGain 2013; DHI 2012; Roberts et al. 2015).

More-sophisticated applications, such as vertical features of the overland flow, require 3-D modelling including turbulence, eddies, spiral flow at bends, and vortices (Monaghan 1994). Application of 3-D models to represent overland flow is considered unnecessary in most cases, since the 2-D models give sufficient and realistic description of the overland flow (Alcrudo 2004).

25.4 Urban Resilience and Water-Sensitive Urban Design (WSUD)

The threats and risks posed to urban areas by potential flood events endanger people, buildings and a multitude of different infrastructures, for example:

- electricity
- gas supply
- fuel
- supply of potable water
- wastewater disposal
- food supply
- voice and data transmission
- data storage and processing
- supply of medical products and services
- road traffic (Kruse 2019).

As explained in the previous section, the risk for urban areas is not solely derived from the hazard itself, but is also determined by the

Fig. 25.8 Urban flood channel in Saudi Arabia
(Source: Amr Gazal)



damage potential. The goal of all efforts to minimise the damage potential is to strengthen urban resilience. In order to achieve this, hydrological as well as spatial planning aspects have to be investigated. Therefore, a further differentiation of the damage potential is necessary. The subcategories *vulnerability* and *exposure* allow further analysis. On the one hand, a focus has to be on the vulnerability of human utilisation and building structure. On the other hand, the exposure of use and the structural structure face the hazard (Greiving 2016).

First, both parts must be recorded separately and spatially represented. The combination with flood simulation shows a differentiated picture of the risk areas.

With the help of this differentiation into subcategories, it is possible to detect endogenous potentials for risk minimisation. This spatial planning analysis of urban structures is carried out exhaustively and in high spatial resolution, and thus creates a basis for the resilience of urban areas towards flooding hazards (Greiving 2016).

WSUD is a widespread planning approach that tries to combine the following three elements:

- water management,
- urban planning, and

- landscape planning.

The aim of WSUD is sustainable water management in urban areas and structural and comprehensive integration into the urban area. Sustainable water management systems consist of different aspects, such as water supply. This includes, on the one hand, the production and supply of drinking water and, on the other, the re-use and recycling of water. Additional to that, sewerage treatment and waterway health is another important field of WSUD. The third field of WSUD are the elements stormwater runoff management and flood protection management.

The focus of a WSUD approach depends on the local climate conditions. In the Arabian arid climate, stormwater runoff management is not in the focus, unlike in Europe. Other aspects, such as flood protection management and water reuse and recycling (to mitigate the drinking water demand), are instead more in focus.

The goal of WSUD in Arabian regions is to integrate the storage/retention and secured discharge of flooding events into the green spaces and to create a so-called blue-green infrastructure (BGI). The quality of life for citizens can also be enhanced if wadis are well designed and not only

seen under technical aspects. Flooding pathways can be identified and optimised by flood simulations. Bottom up from the hydrological basis, the design and utilisation concepts for urban activities and recreation are combined with these (linear and laminar) structures. They develop new connecting functions for pedestrians and cyclists, thus enhancing the quality of life.

The treated water from the treatment plants can be used for irrigation of new green structures in or at the border of those open channels and retention basins. The systematic combination of water management, urban planning and landscape planning leads to multi-use areas for different purposes.

25.5 Case Study Hafar al-Batin, Kingdom of Saudi Arabia

Hafar al-Batin, a city of about 400,000 inhabitants, is located in the eastern province of Saudi Arabia, about 70 km south of the border to Kuwait and Iraq and about 200 km inland. The city is crossed by the largest wadi on the Arabian Peninsula, the Wadi al Batin, which drains an area of about 60,000 km². Within Hafar al-Batin, other tributaries also flow into the Wadi al-Batin.

The city is inadvertently but repeatedly flooded, resulting in frequent damage. Large areas of Hafar al-Batin are impervious. Runoff cannot be reduced due to a lack of retention measures. Consequently, the accumulation of runoff from Wadi al-Batin and its tributaries (so called *fleej*) generates high peak flows with large inundations. As measures, several canals and dykes were built. By building a damn, the wadi catchment around Hafar al-Batin was reduced to 2800 km² (Heinrich et al. 2015). However, there is no overall flood protection concept. Consequently, the impact of each measure is severely limited.

After renewed floods in 2013, the provincial government decided to create a flood management plan. Based on the European approach, the flood discharges from precipitation events with a 100-year recurrence probability should be compensated by appropriate measures.

As the fundamental input for the conception and planning of the retention measures, a 1-D flood simulation was conducted. The simulation results showed the temporal and spatial distribution of inundation during a 100-year event in high resolution (Fig. 25.7).

The example of Hafar al-Batin not only shows the big advantages of flood simulations, but also the greatest challenge: data availability. And the catalogue of required input data is large.

The first step of a flood simulation consists of the description of *runoff generation*. While simplified approaches fall back on runoff coefficients, more-complex models require input data on digital elevation, soil properties, land use, and meteorological data such as precipitation, evaporation and temperature. In the case of the flood management concept of Hafar al-Batin, those data were processed using the hydrological rainfall runoff model, *STORM.XXL*[©].

The main result of hydrological modelling consists of a so-called hydrograph, which pictures the runoff from a certain river section of a stream over time (Fig. 25.9). To get information on the resulting water level and floodplain, the hydraulic capacity of each wadi, tributary, channel or sewer must be known. This information is derived by a hydro-dynamic model, which calculates water levels for all chosen sections. In case of the flood management plan of Hafar al-Batin, this hydro-dynamic model was established using *HEC-RAS*[©] for the wadi system and *EXTRAN*[©] for the sewer system.

Thus, the temporal course of overflow from both sewers and wadis could be computed within additional hydrographs. This overflow represents the amount of water that cannot be discharged by wadis and sewers and thus leads to urban flooding. The precise distribution of urban flooding can be computed with a model of the surface overflow; in the case of Hafar al-Batin, accomplished with the 1-D hydraulic model *FloodArea*[©]. As the accuracy of an overflow model depends significantly on the spatial resolution of the underlying digital elevation model, aircraft-based remote sensing with LIDAR (light detection and ranging) had to be conducted prior to the overflow modelling (Fig. 25.10).

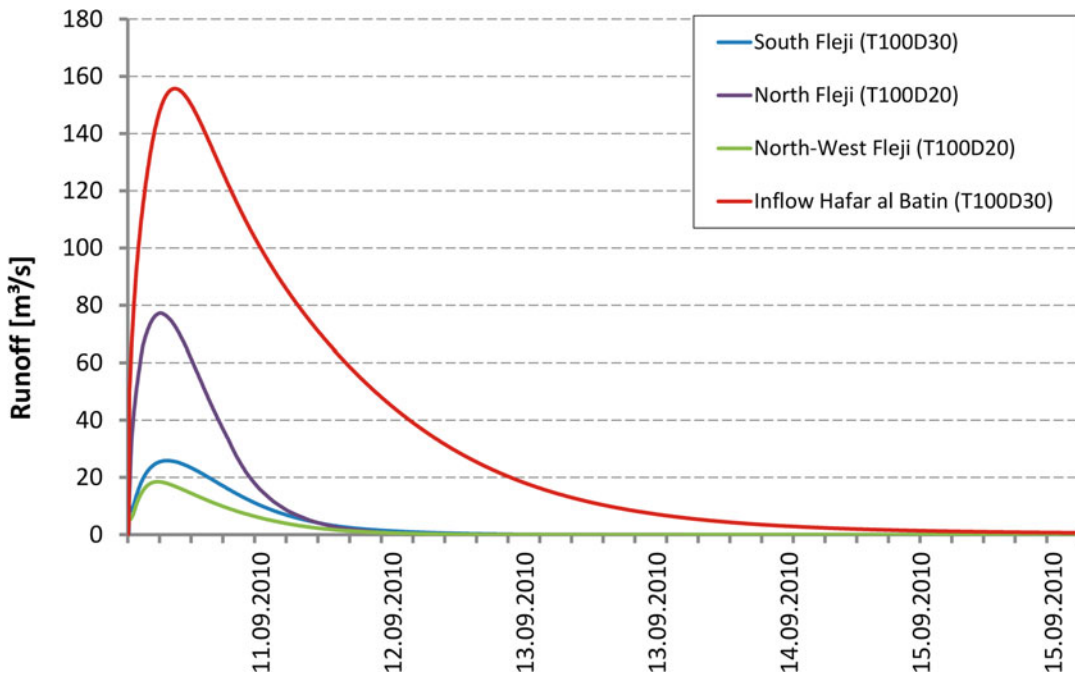


Fig. 25.9 Example of hydrographs for representative sections within different wadis and channels (Source: Ingenieurgesellschaft Sieker)

With the final simulation of the overflow scenario in *FloodArea*[®], the spatial distribution of inundation was computed and visualised for each time step of the chosen rain event (Fig. 25.7). Those visualisations were the crucial input data to derive measures.

In case of Hafar al-Batin, a variety of different measures was developed.

Most of the measures are located at the margin of the city and targeted on a reduction of water runoff *into* the city centre. Temporal lakes as well as retention basins are planned via the improvement of dams and dykes (Fig. 25.11). New channels and the renovation of culverts aim to reduce inundation as a result of too little hydraulic capacities.

The flood protection measures in Hafar al-Batin are quite invasive and of technical character, not least because the underlying scenario was inspired by a worst-case scenario (100-year event). Still, there is a lesson learned regarding the greening of wadis to enhance quality of life. Even though urban greening and wadi greening

can be an important approach to reduce runoff generation and urban flooding, there are frame conditions (like those in Hafar al-Batin) that do not allow wadi greening as a sole measure. On the contrary: without reducing the wadi runoff into the city, there is no potential for wadi greening. The reduction of the current and its hydraulic power is considered as crucial for any wadi greening strategies. Otherwise, all potential greening measures will last just until the next great flood event. Thus, greening strategies and runoff reduction must be combined within a resilient and holistic approach.

In terms of spatial planning, the case study of Hafar al-Batin represents a very good example of the consequences when the timely consideration of wadi floodplains is not included in the urban spatial planning! Floodplain areas should be kept free from housing much earlier in the city development. In comparison to a predictive and far-sighted urban planning, the later effort for mitigation and adaptation measures is enormous.

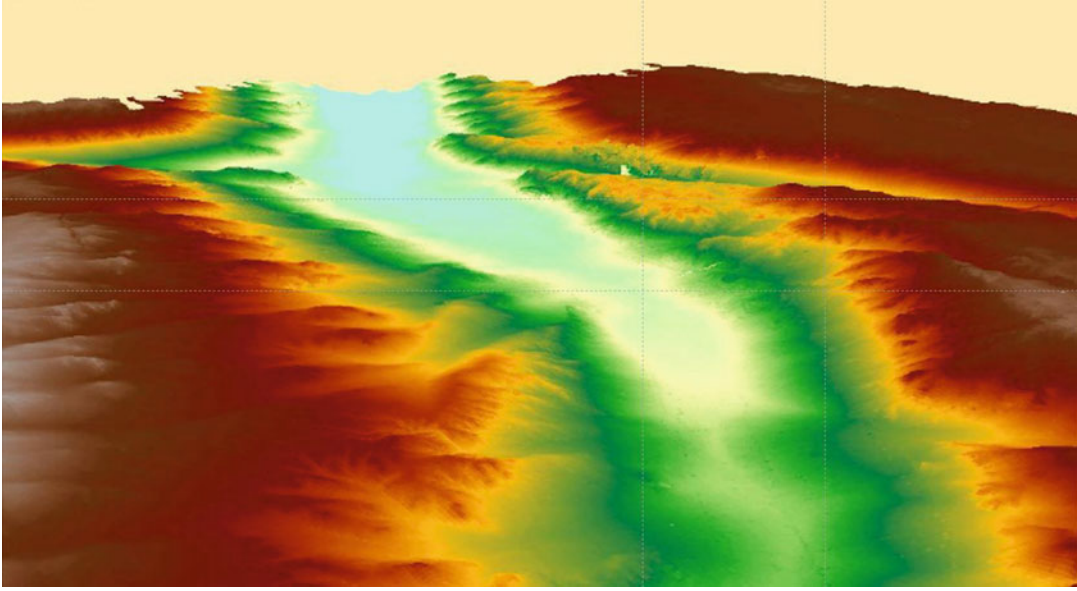


Fig. 25.10 Digital elevation model by aircraft-based LIDAR (Source: Heinrich et al. 2015)



Fig. 25.11 Example of dyke and culvert to manage potential wadi runoff (Source: Halim Maamari)

25.6 Case Study Muscat, Oman

The Sultanate of Oman has been undergoing massive changes over the last 50 years. The Gulf state has transformed from a very traditional and isolated country into a wealthy, open and modern nation. This transition is largely due to the discovery of oil in the late 1950s and the influence of Oman's Sultan Qaboos ibn Said Al Said (†2020) on the development of the country. After Sultan Qaboos was enthroned in 1970, the young sultan began to modernise Oman's economy and thus started an educational and cultural renaissance that is still continuing today (see Nebel and Scholz 2014). The wealth that came with the oil industry was followed by huge demographic changes and challenges, and an increasing population. Within four decades, the capital area of Muscat developed from small port towns and agricultural villages into an urban agglomeration and experienced massive changes. Over the course of the last 30 years, the population of Oman has tripled from 1,557,000 inhabitants in

1986 to 4,654,000 in 2016 (PopulationPyramid 2016), including 44% non-nationals. In the Muscat Capital Area (MCA), there has even been a population increase from 350,000 to 1.56 million as of September 2015. In 2014, more than 85% of the Omani population was living in urbanised regions, primarily concentrated in the MCA.

“Oman has experienced an era of intensive and rapid modernisation and the capital area of Muscat is undergoing an almost unprecedented process of urbanisation.” (Deffner and Pfaffenbach 2015, p. 9) The suburban development of the capital area of Muscat stretches along the coastal Al Batinah plateau for more than 100 km, and the total city area now covers approximately 3500 km². In the last five decades, the built-up area in this region quadrupled (NCSI 2015). The urban area is delimited by the Gulf of Oman in the north and the Hajar Mountains in the south. These natural barriers explain the linear expansion of the metropolitan area between the two. Widespread, single-family houses are the prevailing residential building type, with mono-functional zoning and a dependency on individual transportation by cars.

The demand for Western-style buildings in the commercial and residential areas of Muscat and the adaptation of villa-style single-family houses is high. In addition, the distances between houses and services have increased and destinations cannot be reached by walking, as in old Muscat. This has fragmented the urban centres and contributed to making Muscat one of the least densely populated capitals worldwide, at 300 p/km (NCSI 2015). This means that for every kind of activity, the use of a car is necessary because the hot climate in Oman makes it difficult for most people to walk. This has been especially reinforced by the absence of walking facilities such as wide, shaded walkways and shading elements, or even any walkways along roads at all. Muscat has a semi-arid tropical climate with high humidity all year round, with only a few days of precipitation. The average annual temperature is about 28.4 °C. The average annual rainfall measures about 106 mm. In summer, temperatures rise to more than 40 °C and make it difficult to perform outdoor activities during daylight hours without shade. This, in return,

leads to a high car dependency and a huge dependency on oil, which adds to the negative ecological impact.

Today, the MCA is characterised by a functional segmentation of the city; industrial areas and extensive residential areas have filled up the space between the traditional port towns and oasis settlements. The new residential areas consist of free-standing villas on plots that are usually surrounded by a high wall. This building type “[...] stands diametrically opposed to social habits, environmental and climatic responsibility and, ultimately, traditional Omani culture” (von Richthofen 2016, p. 137). One effect of this mode of development is the massive use of space, which leads to functional segregation and longer travel distances. In turn, this makes transportation infrastructure even more a bottleneck of the social and economic life in the whole metropolitan area. This has contributed to the emergence of certain lifestyle society patterns that are highly dependent on using private transport modes and energy consumption. This influences the quality of life, social cohesion and economic activities within any given area (Forckenbrock et al. 2001).

Looking at spaces in contemporary Muscat, public space tends to be abstract, fragmented, and broken into sectors: the transportation and road network (with large highways), urban nodes, trade and commerce (in large shopping malls), and office block business districts with their labour forces. These spaces are global, conceived and perceived for consumption (Lefebvre 1991); they do not function as an arena for everyday life practices. This space needs to be transformed into qualitative space.

Thus, the provision of public spaces with different hierarchies is a key measure to achieve a better quality of life, using climate design that addresses the social and ecological components of sustainability. This, however, requires a focus on small-scale urban spaces and neighbourhood parks.

Currently, large areas of the suburban neighbourhoods of Muscat contain a multitude of deficits in that they are not sustainable, energy efficient, or appropriate to their populations’ needs. They frequently feature the following

characteristics: low density of buildings and inhabitants in relation to open spaces, mono-functionality, car dependency, lack of climate adaptation, insufficient public transport, lack of major social functions, and more (see Nebel and Scholz 2014). The currently widespread single, detached villa seems to be the preferred and unquestioned residential type for Omani families (Authors' survey in 2018).

A special topographic feature in Muscat are the wadis, the dry undeveloped river beds that channel water during heavy rains from the mountains south of Muscat through the city and into the Indian Ocean. These wadis stay dry most of the time, but experience flash floods for a couple of days. The rainwater partly remains in the wadis for a few days and disrupts traffic. In addition to the flood hazard aspect, wadis form natural barriers that interrupt Muscat's urban development. They segregate the city and neighbourhoods into fragments. The citizens of Muscat perceive them as undeveloped areas with a negative effect on the local climate. Most sections along the wadis are composed of gravel and dust, do not provide living space for vegetation, and heat up on hot, sunny days.

Wadis are often seen as burdensome, but they also have a high potential to improve the capital's quality of life as a green infrastructure. Wadis could be integrated, as green public spaces, into the urban structure of Muscat, a solution that would also address the lack of public spaces in the city. The wadis' current barrier effects could be reduced and converted into a green connection between neighbourhoods.

The wadis, which run in a south-north direction, form natural barriers and breaks in Muscat's urban development. Filled with gravel and dust, they do not provide living space for vegetation and heat up during the day. In their current form, wadis do not contribute positively to their surroundings. However, their locations, orientation, and linear form make them a good starting point to implement linear open spaces in the neighbourhoods they pass through. Since they have to be kept free from any construction development, converting them into parks (that are only temporarily flooded) is a favourable solution on

different levels. Parks in wadis would have a positive effect on the local climate—much like common parks do. The wadis run through the different neighbourhoods due to their linear form; as parks, the green infrastructure could be easily crossed on foot or by bike and serve as a shortcut. By offering comfortable walkways and connections to other neighbourhoods, facilities or open spaces, the walkability for people could be increased and, in turn, car dependency diminished. The wadi valley is also wide enough to accommodate temporary sport fields. In general, wadi parks would be a good urban planning measure for developing areas that are generally not usable for development.

25.7 Al Azaiba Park as Example of a Wadi Park

The Al Azaiba Wadi Park, which serves as a best practice example, is located in the southern part of the Al Azaiba neighbourhood, between Sultan Qaboos Highway and 48 Way. It was transformed in 2012 by Atelier Jacqueline Osty and associés, a French architectural office. The wadi park is part of an urban plan for new urban parks and planning strategies, and was commissioned by the Municipality of Muscat. The design of the Al Azaiba Wadi Park is directly orientated on the topography of the wadi itself, which is why the park was created with two different levels. On the street level, people can enter the park via the southern and northern entrances and follow pathways that go around the park on both sides. The walkways provide a walkable shortcut between the main road, which runs through the Al Azaiba neighbourhood, and the Sultan Qaboos Highway. Along these walkways, palm trees are planted to provide daytime shade. In addition to this, and to meliorate air quality, small bushes and ornaments are planted. On the western side of the park, a larger area is serviced with benches so that one may sit in the shade in order to have a rest or to meet others. To maintain the original function of the wadi, which is to transport rainwater from the southern parts of the city to the Indian Ocean, the river bed has to be kept free of blocking

Fig. 25.12 Al Azaiba Wadi Park (Source: Wolfgang Scholz)



elements. To facilitate this, the ground of the river bed is covered with gravel, which allows the water to flow further and also enables standing water to seep into the ground. The zone between the lower and the upper level is covered with grass and features large steps, which can also be used as sitting space. However, there are two factors that limit the transferability of this example to other wadis: firstly, the wadi of Azaiba Park has only a limited function as a water runoff and, secondly, the investment was quite high. Large-scale extensions are therefore not feasible. Nevertheless, the example underscores the potential wadis have to green the city (Fig. 25.12).

And the same wadi only 100 m downstream, in its original state, which is how most wadis look (Fig. 25.13).

This example serves as starting point to address the problem of the lack of green areas, the underused wadis as barriers in the city, and the availability of unused treated wastewater.

The sewage treatment capacity of the city is being rapidly expanded and modernised, therefore providing ever-growing quantities of high-quality treated wastewater. A total amount of 150,000 m³ treated wastewater (TW) is produced per day in the Muscat Governorate, an amount expected to double by 2022 due to sewage

treatment plant expansions (Al Sabti 2016). About 75% of the current treatment capacity, which is still rising, is of high-quality TW that can be utilised for different purposes (Al Wahaibi 2017). Haya Water, the local public water and sewage company, is already unable to find enough consumers for the TW, only 53% of which is used today. As the population grows, the gap will only increase (Al Sabti 2016) and more valuable TW will be discharged into the sea (Interview Haya Water 2018). In a country challenged by water scarcity, this is not acceptable and new and effective use opportunities must be found for the unused treated wastewater.

25.8 Transformation of Wadis into Green Parks

The strategic approach would be to make use of the available TW for the irrigation of wadis parks and, at the same time, to establish wadi parks as neighbourhood parks connecting the separated parts of the city and providing green infrastructure to enhance the quality of living in Muscat. A potential side effect could be the reduction of necessary planned green parks in the new neighbourhoods in favour of building land,

Fig. 25.13 Al Azaiba Wadi in original status
(Source: Wolfgang Scholz)



which would allow for increasing the density of the built-up area to reduce urban sprawl. According to local planning regulations, every household is supposed to be served with a neighbourhood park within 300–500 m. Therefore, plots are kept open and remain governmental property to ensure the availability for future neighbourhood parks. The size of green public spaces depends on the neighbourhood's density and number of plots, but in general they comprise an area equal to four to six villa buildings (Interview, Ministry of Housing 2018). However, many such plots are still vacant and not every household is provided with a green public space within the mandated distance. Especially in the newly developed eastern part of the city, new neighbourhoods lack parks. This is due to the undefined time of implementation and missing financial means (Interview, Ministry of Housing 2018). Thus, parks in wadis could replace some of the missing parks. Some wadis are already used informally by the residents as sports fields and for connecting the neighbourhoods.

Obviously, a wadi park has to be designed differently from a “normal” one due to the risk of devastating flash floods. Therefore, the design of a wadi park has to consider areas with higher and lower flood risks. Wadis need to be designed

in an appropriate way, e.g., constructions only on the upper areas on the valley slopes and little intervention on the lower parts. Small-scale and low-cost interventions as well as appropriate planting can provide an adequate alternative. Wadis have to be designed with low intervention and for the utilisation of the inhabitants, and not only for a nice and impressive appearance.

A joint project conducted in 2018 by Omani and German planning and architectural students from the German University of Technology (GUTech) in Muscat and TU Dortmund University and supervised by the authors came up with options for a wadi park design that considers the environmental and social functions of a wadi park and, at the same time, provides ideas for flood protection within the different areas in a wadi.

On the basis of almost 300 interviews (including Omani and expat workers and local residents), the needs and expectations for parks as well as the acceptance of parks in wadis was analysed and explored. The students then developed ideas for the design of two wadi parks. One wadi is located more in the inner city and surrounded by densely built-up neighbourhoods (Wadi al Khuwair), while the other is located at the periphery between still-growing neighbourhoods with mainly single-

Fig. 25.14 Branch of Wadi al Khoud (Source: Joint students project 2018)



Fig. 25.15 Wadi al Khoud today (Source: Joint students project 2018)

family houses (Wadi al Khoud) (Figs. 25.14, 25.15, 25.16 and 25.17).

The main requests for what a wadi park should include were sport fields for football and cricket,

bike and jogging lanes, (private) picnic areas, playgrounds, public toilettes, cafés and prayer rooms. The requests differed by nationality and given preferred sport, as well as by the number of

Fig. 25.16 Wadi al Khuweir (Source: Joint students project 2018)



Fig. 25.17 Wadi al Khuweir today (Source: Joint students project 2018)



Fig. 25.18 Draft of the students' design for a park in Wadi al Khuweir (Source: Joint students project 2018)

women and children visiting the park. On the side of the design, green areas for sitting, picnic areas, and shaded areas dominate. For all, the privacy of the area is important. As most (80%) of the users would arrive by car, parking facilities would have to be included.

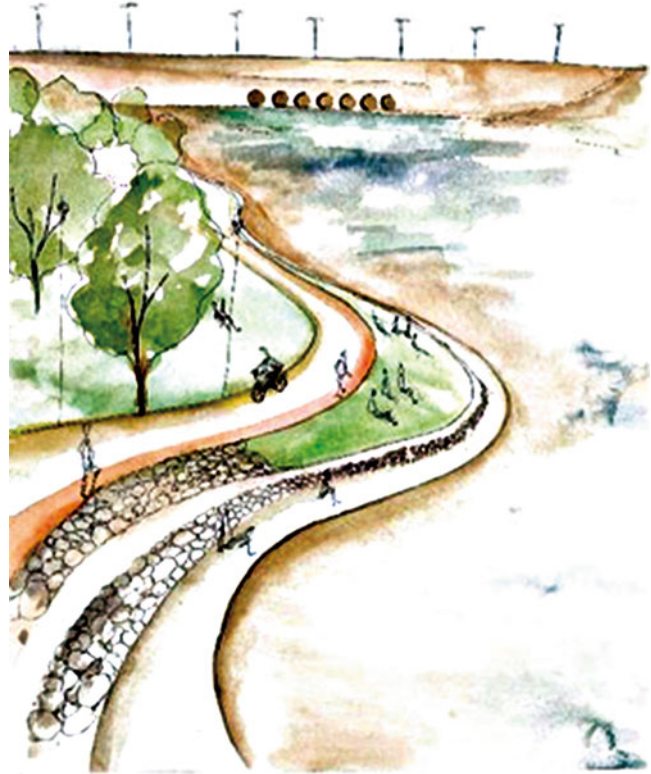
Due to the flood risk and accompanying possible destruction and costs, interventions would have to be adapted into the location in the wadi. The closer to the wadi bed, the less expensive the intervention should be because of the increasing risk of destruction. Therefore, the main park areas need to be placed on the slopes in protected areas that are not highly affected by the potential water flow. Design elements such as stairs and ramps demonstrate essential elements to ensure access, and would be adapted to the shapes of the slopes. To ensure a low-cost park design that can be applied in many areas in Oman, it is important to deal with small interventions. The wadi must

be kept as natural as possible. Therefore, the existing vegetation has to be included into the wadi design and augmented only by native plants.

Making use of the existing natural elements typical for wadis creates a diversified surrounding that is at the same time resistant to flash floods. A mix of soft and hard landscapes is necessary to provide the ability to slow down a flash flood but still let it pass. In general, the wadi stream should be left as natural as possible and not be affected by too many interventions.

The following design example for Wadi al Khuweir clearly displays the different level of interventions, from green picnic areas on the slopes to only levelled sports fields with temporary facilities at the bottom, to reduce the danger of destruction in case of a flood and to ensure the needed capacity for free water flow (Figs. 25.18 and 25.19).

Fig. 25.19 Design intervention on the wadi slopes (Source: Joint students project 2018)



25.9 Conclusion

The previous sections clearly display the flood risks and the devastating impacts of wadis. Obviously, flood protection measures are needed to reduce damages. They are currently mainly driven by technical aspects. These engineering interventions, however, do not contribute to the quality of life of the residents. Instead, they only reduce damages, as seen in the example of Saudi Arabia. However, the existing lack of green open spaces, the demand for parks by the growing populations, and last but not least the availability of currently not fully used treated wastewater open the door for a discussion on seeing wadis as a potential for greening the cities.

Azaiba Park in Muscat, which is highly appreciated by residents, offers a clear example of the potential of a wadi park. However, the park is an exceptional and expensive example, as

outlined before, and cannot be easily replicated. Therefore, the authors investigated, in a joint student survey and design project, options for tailor-made interventions on the relatively safe slopes of a wadi as well as for low inventions for temporary sports fields on the river bed of the wadi, where the flooding and destruction danger is higher. The design, although appreciated by local planning institutions, could not convince local authorities dealing with flood protection measures. Therefore, there is a need for further research on the greening impacts of interventions on the water flow and for a detailed planning and cost-benefit calculation of the interventions on the river bed and at the slopes with the risk of total loss after a flood. However, the potentials of green wadis as public parks are obvious, and the enhancement of the quality of life of the residents can justify more testing of selected parts of wadis in the Gulf region.

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The Crossroads on the Path to Sustainability While Aspiring for a Better Quality of Life: A Case of Delhi

Bibhu Kalyan Nayak and Pushkala Rajan

26.1 Why This Chapter?

As researchers of environmental planning and design, we often find it difficult to translate the idea of sustainability into real world situations. While oscillating between ideas, the aspiration for a better quality of life usually nudges the people to pull it up on their priority list. It has been a long pursuit for us as researchers, to even frame the right question, that can unfold the meandering labyrinth into the realm of sustainability in the real world, largely dominated by the aspiration for a better life. After exploring through all kinds of literatures, we decided to put it together in the form of this essay.

The idea of sustainability has been evolving over the last four decades through numerous academic critics, international agencies, policymakers, politicians and grassroots level implementing agencies. The narratives broadly try to define the term “sustainability” through socio-economic consumption behaviour of communities or societies. Hence the definition primarily revolves around the concept of efficiency and equity between and within generations. Yet the diverse contexts have made “sustainability” a

complex problem. In this globalized world defining sustainability doesn't essentially follow a standard process. The cultural diversity and economic hierarchy often make it a complex problem. As humans, we constantly strive to push the bar higher and higher. Every community wants better for their children. The want of one generation becomes of need for the next one. In other words, the definition remaining constant, the perception of sustainable development changes, with the aspirations of society for a better quality of life, especially in the developing economies. At a fundamental level, the developing societies like India have been rediscovering its definition of “need” in last three decades under the influence of transitions at various levels with multiple layers of social, political and economic ideologies, reinforced by technology. The size of the population and a democratic political system further complicate the situation. This essay is an effort to understand such complexities through the case of Delhi, the capital city of India. The prime objective of this work is to unveil the contextual realities rather than suggesting solutions.

26.2 Understanding “Sustainability” and “Quality of Life” (QoL) Through Existing Literatures

The idea of sustainability was defined by the Brundtland Report (World Commission on Environment and Development 1987), which offers a

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context for combining the “Quality of life” (QoL) aspect to development. However, the QoL does remain constant in any given circumstances. It keeps emerging with time, geographic locations, societies, cultural values and most importantly due to the changing economic factors. But at the elementary level the goal of sustainable development to fulfil the need of the presents generation can’t be achieved without considering their physical and social wellbeing, which predominantly a key aspect of “quality of life”. Hence integration of quality of life and sustainability is critical for the effective execution of the sustainable development goals. Researchers have been trying to establish a relationship between these two idea using different models.

The term “quality of life” first appeared in 1889 by Seth James (Seth 1889) on his article “The evolution of morality”, where he proposed to bring both “quantitative” and “qualitative” aspects of life together for promoting welfare within the society. But according to Farquhar (Farquhar 1995), the term gained popularity after the second world war. Due to the development of telecommunication technology, the concept of quality of life reached to the common mass. In addition to that it became a popular political propaganda for the states as well. Both capitalist and socialist establishments used it to their advantage by appropriating it into their political ideology. However, in both cases all developments in science and technologies were considered as a step towards a better quality of life. Allison Smith studied (Smith 2000) the work of Seth James. After a thorough investigation of related literatures, smith (Smith 2000) concluded that the term being used repetitively in several political speeches fuelled a global curiosity for research in the domain after 1950. Few countries like Denmark, Sweden, New Zealand and Canada made it one of their national agenda to promote “Quality of life”. As the environmental debate started taking pace in the United Nations general assembly, “Sustainability” gained more attention. More researches were funded to expand the existing knowledge about both these terms.

26.3 The Common Linkage

As we dig deeper, the literatures reveal a common connection between sustainability and quality of life (QoL). In both concepts the role of natural resource plays a vital role (Beck and Stave 2011). The consumption of resources improves the quality of life, whereas consumption of the same beyond a limit makes it unsustainable. The natural resources are often shared resources, and referred frequently as “common”. Moreover, the consumption pattern of similar kind of people may vary as the population increases. With a growing demand for any resource, the existing stock of the same may start shrinking in a relative sense, which certainly affects the quality of life of people. As argued by Hardin (1968) in his famous article “tragedy of common”, “a finite world can only support a finite population.” He cited the example of overgrazing in an open field, where every herder makes a rational economic decision to maximize his gain, while collectively over exploiting the common to the point of depletion. As the sequence, it continues further to yield negative commons or negative externalities and the problem gets more complex. Such problems can’t be resolved through technical solutions, as technology will only delay the impacts. In economic terms the demand of a limited resource can be managed to a point by optimizing the consumption through efficient technology. However, the problem will reoccur with time as the pressure of growing population generates more demand. Rather technological solutions often come with negative externalities (Hardin 1968), such as pollution, contamination or deterioration of some other natural resources. For example, moving from fossil fuel to storage cells (battery) simply shifts the negative externalities (pollutions) to a new geographic location. The problem of pollution will simply shift from urban centres to countryside or wherever the power plants are. In addition to that the risk of heavy metal contamination increases with extensive use of batteries in automobiles. At a larger scale the problem remains the same. In

this process, peoples' rational economic decision taken to serve their self-interest, have contributed to the deterioration of the environmental quality in a collective way. The automobile has certainly enhanced the comfort levels of the individual, subsequently enhancing his/her quality of life in an economic term. But the use of same automobile worsens the living environment of the city, that drops the overall quality of life in the city and defeats the larger goals of sustainability. In this case change in the mobility preferences of user/individuals can only resolve the problem permanently.

Extending the theory of shared commons further political scientist Elinor Ostrom (Ostrom et al. 2010) suggested adoptive governance models for common-pool resources. According to Ostrom, self-interest driven individuals often prefer to collaborate in order to make resource accessible to all, through complex social arrangements. Robert Axelrod (1984) contested the idea of Hardin by presenting collective restrains as an opportunity for self-interested people to collaborate for securing their mutual interest. On the contrary these behaviours were largely observed within closed communities with stronger social ties. Garrett Richards (2015) contends the above ideas in the context of global challenges like climate change. As Ostrom solution of collective management may fail in absence of mutual trust and cooperation. Carol M. Rose (1986), highlighted about common pool of resource that offers more benefits as more people use it. Like public parks and spaces become more effective as more people starts using it. Market places get more vibrant and economically more promising as more traders and buyers participate in it. Socialist geographer David Harvey (2011) and environmental activist Derrick Jensen (2007) described "tragedy of commons" as capitalist theory to deprive indigenous and developing economics from exploiting their natural resources for development. Though Hardin's arguments for privatization and enhancing government control over resources have drawn significant criticism, it is undeniably established that individual decisions driven by self-interest certainly pose a

grave concern for common-pool of resources in diversely unregulated environment. Such challenges get worse when it is spread across a larger region.

26.4 The Layers Within the Concept

The above discussion about the concept of "common pool resources" are critical to understand the parallel narratives from different social and political quarters representing distinct ideological standings. These narratives will manifest in different forms while interpreting the idea of "quality of life" in the urban context through the lens of sustainability.

As per El Din H. S. (El Din et al. 2013) the quality of life has seven important dimensions. These dimensions dissects through various layers of interpretation of the term especially in an urban context. First is environmental dimension that covers all natural aspects. The second one is physical dimension primarily covering the manmade infrastructures for human wellbeing. Mobility and social dimension follow the list at third and fourth positions, comprising of the transport and social infrastructure respectively. Economic and Political dimension are next in the list referring to the financial wellbeing and governance in respective order. The last one is the psychological dimension, denoting the average emotional wellbeing of a citizen. In this chapter the case will touch upon different dimension on various occasions.

Robert Marans (2014) has described the concept in the urban context through two related terms. He emphasized on the "Quality of Urban Life" (QoUL), in order to study "Quality of Life" (QoL) in urban context. Marans divided the indicators of QoL into three part; objective, subjective and behavioural. The indicators more relevant for urban managers and planners are selectively taken as the indicator for "Quality of urban life". Hence the parameters for all three types of indicators are different. So, while dealing with different dimensions of QoL, it is possible to encounter indicators from all three categories.

Literature suggests (Sinha 2019) sustainable development and Quality of life are complimentary processes. In most societies these terms are defined by cultural means. People perceive their environment differently in different cultures. Hence for an effective implementation of these concepts, a higher level of cultural awareness and dialogue within and between communities are necessary. As noted by Bilj (2011) building new roads can be a sign of development and growth. It may be a desired infrastructure for the cities in country. On the other hand, people in another country may consider it a waste of public money. It may be taken as an act of destruction natural environment. The community may opt for an alternative transport. The approach to sustainability and quality of life may vary with culture. The variation may even happen within the same culture with time.

With rising global population more people are living in the cities than the rural areas. The urban areas expand more rapidly due to inwards migration from the countryside (Girard et al. 2003). In the global south this situation is even more alarming due to lack of basic urban infrastructure for people to survive in the city. Despite poor urban infrastructure people keep pouring into the cities, primarily due to better economic prospects. In these cases, people put their economic wellbeing ahead of issues related to environmental conditions as most of them barely manage to earn their living through low paying jobs (Unger and Riley 2017). Today a third of urban population lives in unhealthy living conditions within small squatter settlements or slums. These numbers are higher in developing and poor countries. In this context the definition of sustainability and quality of life largely focuses on creating better urban infrastructure, that can fuel the economic growth by creating more job opportunities (Davis 2006). However, it further makes the urban centres more lucrative economic options for aspiring individuals from the rural areas. Thus the cycle keeps growing until a saturation point has reached. In this process of improving basic infrastructure and creating more economic growth the core principles of sustainability and wellbeing are undermined.

26.5 Expanding of the Context

Referring to the argument of Hardin from “tragedy of commons”, the rational economic choices made by individuals for their self-interest lead to the decline of common pooled resources. If cities are considered as a common pool of resource, the situation deteriorate the urban quality of life due to over exploitation and rise of negative commons such as pollution. But recalling the example of Carol M. Rose, cities will thrive when more people come to live in it. Considering these contradictions as part of the urban debate in the developing world, finding the finer balance is the possible key to sustainability without compromising the true spirit of quality of life. To explore the context further in this chapter, a case of Delhi NCR (national capital region) is taken.

26.6 Indian Cities in Twenty-First Century

In the twenty-first century, Indian cities are exploding with growth, both in size and economy. According to the census on 2011, nearly 30% of the population was living in the cities as compared to 25% two decades earlier (Census of India 2011). With a population of 1.3 billion, a growth of 5% corresponds to at least 50 million people who have moved to urban centers in 20 years. As per the recent figures released in 2018 by the World Bank (World Bank 2018), there is a rise of 4% in urban population since 2011 (which makes it 34% in 2018). To draw a comparison, 4% rise in urban population between 2011 and 2018, is close to the entire population of Spain (46 million) (UNFPA 2020), that moved into the Indian cities. Such a high level of influx of population brings serious infrastructure challenges, thereby offers the golden key to economic growth in urban India, as a larger population make mega infrastructure projects financially sustainable. A large population also reduces the cost of labour to a larger extent, which subsequently brings in more businesses into the city. This scaling up of businesses in cities directly

impacts the demand for more real estate and allied infrastructure, thereby building a case for continued investment in the urban centers and reinforcing urban and peri-urban correlations. It is estimated that by 2030, India's GDP will have multiplied by 5 times with over 590 million people living in cities, and 70% of new employment opportunities shall be created in cities (McKinsey Global Institute 2010). The constant demand to build more work places to accommodate the skilled labour that the country is generating, brings in the need for healthy and productive spaces. According to a survey conducted by JLL Corporate Solutions (2019), it has been established that, globally, 92% employees work full time if they are in MNCs/large organizations or corporations, and employees claim that 66% of the time they invest working is at their desks (JLL Corporate Solutions 2019). An estimate made by McKinsey has projected that by 2030, the built space is going to expand to four times the area of built space in 2009 (McKinsey Global Institute 2010). A jump from little less than a billion m² to 4 billion m² is going to be a quantum leap which brings in the concern of quality of these spaces and the environmental cost of building at such a scale. In absence of a strong government control over the built quality, the future of these buildings in India may raise serious concerns. As a large part of the construction sector in India is informal, the unregulated implementation of building standards and energy efficiency code are questionable. As a result, the possibility of highly mechanized but unhealthy buildings cannot be denied. Globally the term 'Sick-Building-Syndrome' (SBS) (Stolwijk 1991) has garnered the attention of building design experts and analysts due to the direct connection established between spaces and productivity, thereby creating an indirect link between the economy and built form. Moreover, in the process of construction at this scale may deteriorate the environmental quality, due to a weak environmental auditing system.

Hence the challenges can be broadly classified into two parts:

1. The indoor living condition of mechanically serviced built spaces, in absence of a stringent implementation of building code/standards.

2. The environmental cost of such scale of construction work, in absence of stringent environmental auditing system.

26.7 The State of Air Pollution Levels in Indian Cities

Since the beginning of the industrial era, dependence on fossil-fuel powered machinery has been increasing exponentially. With the race to establish superiority in the economic development, various countries across the world compromised health and environment for industrial development, that brings economic growth. The countries under the BRIICS congregation have been developing rapidly but environment-wise have been affected due to increasing population and subsequent rise in pollution levels (Table 26.1).

Research has shown that amongst the developing nations, India has the second highest PM_{2.5} concentrations, with only Bangladesh having higher PM_{2.5} concentrations globally (IQAir Visual 2019). The prime source of which is unregulated construction work and vehicular emission. These high levels of pollution are detrimental to the health and wellbeing of the people as air pollution related illnesses and deaths have been recorded to be very high in recent times. Development is a measure of standard of living that is influenced by health and living conditions of the people. Researchers have found (Dandona and Balakrishnan 2018) that this increase in pollutants in the ambient air has largely impacted Indoor Air Quality in Delhi thereby causing poor living and work environments. The report also (Dandona and Balakrishnan 2018) highlights that the life expectancy of the average Indian has reduced by 1.7 years due to high air pollution levels and it is estimated that 1 in 8 deaths in the year 2017 can be attributed to air pollution related causes.

26.8 Pollution in Delhi NCR

Over the past few decades, the capital region i.e. Delhi NCR has seen a surge in the pollution

Table 26.1 Exposure levels in BRIICS nations

Country (BRIICS)	Population in millions	Exposure to pollution
Brazil	206.9	More than 50% people breathe safe air ^a
Russia	143.1	Owing to the location, 80% of the population breathes moderately safe air (between 10 and 20 µg of PM 2.5 per m ³)
India	1307.7	4 in 10 people exposed to five times the safe limits of PM 2.5, with less than 5% of the people breathing safe air
Indonesia	253.9	Only 1/5th of the population breathes safe air
China	1379.3	90% of the people exposed to 3 times the safe limits of PM _{2.5}
South Africa	54.4	2/3rd population breathes unsafe air, upto 4 times the safe limits

Source: NASA Socioeconomic Data and Applications Center, UN, European Commission, Joint Research Center, courtesy FT

^aSafe air levels for PM_{2.5} are as established by World Health Organization (WHO)—10 µg of PM_{2.5} per m³

levels owing to crop burning, fuelwood for cooking, vehicular emissions, industrial emissions and peak surges around major festivals. Delhi NCR, one of the most populated regions in the world, also holds a not-so-coveted position on the pollution scale of being in the top 10 polluted cities in the world. The city is a typical urban conglomerate that has been the centre of development and migratory activity in northern India. Much like any other major city in India, Delhi's development is overseen by both the central as well as state governments. Portfolios like real estate and housing fall under the jurisdiction of the Centre while infrastructure falls under the state. Being the capital of one of the fastest growing countries in the world, Delhi gains the attention of all major investors and thus has become a major hub for social, economic and industrial developments. With the advent of the IT boom in the late 90s and the opening up of the auto market, major manufacturers set up their industries in the region and investors pooled in money to build a solid economy. The Delhi Human development report, 2013 analyses the impact development has had on people, even though social disparity is still evident, and how development has taken a toll on the health conditions of the people of the Delhi region. It is noted that even though the city has developed leaps and bounds, public health facilities haven't improved at the same pace and the local environment has degraded. It is more evident during the current pandemic situation.

In the year 2016, the Delhi government declared a 2-week period of odd-even restriction with vehicles of odd and even number plates plying on alternate days. This was an initiative taken to reduce the pollution levels in the peak winter. Trends during winter in the NCR region highlight severe levels of PM₁₀ and PM_{2.5} due to various reasons—household firewood burning, vehicle-fumes, severe smog and mostly, crop burning in the peripheral regions of the city. Vehicular emissions have multiple impacts on the pollution levels in the region and the intervention proposed by the Delhi state government to curb pollution seemed ineffective (Chowdhury et al. 2017). Earlier in the decade between 1990 and 2000, the CPCB (Central Pollution Control Board) of India decided to enforce changes in fuel quality, which was supported by various interventions like phasing out of old commercial vehicles, desulphurization of diesel, change of old 2 and 3 wheelers, conversion of public transport to CNG etc. It was observed even then the PM₁₀ levels in the region did not fall majorly (Chelani and Devotta 2005). There has been a steady rise in pollution levels globally with hazardous levels being touched in Delhi during certain times of the year. Even with various interventions at policy levels, practices like crop burning, which are rooted to the region and its culture, have a major impact on the pollution levels. Historically the region had seen a lot of smog and dense pollution and with the steady rise in vehicle numbers and industrial emissions, the city witnessed a rise in the need for air quality monitoring and filtration.

26.9 Role of Building Indoor Conditions

In a study of non-residential buildings in Delhi, it has been established that the levels of pollutants, specifically CO₂ and PM_{2.5} were significantly higher inside compared to ASHRAE standards, attributed to poor air circulation combined with ductless air conditioning (Datta et al. 2017). This was the trend with majority of the commercial establishments in India wherein IAQ was not considered as a parameter to gauge productivity and health. A study (Wyon 2004) suggests, indoor environment quality can have negative repercussions like headaches and reduced concentration which led to 6–9% reduction in productivity in office workers.

In a summary of a study by Satish and Fisk (Kumar and Fisk 2002) and Milton et al. of 3720 hourly employees, cost for providing extra 25 cfm per person outdoor air ventilation is estimated as \$3.22/cfm per person per year. This estimated cost has been created after thorough analysis of employee sick leave records working in around 40 buildings under Polaroid Corporation, Massachusetts. By investing in enhanced ventilation in these offices, overall number of sick leaves availed by employees reduces and potential savings of approximately \$400 per employee annually can be obtained (Milton et al. 2000). In a growing economy like India, wherein the GDP is governed by the highly skilled taskforce, investing in enhanced circulation in offices could enable much higher savings in the overall GDP of the country. Another study conducted across seven cities in USA (MacNaughton et al. 2015) established that by doubling the minimum ventilation rates specified by ASHRAE, employee productivity was enhanced by 8%, which stand at approximately \$6500 per employee annually (MacNaughton et al. 2015). In the same study, they studied the efficiency of both Variable Air Volume systems and Fan Coil Unit systems, with and without and ERV. The study further established that over and above the operational costs of extra ventilation, energy costs

were considerably lower in comparison to the profits seen due to the increased productivity, with the inclusion of energy recovery systems, verified best practices and sustainable building design.

Commercial buildings in India allocate around 25–30% of their capex cost and around 10% of the operational and maintenance costs on HVAC equipment installation and commissioning. With the turn of the century, sales of air conditioners have seen a steady rise due to the perceived discomfort caused by rising temperatures in the north and increasing humidity in the south and west. In the decade from 2000 to 2010, the HVAC market had extensive sales and research in air-conditioning and circulation, especially with the introduction of green buildings as a design concept, which supported the case for international standards in workplace design in India. Commercial developments adopted various methods like MERV 8–13 filters to clean air before cooling, VRV/VRF systems for better energy efficiency, water based systems to incorporate humidity in very dry regions etc. to enable comfortable work places. The hindsight of this technological advancement was the deterioration of Indoor Air quality over longer periods of time owing to lack of fresh air addition to the recirculated air. Moreover, with the need to maximize space utilization, companies created tighter workplaces, increasing the density of the office floor, thereby reducing the volume of air available for circulation. With the creation of tighter spaces, pollutants start to accumulate in these offices, creating a perpetual polluted indoor environment. Furthermore, considering the office environment involves the use of various machines and systems like computers, printers, fax/copier machines etc., ambient air inside offices can potentially hold a lot of pollutants in the form of VOCs, carbonyl compounds, aromatic compounds etc. In a study of functional offices in real-time conducted in European workplaces, it has been established that the indoor-outdoor pollutant ratios ranged between 0.34–0.88 for PM_{2.5} and 0.46–1.7 for PM₁₀ (Cacho et al. 2013). This

Table 26.2 Pollution levels for PM_{2.5}—Permissible and Measured (2018)

Pollutant	Measured pollution levels in Delhi NCR (2018)	Permissible concentrations in ambient air—as per NAAQS
PM 2.5	^a Delhi—113.5 µg/m ³ Gurgaon—135.8 µg/m ³ Noida—123.6 µg/m ³	Annual—40 µg/m ³

Source: Data obtained from 2018 World Air Quality Report by IQ Air Visual, which aggregated data from various governmental agencies and NGOs working in the air quality sector in different countries

^aData obtained from 2018 World Air Quality Report by IQ Air Visual, which aggregated data from various governmental agencies and NGOs working in the air quality sector in different countries

study shows that indoor air is certainly not very clean as perceived. Central Pollution Control Board of (CPCB) India adopted NAAQS—National Ambient Air Quality Standards as per the Air (Prevention and Control of Pollution) Act of 1981 and established permissible concentrations for pollutants in the ambient air. In the year 2018, it was observed that mean annual average PM_{2.5} content was almost 3 times the permissible levels for the city of Delhi and Noida, and Gurgaon saw almost 3.5 times the permissible levels (Table 26.2).

If ranges similar to those in European offices were to be considered for the Delhi NCR region, indoor pollutant levels can be estimated to be very high, over 40 µg/m³ around the year in the city of Delhi alone, which is considerably higher than the permissible 10 µg/m³ in indoor areas. Buildings in India are not constructed air tight, and most buildings have considerable infiltration from external surroundings. With very severe AQI (Air Quality Index) prevalent in the region and poor indoor conditions, employees in offices are being subjected to stale and polluted air which results in various lung conditions like asthma, chronic headaches, dizziness and in more severe cases, bronchitis, tuberculosis and even lung cancer. Enhanced ventilation and mixing of outdoor air treated as fresh air does not guarantee healthy indoor environments, as the ambient air outside is heavily polluted due to various reasons. Delhi NCR has seen increased rates of pulmonary and cardiac diseases in the past few years, especially in the past decade. In a report by GBD MAPS Working group, exposure to ambient particulate matter (PM_{2.5}) has been highlighted as the third biggest risk factor for death in India in the year 2015, causing approximately 1.09 million deaths

(10.6% of all deaths) in that year (GBD MAPS Working Group 2018). In the report by (Dandona and Balakrishnan 2018), it has been highlighted that the states of Uttar Pradesh, Bihar and Haryana along with the extended territory of Delhi have the highest population weighted PM_{2.5} exposures (more than 100 µg/m³) (Chowdhury et al. 2017). This goes on to prove the prevalent problem of very high particulate matter content in the ambient air throughout the year.

26.10 The Crossroad

In a bid to counter this prevalent ambient air pollution, Indian builders have started creating tighter buildings with green strategies, to promote healthier indoor environments. The importance of healthy workplaces has been included in the government's mandates especially in its bid to reach the goals established during the Paris summit. The Sustainable Development Goals (UNDESA 2015) adopted in the year 2015 are the guidelines that the various environmental regulatory bodies follow to ensure India attains the goals established. The Indian government has introduced various schemes to reduce the emissions, increase economic stability and overall improvement in quality of life and standard of living. India currently boasts of having the third highest green building footprint in the world, behind only USA and Canada. Architects and developers are working together in constructing state of the art facilities and are investing in green building strategies like high performing systems, façade optimization, high efficiency machinery, project management systems etc. In the hindsight,

with the increase in specialized equipment being incorporated in the building core, three major parameters of building design and functionality have been impacted—cost of construction, maintenance, and energy demand. Commercial establishments have turned to renewable sources of energy to meet the increased demands, though they are unable to offset excessive demands in majority of the projects completely.

The construction industry in India forms a major part of the country's GDP, with construction and infrastructure being the major drivers of development. As per the report generated by CBRE-India in 2018, the cost of construction for a “grade A” office building is Rs. 2750/sq. ft. (approx. \$40/sq. ft.) in the city of Delhi which is second only to Mumbai in India that stands at Rs. 3125/sq. ft. (approx. \$44/sq. ft.) (CBRE Research 2018). The IT boom that came between 1990 to 2010, there was a definite surge in the sales of air conditioners, which estimated that annual sales globally for air conditioners increased by 4 times until 2016, with over 135 million units being sold globally and approximately four million units being sold in India alone. This rampant increase in air-conditioning led to a direct increase in the energy consumption, thereby impacting the GHG emission levels. In a report by International Energy Agency (IEA), energy consumption in India for air conditioning went up from 6 TWh in 1990 to 91 TWh in 2016, which is a considerable rise in the assessment period (International Energy Agency 2018). This can be majorly attributed to the changes in design of a workplace and need for a regulated ambient environment. With the increase in indoor pollutant levels, as discussed earlier, local or point-source treatment methods for air were devised and personal air purifiers were introduced to clean indoor air in smaller enclosures. According to a sample study (Frost & Sullivan 2019), the air purifier market in India was estimated to grow to \$220 million by the year 2024 from the current market standing of \$89 million in 2018. This is the dichotomy of the sustainability sector where additional costs for a purifier reduce economic viability of the project while the investment in the purifier shall clean the work spaces that will boost productivity,

thereby improving the profit margins of the commercial establishments. Further, the purpose of the air purifier as a device is to ensure lower pollutant levels within a conditioned space, to create a healthy indoor environment while it uses electricity to function which in turn causes carbon emissions, by burning fossil fuel to generate the required electricity.

26.11 Future Forward

With the growing demand for efficient work spaces and increasing concentration of economic and administrative activities in the city centres, the high real estate (residential) prices around the Central Business District (CBD) is making housing unaffordable. It ultimately expands the urban sprawl. This ever growing urban sprawl has increased the average travel time of daily commuters exponentially. In winters, the air quality drops to the “very unhealthy” level and remains such for weeks, which can be an effect of natural as well as man-made causes. Businesses run as usual, and despite media reports and push from civil societies, very less has changed in last two decades, and outdoor air quality has become a larger concern requiring multi-level interventions both from government and private sectors. However, until any active macro level changes are made, several micro level changes and additions will continue with people trying to control their indoor environment mechanically, in the same way air-conditioning units have been used to achieve a better thermal comfort level in the last decade. It is a possibility that future buildings may consume lesser energy per unit area but will require complex building services to support an efficient and healthy indoor environment, with a higher energy demand. In case of India, this may defeat the fundamental principles of sustainability.

Assessing the situation through the lens of Hardin's Tragedy of Commons (Hardin 1968), the self-interest driven growth has reached to a critical breaking point in case of Delhi. While extending the idea further, as the prospects of economic gain keep increasing, the place becomes more lucrative for aspiring migrants making the

city very attractive for anyone willing to earn. With more migration, the demand for more infrastructure comes in, which makes it a rational and viable investment option for the local governments and civic bodies to boost construction. The cycle moves on despite a huge environmental cost and the people make arrangements to improve their quality of life at an individual level by including temporary fixes like air purifiers and filters in their homes and workplaces, without considering the most sustainable options. Due to strong corporate lobby of automobile industries, that employs nearly ten million (both direct and indirect) people in India (Statista Research Department 2019), stringent emission legislation are facing multiple road blocks. Despite the instructions of the Supreme Court of India (Economic Times 2019), very little is achieved in terms of the outdoor air quality in Delhi region. Scholars have criticized “tragedy of commons” for projecting a grim future due to rational economic decision taken by self-interested individuals. Yet in case of Delhi such a future has become a reality for all its inhabitants. There is still no sign of cooperation or collaborations, on the contrary sales figures of diesel cars have been going up and construction is booming in NCR, while the larger novel idea of sustainability is choked within some pile of government documents. In other words, the goals of sustainable development (UNDESA 2015) will only be achieved when all dimensions of Quality of Life (El Din et al. 2013) will work complementing each other, and in a synchronous manner.

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Urban Linkages: A Methodological Framework for Improving Resilience in Peripheral Areas: The Case of Arequipa, Peru

27

Carlos Zeballos-Velarde

27.1 Introduction

The world is moving towards a trend of global urbanization, and particularly Latin America, where currently more than 80% of its population lives in cities (Libertun de Duren 2017). The growth of many Latin American cities is often due to migration or speculation processes, which produces the informal occupation of unplanned sectors of the cities, sometimes over areas not suitable for urban growth, or vulnerable to disaster events. In the following years, it is possible that these areas will be affected by the effects of climate change, by means of floods and landslides, which will lead to heavy human and economic losses in these communities (Muller 2007). The occurrence of these disaster events could have devastating effects on populations that are frequently characterized by extremely vulnerable conditions (Giovane di Girasole and Cannatella 2017).

In the case of Arequipa, as in many other Latin American cities, several of these settlements have been built on top or next to floodable ravines, which produce physical-spatial, social and cultural fractures between these communities. Paradoxically, these streams are important ecosystems that could well become spaces of social

encounters that promote the improvement of neighborhoods (Zeballos Velarde 2020).

Since it is frequently difficult to carry out efficient urban planning in vulnerable areas on the periphery of Latin American cities, due to economic, social and sometimes political reasons, this article proposes the development of an integrated model for improving resilience in peri-urban areas based on the of participation of three types of stakeholders population, academic planners and political authorities. To this end, the problem is approached from four aspects: space, environmental, socioeconomic and institutional physics.

Following this introduction, this chapter will review the literature concerning risk reduction and resilience construction. Then it will explain the methodology used to address the problem from an integral perspective. Using Arequipa as a case of study it will offer a discussion on alternative ways to carry out urban planning in these areas, involving the participation of several stakeholders.

This study is part of the research Project entitled: “COSTURAS URBANAS, Red de Centralidades Barriales en la Periferia de Arequipa como alternativa Socio Ambiental al Cambio Climático en Poblaciones Vulnerables” (URBAN LINKAGES, Network of Neighborhood Centralities in the Periphery of Arequipa as an Environmental Socio Alternative to Climate Change in Vulnerable Populations), funded by the Universidad Nacional de San Agustín.

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27.2 Resilience Building in Communities

27.2.1 Urban Fragmentation

During the last decades, informal urban development has played an important role in the growth of Latin American cities, as a form of access to urban land by lower-income households, and which has legal, spatial and social-economic implications (Inostroza and Tábbita 2016). Over time, peri-urban nodes have been generated in these areas, lacking good accessibility, which has led to the accentuation of exclusion processes while not breaking the dependence of the central nodes (Kanai and Schindler 2018).

Some areas of a city are separated by space and time, and constitute the physical support of different classes and social groups that interact with each other, through relationships that reflect their distance and social inequality (Veiga 2009).

The degree of fragmentation or integration of an urban setting has to do with the interaction of four aspects: place, territory, scale, and network (Córdoba Calquin et al. 2017). The spatial fragmentation in cities has had diverse readings by the academic literature. Thus, some authors emphasize the development of ghettos due to racial issues or economic residential segregation (Veiga 2009). Others emphasize the difficulty of accessing different sectors of the city due to the physical separateness, the lack of accessibility or limited mobility available between the sectors (Córdoba Calquin et al. 2017; Kanai and Schindler 2018). Lack of accessibility is not only related to public transportation but also to pedestrian, particularly vulnerable groups such as children, the elderly and people with limited mobility (Ortega et al. 2015). Other authors underline the role that planning has played in the spatial and social fragmentation of cities by favoring hard zoning practices (Marinescu and Avram 2012).

Little has been discussed, however, about the role of the territory itself as a dividing element of communities. Approaches on ecology have debated habitat fragmentation as the degree of

permissiveness offered by the landscape for the displacement of organisms, energy flows and dispersive movements of habitats, addressing especially the effect that the intrusion of urban land uses has had on the connectivity of various ecosystems (Ortega et al. 2015). Conversely, this chapter analyzes the inverse effect, which is the presence of elements in the landscape that fracture urban space and that, eventually, could become integrating elements of the communities currently separated (Zeballos 2018).

These landscape features, cliffs, ravines, and streams, are often associated with disaster risk. The impossibility of accessing a mortgage or any modality of adequate housing in the formal market leads many low-income families to build their dwellings on vulnerable areas, prone to disaster risk.

27.2.2 Vulnerability Versus Resilience

The concept of vulnerability is essential for disaster risk management. As risk is the product of the exogenous hazards with the endogenous vulnerability, and on the other hand, the range of action to control natural hazards is very limited, then efforts tend to focus on vulnerability identification and mitigation to reduce disaster risks (Giovane di Girasole and Cannatella 2017). Likewise, the Peruvian regulatory framework understands vulnerability as composed of three elements: exposure, fragility, and resilience (MINAM 2015).

However, the vulnerability has been seen from different, mostly quantitative, approaches, which allow measuring the impact of events and hazards and the relative fragility and susceptibility of settlements or structures to them. Thus, Timmerman defined vulnerability in 1981 as “the degree to which a system, or part of a system, can react negatively to the occurrence of a dangerous event.” (Usamah et al. 2014, p. 179). Similarly, Peruvian legislation, in the Law No. 29664, defines vulnerability as “the susceptibility of a population, physical structure or socioeconomic activity, to suffer damage due to the action of a

hazard or threat” (PCM 2011, Art. 2.20, p. 3). This approach is useful for quantifying the potential or actual damage to infrastructure caused by disaster events (Jenkins et al. 2014).

However, other authors tend to reject those definitions of vulnerability that focus exclusively on the ability of a system to cope with a risk or loss. For Bohle, Downing, and Watts, vulnerability is a multidimensional social space composed of multiple layers, defined by the political, economic and institutional capacities of people in specific places and times to deal with risks (1994). Blaikie and others define vulnerability as “the characteristics of a person or group and their situation that influence their ability to anticipate, cope, resist and recover from the impact of a natural hazard (an extreme natural event or process)” (Blaikie et al. 2005, p. 11). The MOVE framework also emphasizes a multidimensional approach to vulnerability, emphasizing its social character (Birkmann et al. 2013).

Resilience, on the other hand, has been seen as a way to emphasize mitigation measures before the disaster in order to improve the performance of the structures, to reduce the losses caused by a catastrophe. The United Nations defines resilience as “ability of a system, community or society exposed to hazards to resist, absorb, accommodate to and recover from the effects of a hazard in a timely and efficient manner, including through the preservation and restoration of its essential basic structures and functions.” (UN-HABITAT 2010, p. 12). Resilience also reflects a concern to improve the ability of physical and human systems to respond and recover from extreme events (Tierney and Bruneau 2007). Peruvian legislation, in the aforementioned Law 29,664 refers to resilience as “the level of assimilation or resilience of human beings and their livelihoods in the face of the occurrence of a disaster.” (PCM 2011, Art. 2.18, p. 3). This legal definition illustrates the antagonistic position that exists in much of the literature between these two concepts: the greater the resilience, the lower the vulnerability (Folke et al. 2002; Gallopín 2006; Klein et al. 2003).

However, some other authors establish a coexistence relationship between resilience and

vulnerability (Manyena 2006). In a study on settlements or barangays in risk areas in the Philippines, Usamah and others (2014) conducted a qualitative analysis that revealed the strength of social relations, as a means to help reduce the vulnerability of these communities. Likewise, the social domains of the community rely on strong perceptions about their level of resistance to the impacts of disasters, through a built-in resilience as a result of the perception of disasters assumed as part of life, establishing strong social ties, given the permissiveness of the government on the validity of informal settlements in vulnerable areas (Usamah and Haynes 2012).

This perspective is of great importance, as several authors agree on the need to direct greater attention and resources to promote participation and risk management at the community level from a bottom-up approach (Van Manen 2014; Wamsler 2004; Dibben and Chester 1999).

27.2.3 Identity Building

One of the most effective ways to increase resilience in vulnerable peri-urban areas is to build identity between the populations and the places they inhabit so that these places become a part of their collective identity.

Carlos Yory has called this process the Social Construction of Habitat and he defines it as the integration of socio-environmental processes and procedures that lead to the symbolic and functional adaptation between a human group and its environment through cultural practices, development of imaginaries and values that come from a particular idea of the world (Yory 2009). This definition conveys two intimately related aspects: the social production of the built space and the way of inhabiting it. To inhabit a territory socially is to establish a symbolic link with it.

Others has seen the Social Production of Habitat as the generation of new situations, physical or relational, through the construction, transformation or elimination of physical objects—buildings, infrastructure, cities, networks—and/or relational objects—service systems, laws, codes and rules for the benefit of a specific user,

or of a social sector (Pelli 2010). In a more practical way, the social production of habitats aims to offer better living conditions and accessibility for low-income families, contributing, to a greater extent, to the development of families and communities, compared to the alternatives offered by the market (Agudelo Rodríguez et al. 2013).

27.3 The Site

Arequipa, is the second largest city in Peru, and is located in the middle of an arid desert, furrowed by the fertile valley of the Chili River and flanked from north to east by a volcanic chain: Chachani (6440 m), Picchu Picchu (5635 m), extinct volcanoes, and Misti (5822 m) that presents sporadic fumarolic activity. Its altitude ranges between 2300 and 3000 m (Zeballos Velarde 2020) (Fig. 27.1).

Arequipa sits irregularly along 18,000 ha and with an estimated population of one million inhabitants, with a very low net density of 101 hab/ha, which decreases as the urban fabric moves away from its historic center (IMPLA 2016). In recent decades, it has experienced chaotic and unplanned growth particularly but not

exclusively carried out by immigrants or people of low socioeconomic status, and sometimes favored by political processes.

Many poor settlements are located on the outskirts of the city, particularly in high-risk disaster areas. The most common disasters in Arequipa are floods, earthquakes, and landslides, and although a volcanic eruption has not been recorded in the past 500 years, this type of hazard is always present. As a consequence, human and material losses are frequent due to disasters, particularly among the most vulnerable populations.

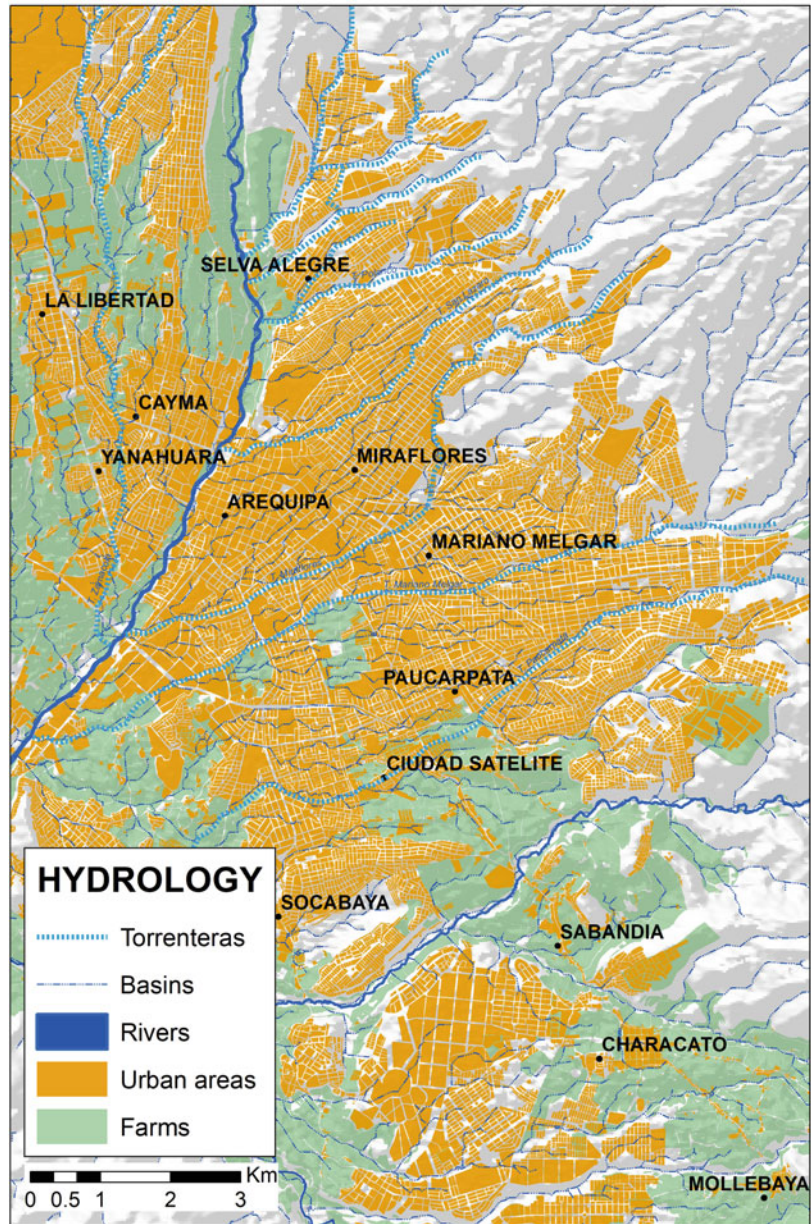
On the other hand, large urban areas are located on the slopes of the Misti volcano, whose rugged topography does not facilitate the development and integration of these settlements. These settlements are divided by the ravines or seasonal streams locally called *torrenteras* (because while they are dry most of the year, they carry torrents of mud and water during the rainy season) that run from the volcanoes to the Chili River (Fig. 27.2). These areas have often been neglected by the authorities and the planners, becoming abandoned, negative interfaces (Pesci 1999).

As for the urban layout, many of the main roads are parallel to the direction of these ravines and oriented towards the city center, which makes



Fig. 27.1 Location of Arequipa in Peru and South America (Source: ESRI)

Fig. 27.2 Arequipa’s territory is crisscrossed by seasonal ravines or torrenteras (Source: C. Zeballos)



a connection and accessibility difficult, increasing segregation between these neighborhoods.

For this research, intermediate peri-urban areas located in the slopes of the Misti volcano have been considered, specifically in the Alto Selva Alegre (ASA), Miraflores (MIR) and Mariano Melgar (MM) districts, whose characteristics are similar to others in Arequipa and many other cities in Latin America.

27.4 Methods

This research aims to establish mechanisms of Social Construction of Habitat that has been developed (or could be developed) by populations that live in fragmented and segregated areas in Arequipa, settled in hazardous areas, suffering from lack of institutional support,

in order to improve their living conditions and enhance integration between these areas.

The methodology is mixed, both quantitative and qualitative, and focuses on four main aspects of the problem:

27.4.1 Physical-Spatial

Field visits and subsequent GIS techniques were used to identify the main centralities in the neighborhoods. For this purpose, a land-use map was used and weighted according to the influence of each centrality, either neighborhood, district or multi-district level. Subsequently, a point density map was created to identify hot spots or concentration patterns.

In addition, an analysis was made in Space Syntax using Depth Map in order to identify the topological integration of the road network.

27.4.2 Ecological Systems

For the analysis of ecosystems, Landsat 8 satellite images were processed in ENVI, which allows the analysis of the different bands that make up a multispectral image. In the case of the Normalized Difference Vegetation Index, the FLAASH method was used, carrying out a map algebra correction, a radiometric correction, and an atmospheric correction. Finally, spectral indexes were used to generate the NDVI image.

The main ecosystem units in the area were mapped, using first large-scale remote sensing using Landsat imagery to carry out NDVI analysis to identify groups of wild vegetation. Subsequently, a finer ecosystem map was with the participation of experts.

A survey was also carried out using UAVs or drones to model flood areas and slopes in ArcGIS and thus identify risk areas on a detailed micro-scale.

27.4.3 Socioeconomic

One of the most difficult problems for socio-economic analysis in Arequipa is the lack of

access to demographic information. The National Institute of Statistics and Informatics INEI has carried out detailed population censuses in 1993, 2007 and 2017, however, only data by district-level are available, which is a very large scale for this type of research. It has been very difficult to acquire the official population data per block from the 2008 census since the most recent census is still being processed.

A population map was built from the database provided by INEI and a density map was created using GIS. Social-economic status maps per block were used to establish the social vulnerability of the population. These data were corroborated by field survey carried out by students of the Faculty of Architecture and Urbanism of the UNSA.

27.4.4 Institutional

Workshops were held with the population, technicians, and authorities of the three districts in order to identify common problems, particularly related to the *torreteras*, but also on aspects related to identity building on these areas.

Finally, a conceptual map for the integration of peri-urban areas was proposed, aiming to integrate the communities while preserving and enhancing the *torreteras* as spaces of great ecological and social value.

27.4.5 Social Construction of Habitat

In order to understand the identity of the communities with their territories, several workshops were held. This chapter will discuss a workshop that took place at the “Nicolas Pinto Talavera” School, in a slum called Villa Ecológica, in Alto Selva Alegre district. 32 people participated in the workshop, including high school students, parents, school authorities and teachers.

For the workshop, four working groups were formed, and each one discussed problems a particular topic of interest: (a) disaster risks (b) important places in the community (c) A vision for the desired neighbourhood

(d) perception of the community regarding the municipal authorities. Each group developed conceptual maps, which were presented and discussed in a panel, where the conclusions of the activity were established.

Subsequently, a cabinet work was done, where all the information was processed by tabulating it in tables and georeferencing the concept maps (Zeballos Velarde et al. 2019).

27.5 Understanding Fragmentation in Peri-urban Arequipa

27.5.1 Ecological Systems Integration

The varied conditions of climate, altitude, topography, geomorphology, and soils of Arequipa give rise to the formation of different types of

ecosystems, characterized by the presence of natural desert fauna and flora as well as man-made agricultural and urban areas. The city sits on these ecosystems and interacts with them. During the rainy season in summer (January, February and March), several particular plant communities represented in green color can be observed (Fig. 27.3), occupying most of the area of the western slope near the volcanoes of the city and along the ravines or torrenteras.

Through the Chachani volcano sector, at an altitude higher to 3100 m, arid mesotropical communities with cacti can be found: *Corryocactus brevistylus*, as well as semi-arid supratropical communities with *Oreocereus leucotrichus* and *Corryocactus brevistylus*. The thicket of the semi-arid upper mesotropical floor that sits on the pleistocene mud flows of the Misti and Pichu Pichu and, occurs, in general, in the

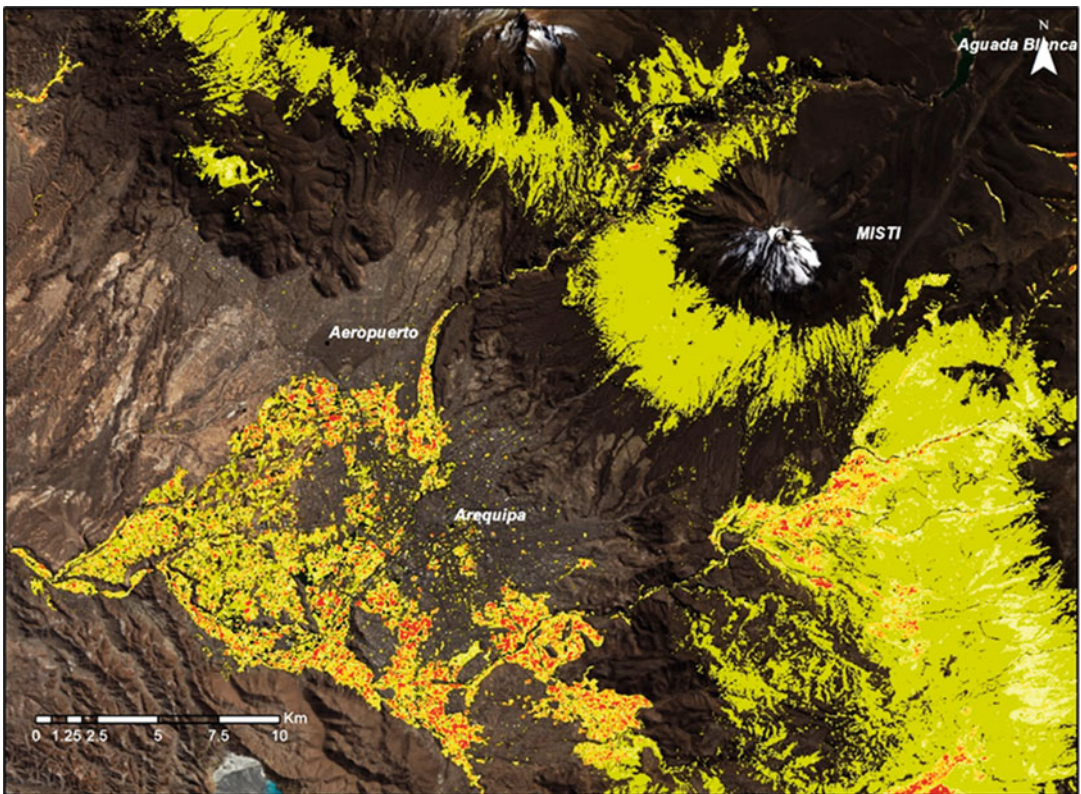


Fig. 27.3 Analysis of the Normalized Difference Vegetation Index (NDVI), using Landsat 8 multispectral photography, taken in summer (03/30/18) (Source: USGS/NASA. Map: C. Zeballos)

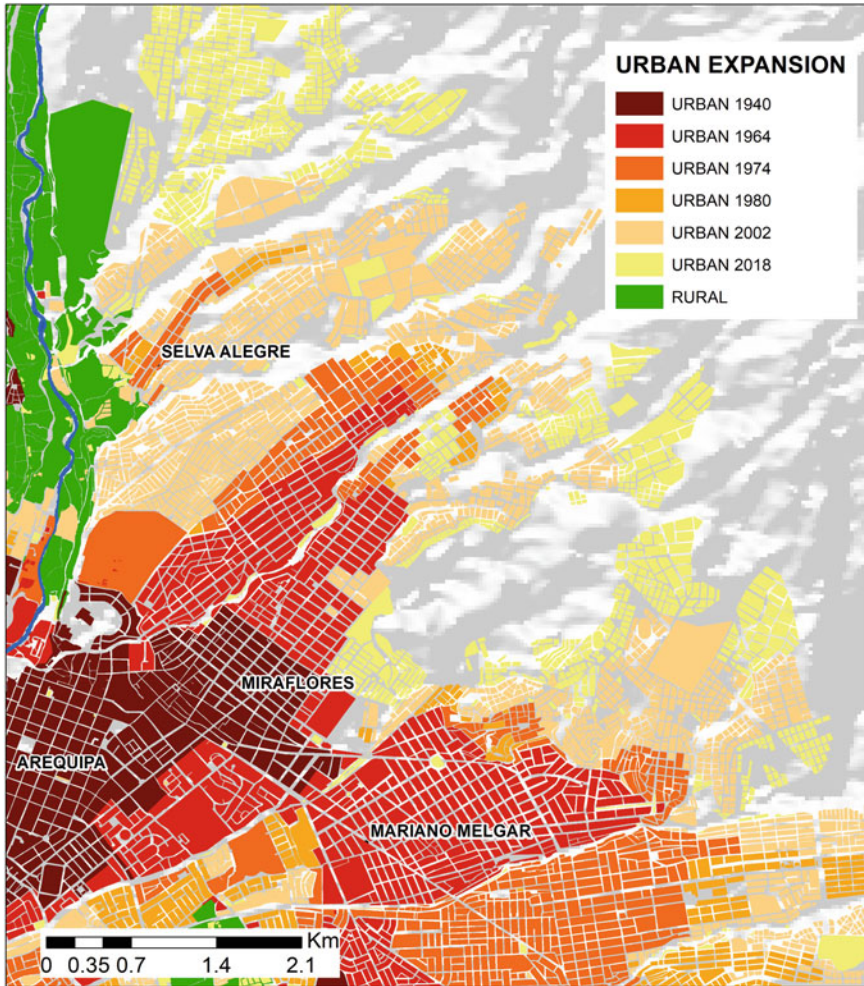


Fig. 27.4 Urban sprawl towards the Misti volcano, based on aerial and satellite photographs (Source: C. Zeballos)

entire western volcanic arch of the department of Arequipa (Arenazas Rodríguez 2020).

27.5.2 Physical-Spatial Fragmentation

The map in Fig. 27.4 summarizes the process of urban evolution in the last 80 years and is based on aerial photographs. Arequipa expanded 17 times between 1940 and 2018. While the middle and upper classes tended to urbanize agricultural areas, low-income populations tended to be located on the slopes of the Misti volcano, increasingly in higher altitudes and arranged in parallel to the streams. The district of Alto Selva

Alegre appeared while Miraflores and Mariano Melgar continue to populate. These districts maintain a radio-centric urban structure, further reinforced by the geomorphology of the territory.

Although it is true that initially, informal invasions accommodated impoverished populations or homeless migrants, today they are carried out by speculation (that is, each invader has several lots), in some cases with the support of some authorities. This is one of the main ecological problems of the city since this unlimited growth will be unsustainable and impossible to satisfy in terms of infrastructure, basic services, facilities, and green areas. It is also evident that, as the first occupations have

been consolidating, subsequent urbanizations have been growing towards the streams, in increasingly riskier areas.

From a topological perspective, that is, based on the relationships of a site, a road network is defined by the links that represent the road segments and the nodes that represent their intersections (Wang et al. 2012). In the same way, Hillier analyzed how the spatial form of cities is shaped by spatial laws that link the appearance of characteristically urban patterns with cognitive, social and economic factors; and on the other hand, how the emerging patterns of spatial movement configure land-use patterns, which lead to the generic form of the city as a network of linked centers at all scales (Hillier 2007). A criticism for this method is that is only based in topology, not including factors of impedance such as topography or slope.

An integration analysis is a method to predict the behavior of a road network. Therefore, the axial analysis of local integration of Arequipa represents the spatial functioning of the city and the topological relations of these streets with the surrounding ones. The fragmented and poorly integrated nature of the metropolitan network is notable, particularly towards the periphery. The most integrated roads, represented in red appear near and towards the city center. Conversely, there is scarce transversal integration, represented in blue, and it is notorious how the integration becomes weaker as it approaches the *torreteras* (Fig. 27.5).

On the other hand, it is important to contrast this information with the grouping or agglutination of centralities. Many of these nuclei of urban attraction coincide with the axial integration map, which in Arequipa favors the connection to the city center, but is weak or non-existent in the transverse direction, due to the presence of the streams or *torreteras* (Fig. 27.6).

27.5.3 Social-Economic Distribution

The population on the outskirts of Arequipa follows the logic of the historical occupation of the territory. The oldest areas are the most populated, that is, those close to the city center

and to the connecting roads that run through the areas flanked by the streams (Fig. 27.7a). Also, the oldest areas have developed some sense of identity with the place, though collective work and social organization, or by means of festivities or sports.

The density is usually low although in recent years some real estate companies have tended to create high-density buildings in peri-urban areas very close to risk areas. These data, however, do not appear in the official information for 2008.

Gray areas did not exist in 2008 and therefore there is no official demographic information on them, but they have now been occupied. The a priori observation after the field visit shows that the pattern is maintained, that is to say, that the occupied areas keep consolidating and new areas are added in hazardous places in higher altitudes.

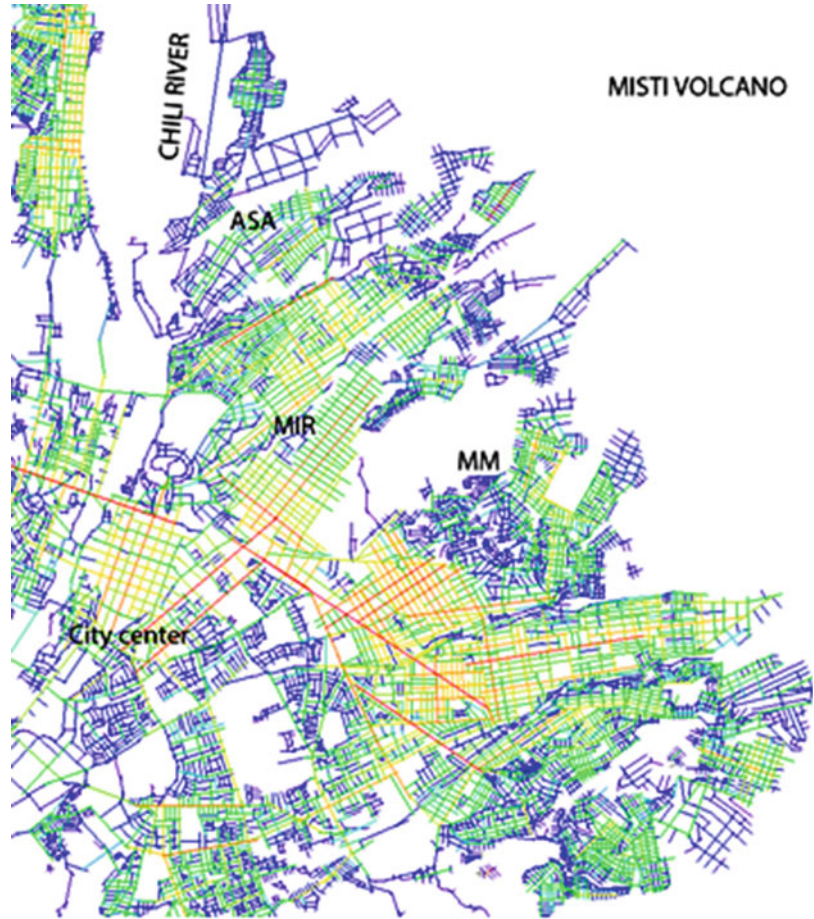
27.5.4 Areas at Risk

In 2016, the Metropolitan Planning Institute—IMPLA conducted an assessment of risk areas for carrying out Arequipa's Metropolitan Master Plan (PDM) (IMPLA 2016). These risk scenarios included seismic, volcanic, flood and landslide hazards and although they maintain a truthful logic at the macro-level they lack specificity at the micro-level. Using the official risk maps you can calculate the population that was at risk in 2008. The one that occupied areas of mitigable risk was composed of 5655 inhabitants and those that occupied areas of non-mitigable risk and therefore had to be relocated were 17,907 settlers. Many of these populations are located along the streams or streams (Fig. 27.8a).

The 2018 population data per block are not yet available, but it can be verified how the city has grown expansively over these areas of both mitigable and non-mitigable risk, which can become a potential disastrous factor for a considerable amount of population as they are typically very vulnerable and can lose his material possessions and even his life (Fig. 27.8b).

More concrete slope analysis was developed for this study assuming that the areas with high slope are the ones with the highest risk of landslide. For a general overview, a DEM with a

Fig. 27.5 Integration map of the in the Alto Selva Alegre (ASA), Miraflores (MIR) and Mariano Melgar (MM) districts and their relation to the city center (Source: C. Zeballos)



resolution of 30 m was used based on a Landsat image, that is, the same one that was used to develop the risk map for the Metropolitan Master Plan (Fig. 27.9a).

However, to achieve more precise modeling, drone surveys were carried out on the *torreteras* with a resolution of 50 cm to clarify more clearly what are the vulnerable areas due to landslides and flooding (Fig. 27.9b). As a result, some areas that in a larger resolution were considered risk free, in a finer scale they turn out to be hazardous.

27.5.5 Social Construction of Habitat

The workshop held at the “Villa Ecológica” school presented the following results:

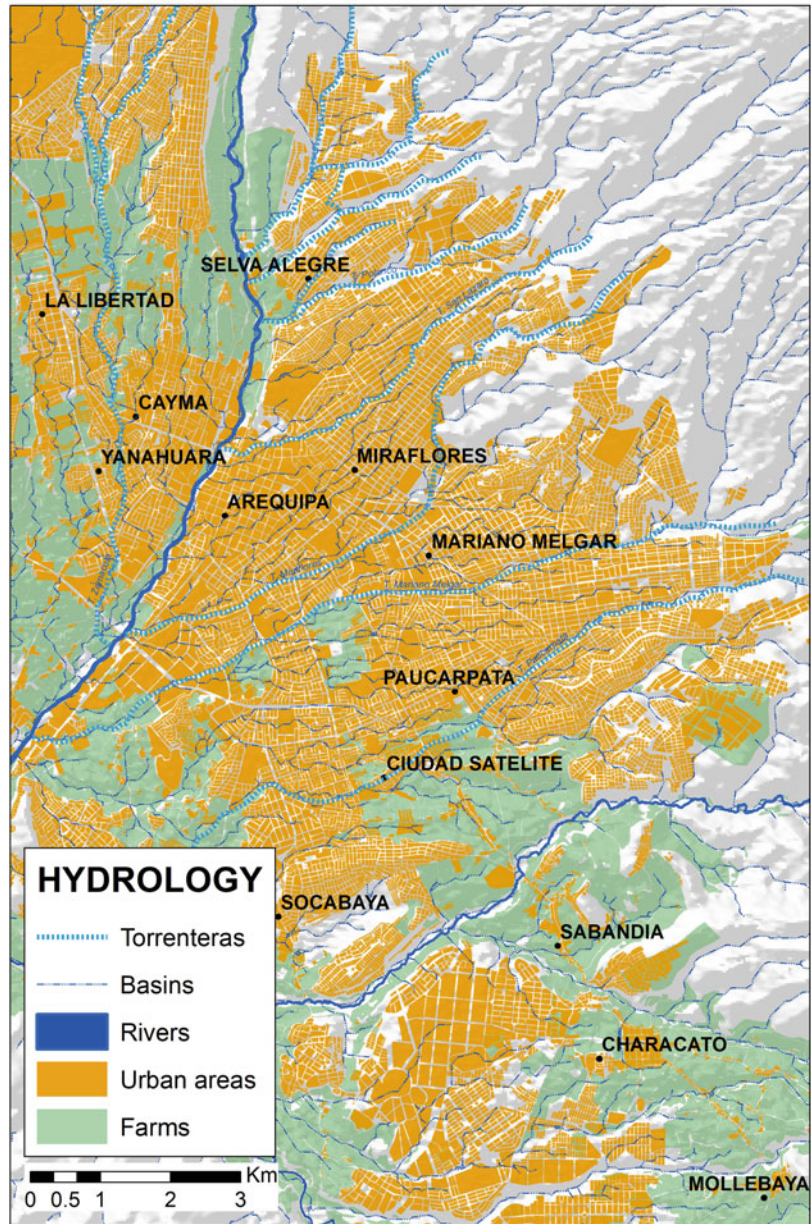
27.5.5.1 Disaster Risk

The four working groups that were formed identified the following as the main disaster risks in their communities: avalanches (30%), floods (21%), earthquakes (20%) and environmental pollution (19%). In contrast, landslides (10%) were considered low hazards.

The aforementioned allows affirming that the population has a clear perception of the possible risks in their settlement, as they have acquired over the time they live in that place. Nevertheless, they prefer to remain in the community as they have developed a strong relationship of emotional appropriation with their settlement.

However, there is no adequate risk culture despite the fact that some public and/or private institutions have supported afforestation actions

Fig. 27.6 Concentration of centralities (Source: C. Zeballos)



on the slopes nearby the community, to prevent probable landslides that threaten the physical safety and life of the inhabitants.

27.5.5.2 Important Places in the Neighborhood

The community has recognized three groups of important places (facilities) and public spaces:

- The church (18%), the nursery (18%) and the school’s bus stop (18%), which together constitute 54% of the answers.
- The bullring (12%) and the community bus stop (12%), adding together 24%.
- The rest of the spaces: the Beethoven Bridge (6%), the sports field (6%), the emergency center (6%) and the community hall (6%), which together make 24%.

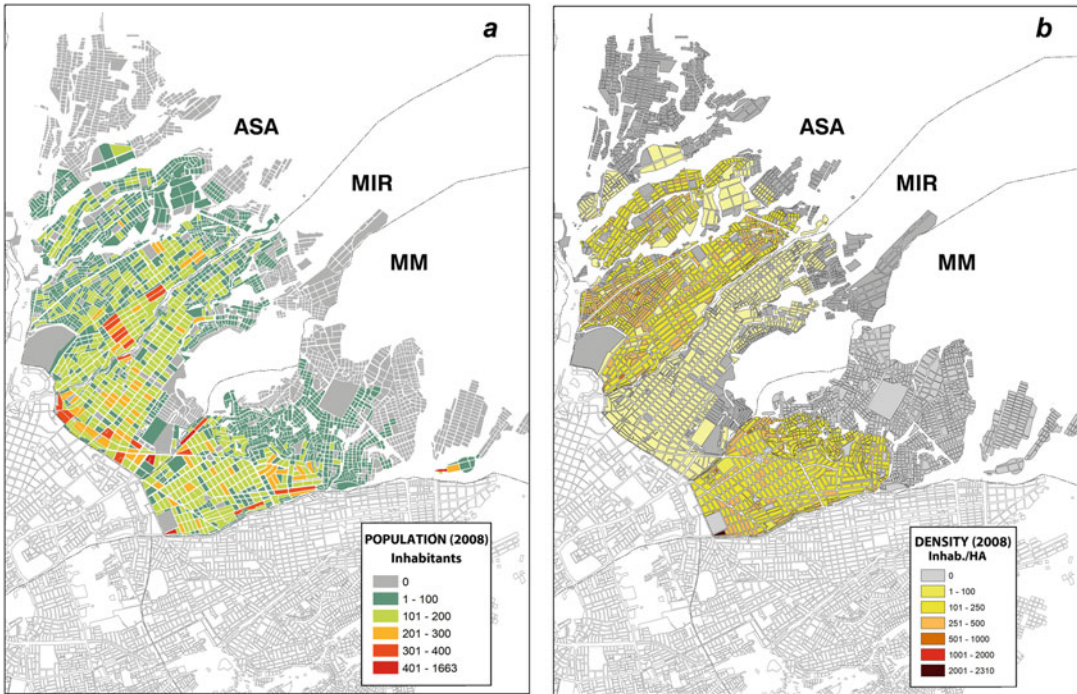


Fig. 27.7 Demography by block based on information by INEI. (a) Population (b) Density (Source: C. Zeballos)

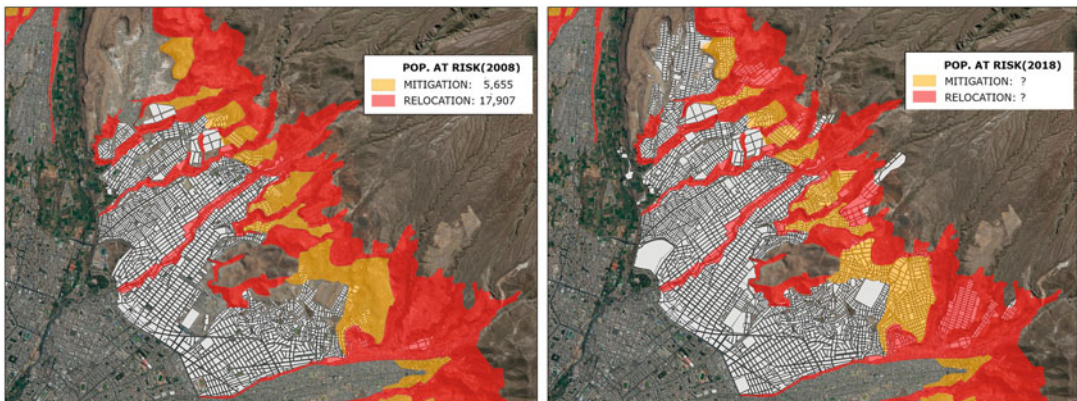


Fig. 27.8 Urban sprawl occupying risky areas. (a) 2008 (b) 2018 (Source: C. Zeballos based on IMPLA 2016)

Since the Villa Ecológica settlement is only 20 years old, its facilities and open spaces are scarce and precarious, evidencing a slow consolidation process. Despite its very poor urban image, these open spaces and facilities have a high utilitarian and symbolic meaning for the community, as these places allow them to build and structure a sense of identity, collective memory and

neighbourhood belonging, in addition to their own traditions and customs (Fig. 27.10a).

27.5.5.3 Wished Neighbourhood

The neighborhood desired by the population of Villa Ecológica, is based on three large hierarchical groups of activities (facilities and open spaces):

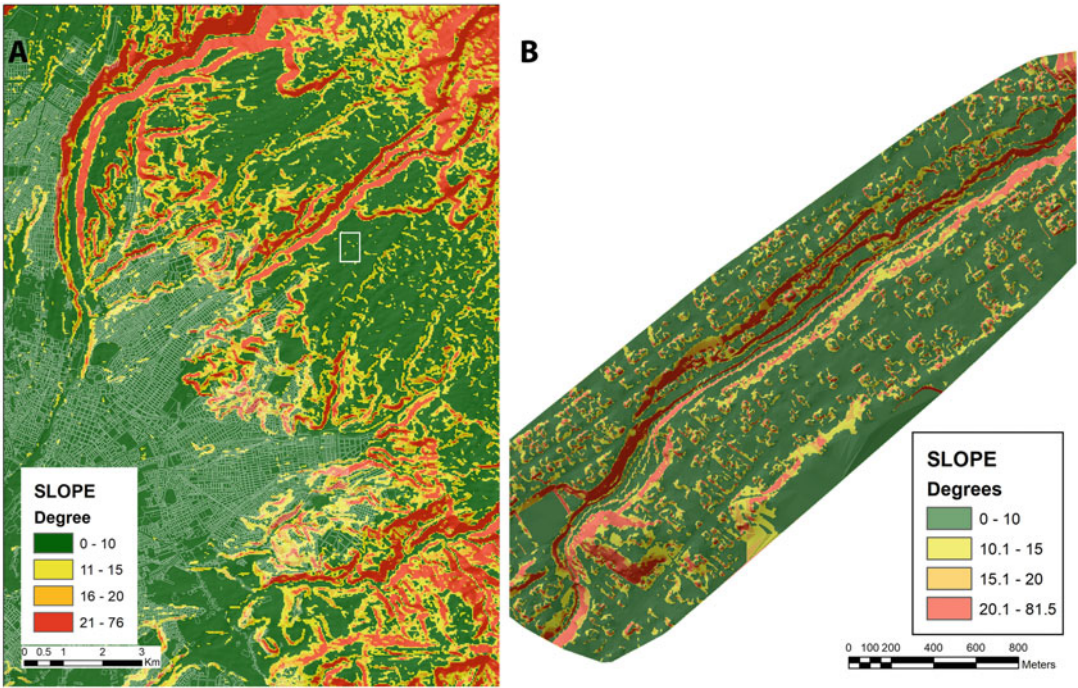


Fig. 27.9 Slope analysis. (a) 30 m Landsat DEM (b) 0.5 m UAV survey DEM (Source: C. Zeballos)

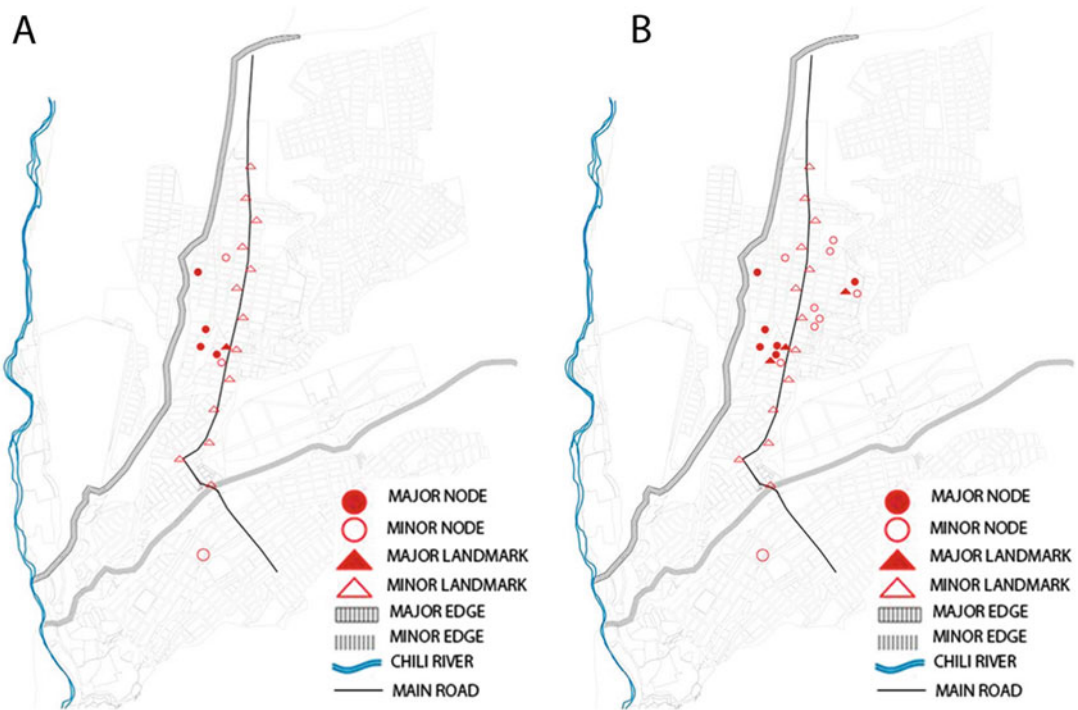


Fig. 27.10 Important places as perceived by the community in Villa Ecológica settlement. (a) Current (b) Wished (Source: E. Chui)

- Major group: including a police station, a medical center, a market, a pool and neighborhood parks, which together constitute 38.76% of the total activities desired by the population.
- Intermediate group: made up of a library, a sports field, a public transport terminal, paved roads and a series of open spaces such as ecological parks, reforested *torreteras* and the main square, which together sum up 30.45% of the total required spaces.
- Minor group: Formed by a diversity of urban activities: a communal dining room, a stadium, a high school, a home of the elderly, a cemetery, a post office, office of the nation's bank, fire station, environmental research center, recycling center, farms, garbage containers and basic infrastructure services (water, sewage, electrical energy), which together constitute 30.80% of the total proposed activities.

Obviously, all these activities would create a new urban image that, over time, will contribute to strengthen their collective memory by giving them a strong sense of identity and belonging with their settlement (Fig. 27.10b).

27.5.5.4 Institutions and the Community

The perception of the population of Villa Ecológica, about the performance of the local government of the Alto Selva Alegre municipality is negative since 50% mentioned that they do nothing or that they do not visit the neighborhood to help improve the living conditions of that settlement.

This situation, among other aspects, causes the population to develop new mechanisms to procure a better habitat through communal tasks or seeking support from other public and/or private institutions. Under this modality, they have managed to forest the slopes next to their neighborhood to avoid landslides that threaten their life and safety, which is by all means insufficient.

For these reasons among others, the population of Villa Ecológica and in general the inhabitants of the peri-urban areas of the city of Arequipa do not identify themselves with their

local governments, hence the institutionality is low in the city and in the rest of the country.

27.6 Results Summary

The results of the diagnosis indicate two clear opposite tendencies which, although they are characteristic of the study area, are common in other parts of the city.

27.6.1 Socio-Spatial Fragmentation

The city has grown without planning, spontaneously, occupying a rugged territory divided by the ravines. The urban layout of the streets on both sides of the ravines developed independently, and therefore it is difficult to integrate them physically. The neighborhoods lack facilities, so they depend heavily on the city center for their daily subsistence.

In the same way, the population has been agglutinating as the settlements have evolved historically. The social fragmentation was directly influenced by the physical-spatial one. Migrants who belonged to the same place of origin have been segregated by physical barriers when settling in Arequipa. In spite of this, relations between neighborhoods still remain and they are evidenced through spontaneous communal roads that cross the *torreteras*, linking the neighborhoods.

Also, the streams are generally district boundaries and consequently, none of the authorities tend to deal with them as both margins are considered no man's land. The problem is aggravated by the effects of floods during the rainy season, resulting in both material and human losses in the most vulnerable areas. This situation results in the abandonment, pollution and social deterioration of the *torreteras*.

27.6.2 Landscape Integration

The streams are unitary ecosystems with great potential to develop as green areas since they are

composed of fertile, volcanic soils. This is evident during the rainy season when these streams are naturally filled with greenery and are highly appreciated by nearby the communities.

The mental landscape that the inhabitants have been developing for the construction of their habitat also needs to be considered. As shown in the workshops, the hostile conditions of their settlements have led them to develop incipient ways of creating an identity with the place they inhabit, enhancing social and cultural ties in their communities.

27.7 Urban Linkages

The development of the periphery of our cities requires a systemic and multiscale approach capable of identifying the interfaces or key areas that could facilitate the execution of successful interventions. Exploring new ways for urban planning and upgrading, particularly in unplanned areas of high levels of vulnerability, is of the highest priority and relevance.

How can a vulnerability factor become an agent of resilience? We must start with a paradigm shift about the way we understand the city center and its periphery. The periphery should stop being seen as a mere collection of fragments to which conventional planning has responded with inefficient patches. Instead, integrative urban planning should be promoted that aims to link neighborhoods with ecosystems, so as to form environmentally, economically and socially strengthened communities.

Recognizing the water tributaries present in urban contexts as positive interfaces and ecological corridors, instead of spatial, garbage dividers, or sources of risk opens up the possibility of urban integration and articulation to these frequently marginalized areas.

The upgrading of the ravines as ecological corridors and social spaces will allow the city, both the center and the periphery, to be integrated through urban linkages (Fig. 27.11). These spaces would become interdistrict centralities that in turn connect to neighborhood spaces and facilities, which would influence the particular role of these linear parks. These areas could easily

become spaces for social and cultural exchange and, due to the activities associated with them, also offer economic improvement to the surrounding areas.

Unlike the construction of retaining walls which separate and alienate the interface of ravines from the surrounding neighborhoods, in addition to accelerating the hydraulic flow, the landscape design of the ravines through soft engineering techniques such as “soft edges” is an efficient way to control flooding risks, protecting infrastructures and at the same time recharging aquifers and providing a social use of the space during the dry season (Gehl 2006). Providing greenery to these very dry areas will also improve their ecological systems and microclimate conditions.

The longitudinal connection of these corridors would be possible due to the development of cycle paths and promenades and their transversal connection could be achieved through pedestrian bridges, in order to promote the inclusion, development and social integration of communities.

From the institutional point of view, it is necessary to involve the various relevant stakeholders as well as the participation of the population itself, in such a way that they become actors and authors of this urban renovation, through multisectorial committees that allow the development, maintenance, and protection of these spaces. In addition, it is necessary to define legal regulations that allow these social construction practices of the popular habitat to be incorporated into official planning.

Finally, the design of planning instruments aimed at the construction of consensus and the assertive and strategic determination of centralities and facilities in peri-urban areas also opens the possibility to urban integration beyond the usual separation between the formal and the informal city.

27.8 Conclusions

The recognition and identification of different types of urban and social fragmentation, their connotations of vulnerability and their possibilities of resilience in the periphery of the city of Arequipa have been carried out through a

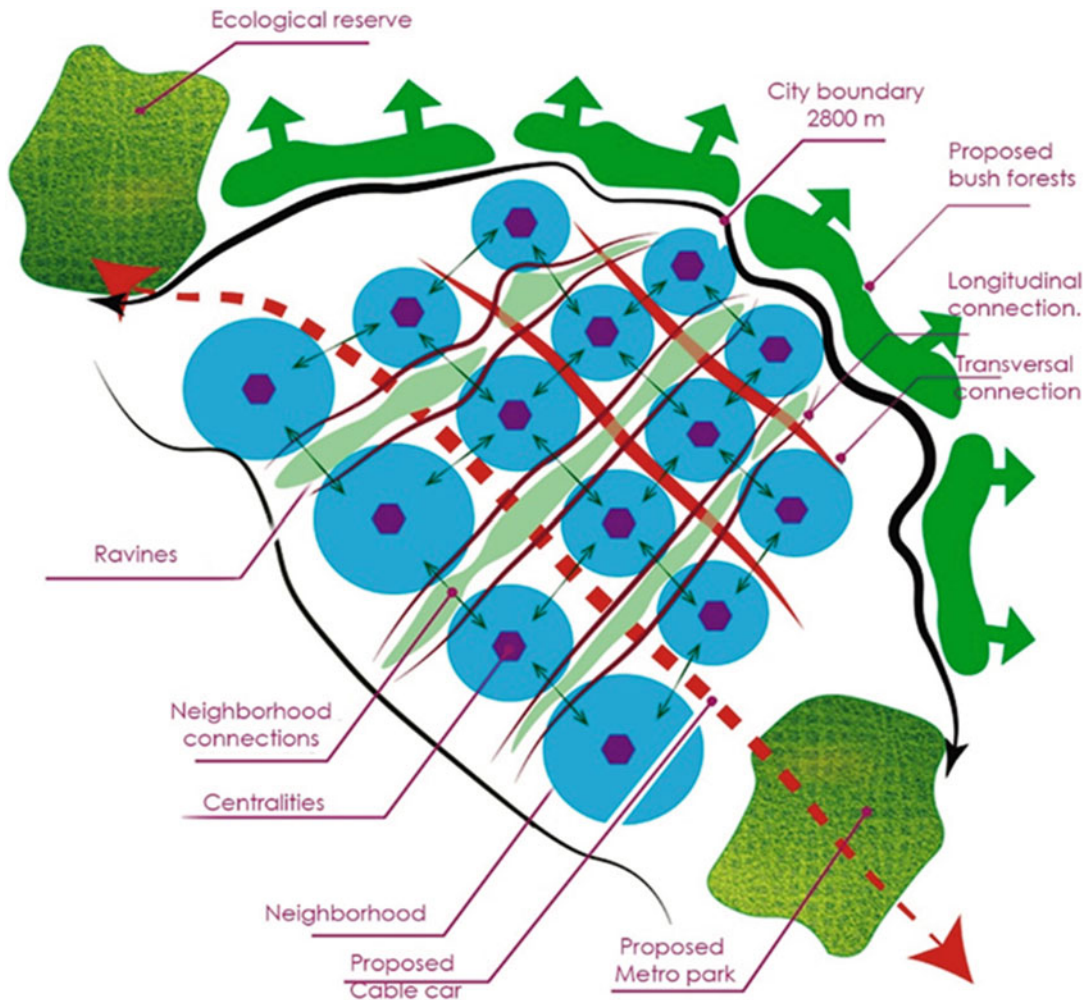


Fig. 27.11 Conceptual model of the urban linkages, proposing the ravines as major ecologic corridors to integrate the center and the periphery as well as the connection of

neighbourhoods and their own centralities (Source: Costuras Urbanas Project team)

combination of quantitative and qualitative techniques, involving both computational work in GIS and Space Syntax as well as participatory workshops held with the communities. Participatory workshops allowed not only knowing the location, magnitude, and recurrence of problems, such as social insecurity, risks of flooding or landslides, lack of connectivity, etc. but also more abstract aspects such as the vision of the future and the social construction of the habitat by a community.

In the light of the results obtained in three districts on the outskirts of Arequipa, it is possible to determine that the role of the streams or

torreteras in the urban context can be a determining factor to transform them from vulnerable areas to resilient spaces, being part of a new conception of a city that involves these places within the planning and urban renovation of neighborhoods and districts.

In the light of the results, it is clear that the inhabitants of Villa Ecológica and other peri-urban areas of the city of Arequipa, do not identify themselves with their local governments. Moreover, the formal urban planning developed by the public institutions of the country does not consider those practices and mechanisms

developed by the population of peripheral popular urban sectors (self-management, self-construction, strategic alliances, communal tasks, etc.); to face the adverse situations in which they live.

Therefore, it is necessary to define legal mechanisms that allow these social construction practices of the popular habitat to be incorporated into official planning.

The methodology used in this low-budget academic research can be replicated in other neighboring districts, and eventually at the metropolitan level. For this, adjustments at the logistic level must be taken into account to guarantee the participation of the population, the collection of large amounts of data and the handling of the information on a larger scale. The project is expected to serve as a functional prototype of participatory management for the peri-urban areas of the city of Arequipa, and in other cities of similar conditions.

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Correction to: Handbook of Quality of Life and Sustainability

Javier Martinez, Claudia Andrea Mikkelsen, and Rhonda Phillips

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The original version of the book was inadvertently published without incorporating the author's proof corrections mentioned below. The chapter has now been corrected and approved by the author.

- In Figure 13.3, the part figure (c) has been moved from page 269 to 271.
- In Table 20.2, the data in the rows labelled "Employment" and "Income" has been removed. The data used in this table has been adjusted accordingly.

The updated online versions of the chapters can be found at

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