

Research for Development

Agostino Petrillo
Paola Bellaviti *Editors*

Sustainable Urban Development and Globalization

New strategies for new challenges—
with a focus on the Global South

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Preface

This publication concerns the multidisciplinary set of studies, researches and projects developed in recent years within the Laboratory for International Cooperation of the Department of Architecture and Urban Studies (DAStU) of Politecnico di Milano and particularly in relation with the Post-graduated Programme “Coopera(c)tion: Knowledge and skills for sustainable cities in the Global South”, promoted by the Laboratory from the academic year 2013–2014.

The Programme was organised in collaboration with many local, national and international institutions: POLISOCIAL of Politecnico di Milano, UNESCO Chair in Energy for Sustainable Development (Politecnico di Milano), UNESCO Chair in Architectural Preservation and Planning in Heritage Cities (Politecnico di Milano, Mantua Campus), UNESCO Chair in Urban and Regional Planning for Sustainable Local Development (University of Ferrara), Architecture Sans Frontières Italy, Engineers Without Borders Milan.

The Programme was designed to promote a culture of international cooperation among students, scholars and professionals of spatial planning, architecture, urban design and land management, in order to raise awareness about the need of a global urban knowledge and to nurture a tendency to find common solutions to deal with the challenges posed by the major environmental, social and cultural changes brought about by globalisation in cities and territories.

In the deeply re-articulated scenario of changing relations between the Global North and the Global South, the old paradigm of international cooperation intended as aid by the North to the South of the world has declined and cooperation is today meant as exchange and sharing of knowledge and practices, in order to proceed towards a more inclusive and sustainable model of development drawn on jointly addressed issues concerning urbanisation and the built environment. Actually the worldwide, massive and rapid urban growth and the related growing social demand for quality and equity assigns specifically to architecture, urban planning and territorial governance the responsibility of bringing out this new paradigm of international cooperation, for the sharing of “knowledge and skills that make cities and urban settlements inclusive, secure, resilient and sustainable”, one of the key goals of the Agenda for sustainable Development 2030.

The Programme Coopera(c)tion implemented such a philosophy through a multidisciplinary project drawn on the current lines of study, field researches and experimental projects on the Global South produced internationally. A wide range of topics was investigated, including: new forms of socio-spatial inequality; spatial conflicts; informal urbanisation; informal economies; strategies for slum up-grading; inclusive urban management; building techniques for informal contexts; projects for the protection and enhancement of cultural heritage in the territories in transition; strategies and technologies of access to primary resources (soil-water-energy-food); territorial risks assessment, mitigation and management; new technologies for development and social innovation; capacity building; empowerment and local governance.

The publication offers a wide overview of studies, researches and projects related to these topics and fields of intervention, presented by a large number of teachers of the programme—equipped with different disciplinary backgrounds: they are architects, urban planners, urban sociologists, engineers, etc.—and organised following the thematic modules of the same programme, where the different competences and approaches interact on the same issues.

The volume also contains the results of a multidisciplinary Workshop organised “on the field” (Johannesburg 2015) to give the opportunity to the students of the programme and other international students and young professionals to experiment the theoretical approach and the research methodologies on urban development inspired by the principles of socio-ecological sustainability and collaborative governance.

Finally, a selection of the final project works and reports developed by students of the Programme Coopera(c)tion is presented in the Extra materials online platform attached to the volume.

The interest and the quality of this publication depend to a large extent on the commitment of this large group of teachers, researchers, professionals and students who have all contributed to the implementation of the three editions of the Post-Graduate Coopera(c)tion Program and the production of such a large and articulated complex of studies and projects.

As curators of the book, we want to thank them first and foremost.

We would also express our special thanks to the Director of the Department of Architecture and Urban Studies, Prof. Gabriele Pasqui, and the Delegate of the Rector for Cooperation and Development of the Politecnico di Milano, Prof. Emanuela Colombo, for the great support given to the project and the activities of the Laboratory of International Cooperation and of the Post-graduate Program Coopera(c)tion.

Our thanks go also to other colleagues of DASTU who have collaborated with us in the Scientific Committee of the Laboratory and that of the Post-graduate Programme, contributing to their direction and development: Eleonora Bersani, Gian Luca Brunetti, Antonella Contin, Giuliana Costa, Anna Delera, Remo Dorigati, Maria Cristina Giambruno, Camillo Magni, Marcello Magoni, Maria Chiara Pastore, Antonio Tosi and Francesco Chiodelli (GSSI-Gran Sasso Science

Institute). Special thanks to Rachele Radaelli for her fundamental support to structuring, organisation and management of the Programme.

Other thanks go to all the academic, institutional, and NGO partners, national and international, who have collaborated on the research experiences, projects and seminars developed by the Laboratory of International Cooperation and presented in the Post-graduate Programme Coopera(c)tion, many of which are mentioned in the essays included in this volume.

Here we can only remember the international experts with whom we developed the Workshop in Johannesburg, which allowed us to realise an international scientific cooperation experience of great interest and high profile, widely documented in the volume: the teachers and researchers at the University of the Witwaterstrand (Philippe Harrison, Marie Huchzermayer, Noeleen Murray, Garret Gantner, Alex Wafer, Costanza La Mantia, Kristen Kornienko), Roberto Rocco (Technical University Delft), Antje Stockman (Stuttgart University), Chris Harnish (Philadelphia University), Mohamed Salheen (Ain Shams University), Montgomery Narsoo (Governance Consultant to the South African National Department of Human Settlement), Diane Arvanitakis (South African National Department of Housing), Jhono Bennet (University of Johannesburg; 1to1—Agency of Engagement) and Blanca Calvo (CORK/South African Shak Dwellers International Alliance; 1to1—Agency of Engagement).

Finally, we would like to thank Daniele Fabrizio Bignami of Fondazione Politecnico di Milano for supporting us in submitting the volume in the “Research for Development” series of Springer International Publishing.

Milano, Italy

Agostino Petrillo
Paola Bellaviti

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Sharing Knowledge for Change. Universities and New Cultures of Cooperation: Transnational Research and Higher Education for Sustainable Global Urban Development

Agostino Petrillo and Paola Bellaviti¹

Abstract This essay introduces the volume presenting the main arguments and experiences that have contributed to its creation and foundation. Firstly, we will trace the new interest and new potential that the University offers regarding the great challenges placed by the radical environmental, social and cultural changes induced by globalisation, in particular in the territories and cities of the *Global South*, overcome by extremely fast and imposing urbanisation processes that have dramatically drawn out new problems of spatial and social inequality, such as the new environmental challenge linked to climate change. In particular, we will analyse in depth the new scenario of international cooperation as a possible space in which the University may act to support more equal and sustainable development processes, in both the South and the North of the world, which looks to share the most up-to-date knowledge and skills in emerging problems. A second section analyses the “new urban question” implied by the processes of globalisation, a set of problems that would give architecture, urban planning and territorial governance the responsibility for spreading a more inclusive and sustainable development model through international scientific cooperation. Interpreting, surveying and focussing on new approaches of intervention for the contemporary global urban condition and in particular for the most extreme manifestations thereof, no longer treatable with paradigm and tools used in western cities during the last century, therefore represent the true challenge of the new millennium in urban design and planning. The last section is dedicated to presenting the paths of research, project and training for sustainable cities and territories; aspects that have been shared within the activities conducted in the Department of Architecture and Urban Studies

¹ The article is the result of the work and the discussion between the two authors, but the individual parts were written as follows: paragraphs 1, 2 and 4 by Paola Bellaviti, paragraph 3 by Agostino Petrillo.

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of the Politecnico di Milano (DASStU) in recent years and which give shape and substance to the entire volume. It is a vast and polyphonic complex of studies, research and projects regarding various themes and applicative fields, brought together in a multidisciplinary project of research and training, which we believe may represent an important contribution for the growth of a new culture of urban planning, design and management that is more open to the great urban questions of our time and able to interact with the different realities that make up the international scenario—especially the most problematical ones—in the perspective of sharing learning processes and experimenting with innovative solutions to gain a different model of urban and territorial development.

Introduction

In the university world, especially in Italy, in recent years, we have witnessed a certain blossoming of initiatives dedicated to research, planning and training applied to the theme of global human development and the areas of the so-called *Global South*: the term coined to replace the previous definitions of “Third World” and “Developing Countries” in order to identify those countries or territorial systems that still find themselves in conditions of economic, social and environmental inequality also thanks to recent globalisation processes.²

The interest shown by the academic world in the new challenges of globalisation put to the various fields of knowledge and the increased awareness that the North and the South of the world are much more interconnected than before and share a lot of these challenges has relaunched and renewed this field of study and intervention, also finding support in some processes that have recently overtaken the university and research worlds:

- internationalisation and universities’ new policies of social responsibility which aim to make room for relating, exchange and sharing of knowledge and skills among a wide variety of subjects (students, lecturers, researchers, institutions, the private world, NGOs, civil society) and an increasingly broad range of countries, cities, territories, building up networks of knowledge and training that move beyond geopolitical and cultural frontiers;
- the evolving of international cooperation towards new paradigms and intervention models, which give the University—and more generally the research system—more possibilities (and responsibility) to intervene on the international

² Cfr. A. Boni, M. Walker, *Universities and Global Development. Theoretical and empirical insight for social change*, Routledge, London and, in reference to the Italian case: E. Dansero, F. De Filippi, E. Fantini, I. Morocco (eds), *Imagining Culture of Cooperation: Universities networking to face the new development challenges*, Proceedings of the III Congress of the Universities Network for Development Cooperation, in JUNCO-Journal of Universities and International Development Cooperation, 1, 2014.

level in dealing with global challenges, promoting the diffusion of the paradigm of equal and sustainable development (*Agenda 2030 “Transforming our World”* and *17 Sustainable Development Goals-SDGs*) and how it is translated into approaches, programmes and projects that better adhere to the local contexts affected by the interventions of cooperation.

The Politecnico di Milano, in particular, has outlined these trends in various initiatives and experiences that have recently been collected and documented in the volume “*Storie di Cooperazione Politecnica 2011–2016*” (*Stories of Polytechnic Cooperation 2011–2016*) highlighting the path that, moving from a few initiatives linked to the interest and pioneering commitment of some individual lecturers, is trying to pave the way for a more recognisable, more participatory and integrated intervention between the various “polytechnic” souls aspects—architecture, design, engineering—in international cooperation.

In this volume, we present the results of a more circumscribed experience developed by the Department of Architecture and Urban Studies through a Laboratory of International Cooperation (2010–2016) and their *Post-graduate Programme “Coopera(c)tion: knowledge and skills for sustainable cities in the Global South”*, aiming to establish and support research and training initiatives that measure up to the new challenges of global urban development through initiatives of North–South scientific cooperation.³

Many of the changes implied by globalisation, in the North as well as in the South of the world, in fact affect cities and territories by disturbing the pre-existing equilibrium. These are changes that by dimension and intensity are unknown compared to the past and which dramatically draw out new problems of spatial and social inequality and a brand new environmental challenge linked to climate change.

While the advent of a new “urban age” is being celebrated (Burdett and Sudjic 2007, 2011) emerges a “new urban question” (Secchi 2013) that joins the North and South of the world, reaching its apex in countries of transition where extremely high processes of urbanisation create at an incessant rhythm megacities that are increasingly divided between “the city of the rich and the city of the poor” (ibid), as well as creating territorial and environmental unbalances that—often irreversibly—compromise ecosystems, resources, communities, cultures and economies rooted in un-urbanised territories. This massive and rapid global urban growth and the growing social question of quality and equality mainly give architecture, urban planning and territorial governance the responsibility of creating a more inclusive and sustainable development model, to share “knowledge and skills that make cities and urban settlements inclusive, safe, resilient and sustainable”, as stated in one of the key objectives of Agenda 2030.

³ On this experience Cfr. Bellaviti P, *Ricerca e formazione per co-operare nelle città e nei territori del Global South*, in Atti della XVII Conferenza Nazionale SIU, *L’urbanistica italiana nel mondo*, Milano, 15–16 maggio 2014, Planum Publisher, Roma-Milano.

Interpreting, surveying and focussing on new intervention approaches for the contemporary global urban condition and in particular for the more extreme manifestations of it that cannot be treated with the same paradigm and tools used in western cities during the past century therefore become the challenge of the new millennium in urban design and planning.

The exportation of—often stereotypical—traditional planning models and tools and of astonishing architecture for the “cities of the rich” in *Global South* countries never ceases, but it is growing the number of young researchers and professionals interested in developing applied research, projects for specific contexts and critical reflections on the main problems of contemporary urban development through new joint and locally shared forms of cultural and scientific cooperation.⁴

It is against this backdrop that the new trends of study and application shared between the University, research centres, institutions and NGOs grow: the humanitarian and emergency architecture; the studies on new forms of social and spatial inequality, on informal urbanisation and informal economies, on spatial conflicts; the focussing on strategies and tools for *up-grading* and community *empowerment* of slums; the strategies and technologies to promote access to primary resources (food-energy-water); the strategies for the protection and valorisation of material and immaterial heritage; the use of new technologies supporting inclusive governance strategies; the interventions for the training of human capital and the reinforcement of institutional capacity.

The volume offers a wide panorama of studies, research and projects regarding these fields of application, in the conviction that they may represent an important contribution for the growth of a new culture of urban design, planning and management that is more open to the great urban questions of our times and able to interact with the different realities that make up the international scenario, especially the more problematical ones, within a perspective of sharing learning processes and the experimentation of innovative solutions for a different model of urban and territorial development.

To introduce and present this polyphonic set of contributions elaborated by lecturers, researchers and professionals from various disciplinary backgrounds (architects, town planners, urban sociologists, engineers), in the notes that follow, we will try and outline the problematic scenario within which they are located and integrated in a perspective of research and training on the multidisciplinary and transnational contemporary urban development paying special attention to the countries of the *Global South*. We will deal with three main arguments:

- University and international cooperation for sustainable global development;

⁴ Cfr. Chiodelli F, De Carli B, Falletti M, Scavuzzo L (eds) (2014) *Cities to be tamed? The space of urbanism and planning in the Urban South*. Cambridge Scholars Publishing, Newcastle upon Tyne and AA.VV. (2014) *Atelier 3: Piani, programmi e interventi nella cooperazione internazionale e nei Paesi emergenti*, Atti della XVII Conferenza nazionale SIU, *L'urbanistica italiana nel mondo*, Planum Publisher, Rome-Milan.

- a new “urban question” and the challenges for the disciplines of urban design and planning;
- paths of research, design and training for sustainable cities and territories shared by countries in both the North and the South of the world.

Universities and International Cooperation for Sustainable Global Development

To deal with this theme, we refer back to the results of a seminar (“*The cooperation for development in crisis of the territories*”, DASTU, 19th November 2011) promoted by the editors of this volume in order to inaugurate the activities of the Laboratory of International Cooperation, in which a critical discussion was developed on the role that the University may play in this ambit, referring in particular to the territorial and design disciplines and the contribution that this fields of knowledge and skills may give to the very redefinition of cooperation approaches.

The discussion started by recognising a scenario of development cooperation that has been deeply changed thanks to globalisation, which has altered the pre-existing equilibrium, integrating and fragmenting the territories in countries in both the North and the South of the world. Within the overview of this general “crisis of territories”, cooperation is currently nearing the end of its presumed ideal of “help” towards disadvantaged countries, and is moving onto the presupposition of “sharing”. The approach becomes more egalitarian, and cooperation is no longer simply giving, but also learning, in a process of reciprocal hybridisation. In this passage, university cooperation finds itself playing a central role as it aims towards increased knowledge and the reinforcement of abilities as the real foundation of local autonomous development (Petrillo 2012).

In particular, the seminar posed a series of questions to architects, engineers, sociologists, economists⁵ with a consolidated experience in research and teaching in

⁵ The Seminar was attended by: Agostino Petrillo, Paola Bellaviti, Antonio Tosi, Annapaola Canevari, *Comitato Scientifico del Laboratorio di Cooperazione Internazionale*; Emanuela Colombo, Politecnico di Milano, *Delegata del Rettore per la Cooperazione e lo Sviluppo*; Alberto Giasanti, Università degli Studi di Milano Bicocca, *Coordinatore Dottorato internazionale in Cooperazione e Sviluppo Locale*; Jardena Tedeschi, Università degli Studi di Milano, *Coordinatore Master in Analisi e Gestione di Progetti di Sviluppo*; Enrica Chiappero Martinetti, Università di Pavia, *Direttore Human Development, Capability and Poverty–International Research Centre (HDCP-IRC)*; Marcello Balbo, IUAV di Venezia, *Direttore Master in Urban Development and Reconstruction (2001–2009)*; Maurizio Tiepolo, Politecnico di Torino, *Direttore Master internazionale in Plans et projets*; Raffaele Paloscia, Università di Firenze, *Coordinatore LabPSM—Laboratorio Città e Territorio nei Paesi del Sud del Mondo*; Camillo Magni, Politecnico di Milano, *Presidente Architetti senza frontiere*.

the field of cooperation for development and related thematic areas, developed within the university world:

- In a scenario that is so deeply re-articulated and changeable in its geography and in the North/South and South/South relationships how does “cooperation for development”—traditionally considered as help from rich countries to more disadvantaged countries—change?
- Today, how do we redefine an action that aims to support more equal and sustainable processes of development that may combat deprivation, marginality, exclusion, conflict and which on the contrary may promote the well-being and cohesion of community and territories?
- And how can the university—a relatively “new” actor in the policies of international cooperation—contribute to formulating the new contents and new methods of cooperation?
- And above all, what may be the contribution of the disciplines of urban and territorial design to international cooperation that focusses on a diverse model of territorial development?

All participants mentioned the historical cooperation crisis, the decline of the old paradigm of cooperation as aid from the North to the South of the world, irreparably marked by an ideology of “development” and compromised by an often ambiguous role aimed in an integrative function at third world governments/states or within the ambit of martial conflicts, diaspores, etc. (Petrillo). We need to “clear the field of previous ideology”, overcome the idea of the “beneficiary/benefited”, in order to pave the way for a new paradigm centred on cooperation as the exchange and sharing of knowledge and practices for a different model of territorial development. A trend that however proves hard to establish, translating new concepts in concrete practices of bilateral cooperation or filling up old concepts with new content such as that of “sustainable development” (Giasanti).

Another shared point is the opening up, in this new “framework of meaning” for cooperation, of new potential for the University in the direction of a broadening of functions and a wider assumption of social responsibility towards territories, both here and elsewhere. The university mission in the cooperation—traditionally sub-divided into formation, scientific research, transfer of knowledge and technologies—may enrich the current strategies of internationalisation and give them another “face”: it may create in students a mentality that is more open to the world, sharing a culture of cooperation to all professions; it may stimulate scientific research in innovation, through the development of horizontal and transversal partnerships between university, business, civil society, here and in the Global South, which, exceeding the logic of “technological transfer” in favour of a collective and shared construction of knowledge, may pave the way for experimentation and innovation. In this way, the theme of innovation evolves towards the concept of “lever for local development”, pointing it towards some strategic sectors (energy, water resources, management of territorial resources, planning of the

territory) and pushing the University to adopt more explicit ethics of responsibility (Colombo).

The extension of university functions through cooperation may lead us to perceive universities as “agents of local development” which “equip” themselves, through the integration of knowledge—practices—critical knowledge, the development of intercultural approach and the carrying out of forms of research intervention. In this capacity, universities must form strategic alliances with local institutions and companies, NGOs and other *stakeholders*, also within their own territories. If cooperation becomes the idea of working together to deal with common problems, here and elsewhere, universities may take on a strong role of cooperation, through training and research. Through training, they must promote an intercultural approach, redefining the initial ethnocentric-professional training. Through research, universities must learn to work with others—without losing their own critical capacity—in order to promote the quality of the territory, both their own and that of other places (Giasanti).

This new perspective of university cooperation therefore implies the research of new formulas, both within training and research. The university, and in particular territorial disciplines, atones for a certain delay in the reading and comprehension of the deep change that has affected the North and the South of the world and in the appropriating of the new paradigm of cooperation, centred on exchange and North–South sharing. The redefinition of training practices and cooperative research must therefore be associated to the attempt to interpret transformations in progress and new concepts of cooperation (Balbo), and the development of a theoretical reflection that leads the action (Petrillo).

This seminar thus lays out a scenario that allows us to identify a more aware and current method of thinking of the role of international relationships between North and South—according to which a lot of differences between what can be intended as internationalisation and cooperation decrease—and a more articulated, proactive and responsible view of the university involved in this field of action.

A New “Urban Question” and the Challenges for the Disciplines of Urban Design and Planning

As it would appear from the alarming reports by UN-Habitat—which have been insistently emerging for more than a decade now⁶ without however resulting in the identification of action strategies that are efficient on the global governance level—in

⁶ Cfr. Un-Habitat, *Cities in A Globalizing World—Global Report on Human Settlements 2001* London, Earthscan 2001; Un-Habitat, *The Challenge of Slums—Global Report on Human Settlements 2003*, London, Earthscan 2003; Un-Habitat, *State of the World’s Cities 2010/2011. Bridging the Urban Divide*, London, Earthscan 2010; Un-Habitat, *Cities and Climate Change—Global Report on Human Settlements 2011* London, Earthscan 2012; Un-Habitat. *World Cities Report 2016: Urbanization and Development—Emerging Futures*, London, Earthscan 2017.

2030, the population of cities in emerging countries and in the south of the globe will grow by around a billion.⁷

So the question arises on where these new urbanites will settle and what their living conditions will be like. The question has become more and more urgent and now represents the profiling of a gigantic “housing question” of planetary scale, which has become so serious and persistent as to represent one of the two main themes proposed by the Habitat III conference held in Quito in 2016, and dedicated in fact to “Housing and sustainable urban development”. The question was moreover identified as crucial twenty years earlier in 1996, during the previous United Nations meeting on cities, Habitat II in Istanbul. The final declaration of intent, shared by all the participating countries, in fact aimed at creating “a world where everyone can live in a safe home with the promise of a decent life of dignity, good health, safety, happiness and hope”.⁸ Wonderful, aspiring words which, unfortunately, resulted in very few actual deeds.

The shift of urban growth towards Asia and Africa, which occurred massively in the two decades between Habitat II and Habitat III, in fact contributed to a global level of generalised problems such as that of housing, but in many countries it also further exasperated living conditions that were already extreme, and which for many of the new city inhabitants could only just be determined as “urban”. The destinies of entire parts of cities thus rotate around housing “sustainability”, intended not only as environmental sustainability but also and above all social sustainability, as the ability to imagine future developments that varied from the current situation.

The 1996 appeal seems however to have remained mere *flatus vocis*, or at least it has been substantially disregarded: a large part of new “citizens” were excluded from the legal land property and housing access supply chains.⁹ They live in districts that are almost completely lacking in services, often self-built, which have, in recent decades, been subject to expansion that is without precedence. It is estimated that “unlawful” and informal housing represents, depending on the various areas taken into consideration, between 20 and 80% of the overall urban growth rate in these areas of the world, which even higher peak values in large metropolises.¹⁰

⁷ This problem has already been clearly outlined in J.N. Rosenau, E.O. Czempel (eds.), *Governance without Government: Order and Change in World Politics*, Cambridge University Press, Cambridge 1992. A pessimistic evaluation on the capability of managing the question of urban growth on the *global governance* level is expressed in the careful analysis undertaken by A. Ziai, *Zwischen Global Governance und Post-Development Entwicklungspolitik aus diskursanalytischer Perspektive*, Westfaelisches Dampfboot, Munster 2006.

⁸ Un-Habitat, *The Istanbul Declaration on Human Settlements*, in *Population and Development Review*, Vol. 22, No. 3, September 1996, pp. 591–594.

⁹ Cfr. E. Peñalver, S. Katyal, *Property Outlaws: How Squatters, Pirates, and Protesters Improve the Law of Ownership*, Yale University Press, New Haven 2010.

¹⁰ Cfr. G. Massiah, *Les politiques urbaines et la crise de la mondialisation*, in F. Lieberherr-Gardiol, G. Solinis (sous la direction de), *Quelles villes pour le 21e siècle?*, Infolio, Lausanne 2012, pp. 97–98.

The celebration of the “*urban age*” affecting a large part of the planet is almost laughable, if not downright fraudulent.¹¹ The concept of city and urban in similar contexts appears in fact far removed from traditional meanings and, almost as if reflected in a hall of mirrors, takes on connotations that are anything but reassuring. The *urban age* in fact risks bringing with it a number of rather unpleasant features for a large amount of new inhabitants of metropolises. But why is this? In the absence of planetary strategies, how do governments and administrations react to these phenomena? On the borders of metropolises grow areas of exclusion that risk becoming permanent.¹² It is therefore difficult to be able to foresee what will happen when over not even fifteen years we will find ourselves with another billion newcomers to manage, concentrated in urban realities that already appear barely manageable. All the more so given that recent history has clearly shown how policies aimed at limiting internal migratory flow from the countryside to cities is rather ineffective, and risk merely worsening the situation, given that they end up in conflict with the policies of rural development and require in any case huge investments and highly effective political-bureaucratic organisation in order to be successfully brought to term. A set of problems that risks becoming chronic, given that, as a number of German geographers have for some time sustained, these new city-dwellers will most probably find themselves in informal production, concealed and precarious work and informal living, which become a real vicious cycle, a marginal world from which it is very difficult to escape once there. Precarious and irregular work and self-built and informal housing in fact increasingly represent a *hendiadys* that is difficult to resolve.¹³

It is hard to imagine what governance could be exercised against the new masses of marginalised people who crowd and will continue to crowd into intermediary cities and metropolises, and who risk extending the queues of those poor urbanites who, as demographers warn us, not only will grow in absolute numbers but will also become younger and younger (already today a large part of the inhabitants of African slums are twenty years old on average).¹⁴ At the same time, in the light of

¹¹ I share the same perplexity regarding the concept of *urban age* as N. Brenner, C. Schmid, *The ‘urban age’ in question*, in *International Journal of Urban and Regional Research*, Volume 38, Issue 3, May 2014, pp. 731–755.

¹² Cfr. L. Wacquant, *I reietti della città. Ghetto, periferia, stato*, translated, introduced and edited by A. Petrillo and S. Paone, ETS, Pisa 2016.

¹³ This is very convincingly argued by F. Scholz in *Entwicklung und Unterentwicklung im Prozess der Globalisierung*, Westermann, Braunschweig 2007.

¹⁴ Cfr. *Demographia World Urban Areas*, 10th Annual Edition, May 2014 Revision; but also cfr. United Nations, Department of Economic and Social Affairs, Population Division (2014), *World Urbanization Prospects: The 2014 Revision, Highlights*.

this situation, we require a general rethinking of the disciplines of the territory, in particular territorial planning, so we can build up the tools of a “sustainability” that otherwise would be difficult to attain.

Research, Planning and Educational Paths for Sustainable Cities and Territories Shared Between the North and the South of the World

How do scholars and professionals of urban design and planning deal with these enormous and complex changes? What theoretical and operative tools do they use? Which are the most relevant themes and most significant experiences?

Our experience with the Laboratory of International Cooperation allowed us to explore this new field of study and intervention by building networks of international knowledge with which to develop shared initiatives of research-action and training, scientific and cultural exchange.

These initiatives led to the surveying of the main crux of which knowledge and skills—in urban planning, architecture, urban sociology, engineering—to put into the field, develop, integrate, share and teach in order to interpret change and promote the diffusion of a more sustainable and inclusive model of urban development. This research, while certainly not exhaustive, intercepted a number of ambits (and questions) of study, research and experimentation, some of which have already been included in the practices of international cooperation, others which have only recently been of interest and elaboration.

At the same time, the practical result and development of this research was in particular the *Post-graduate Programme “Cooper(a)ction: knowledge and skills for sustainable cities in the Global South”* established in the academic year 2013–14 and continued for three editions, which was designed to diffuse a new culture of international cooperation among students, scholars and professionals of spatial design, architecture, urban design and territory management and more generally increase awareness of the need for global urban knowledge and feed the desire to find common solutions to the challenges set by the significant environmental, social and cultural changes that globalisation is causing in cities and territories.

The course has developed these aims by focussing on urban and territorial transformations in the countries of the Global South, thus identifying a new field of investigation and intervention that requires an innovative effort to develop new approaches, specific skills and an appropriate knowledge for working in such contexts. The aim is to interpret and deal with the challenges posed by contemporary urban growth, as well as to combat deprivation, marginalisation, exclusion and conflict and to promote well-being and inclusion in the urban environment. The programme of the course implemented such a philosophy by building a multidisciplinary work project designed following the most up-to-date study lines, field

research and experimental projects focusing on the Global South at the international level.

This volume continues the interdisciplinary set-up of the Post-graduate Programme and its division into thematic modules that deal with the various questions that emerge both from the interpretative point of view as well as on the level of concrete experiences of research and design, giving room to a plurality of disciplinary viewpoints, sectors and intervention scales, of knowledge and places involved, with the aim of favouring integration and fertile hybridisation between theoretical approaches, methodologies and tools of the various disciplines involved.

The Part I, *Urban growth and rising socio-spatial inequality: research paths and planning approaches*, focusses on the phenomena of rapid urbanisation of the *Global South* and on the strategies for counteracting the new forms of inequality and socio-spatial exclusion that are closely linked thereto. It is the well-known phenomenon that is variously known as “planet of slums”, “informal city”, “marginal areas”, often coinciding with the suburbs, in which economic and housing poverty, social and spatial marginalisation, health and environmental insecurity and risk concentrate in varied measures and combinations.

This macroscopic urban problem with its multiple social and environmental implications was subject over the last decades to a growing academic debate between urban designers, urban planners and other specialists in urban and social phenomena, and new and often conflicting meanings and representations have been elaborated.¹⁵ International agencies and national and local governments have configured and tentatively implemented some macro-policies of interventions inspired by diverse paradigms, but the impacts are still very limited and controversial (Chiodelli 2016). Thus, the problem of urban informality is anything but “tamed” and more than ever requires an innovative effort for setting up knowledge, strategies and tools for a more aware and appropriate action of requalification and governance of these extremely extensive marginal urban habitats.

Various contributions of the part (Montedoro; Frigerio; Piscitelli; La Mantia; Beacco, Saborio and Costa) explore the new global urbanism and the many faces of informal urbanisation in different territorial contexts (from North Africa to sub-Saharan Africa, from Asia to South America) highlighting the various problematical aspects of these phenomena:

- the complex relationships with tradition local urbanism and those—often conflictual—with the city planned according to models and paradigms imported in the past from Western countries, that are often one of the main cause of the phenomena of informal growth;
- the interweaving with recent dynamics of global economic development that remodels and “explodes” the pre-existing urban structures, enveloping (or expelling) areas and populations in precarious conditions and causing the

¹⁵ Cfr. in References: Bayat 2013; Davis 2006; de Soto 1989, 2000; Huchzermeyer 2011; Parnell and Pieterse 2014; Pieterse and Simone 2013; Rocco and van Ballegooijen 2017; Roy 2005, 2011; Roy and Alsayyad 2004.

multiplication of informal practices that are not only linked to housing, but also to production, trade and mobility;

- the pressing link with the deficient and/or controversial public strategies in the matter of urban government and management (more often badly managed or not managed at all) of the informal areas, which are often translated in policies of concealment, stigmatisation, exclusion or attempts at extirpation, raising an explosive question of socio-spatial injustice that urgently needs to be addressed.

Other contributions (Aramburu; Mion; Vasilescu, Cominola, Vigotti; Vito), through direct case studies and investigations, propose methods of analysis and intervention or critical re-readings of experiences undertaken by public institutions in the matter of *slum improvement*, highlighting the need and the potential of research and experimentations in the field for the construction of more in-depth and specific knowledge of these marginal habitats (often corresponding to white areas on institutional maps) in order to set up more appropriate design and governance approaches aimed at improving them.

In particular, we see the emergence of potential innovative strategies of urban design and urban management for the inclusion of these marginal areas and their communities in the processes of intervention and urban regeneration, through the setting up of devices of communication and interaction between the *top-down* urban policies of the institutions and the *bottom-up* practices of self-organisation and regeneration established by the local communities themselves. An important role in these initiatives may be played by the most up-to-date methods of *mapping*, *community empowerment* and *capacity building*, often supported by new digital technology.

The goal is not only the improvement of living conditions in marginal contexts—higher levels of health, well-being, security through increased accessibility to resources, infrastructure and urban services—but in perspective the overcoming of formal/informal dualism, to come to a new integrated vision and management of the urban system that gives recognisability, dignity and a chance for change even to these precarious but important spatial and social components of large global urban areas.

The Part II, *Design strategies and construction techniques for development in marginal and rural areas*, deepens in particular the potential of the project of architecture and constructive technologies in function of the improvement of living conditions in marginal areas—be they suburban or rural—and the creation of opportunities for local socio-economic development. The Part is introduced by an essay with an overall reflection on the role of the project in the cities of the Global South (Magni).

The reflections and field-based experiences—some of them long-term-presented by the other authors—mainly regard urban suburbs and rural areas of African countries, where the design of housing and structures for education, health, the development of economic activities linked to natural resources and the abilities of local communities, face up to specific technical and constructive problems, the scarcity (or complete absence) of public resources and strategies, the presence of

social organisations and local cultural traditions linked to housing that are still vital in rural areas, though slightly eroded by globalisation.

This is how the importance and potential of the bioclimatic project are highlighted in the requalification of informal settlements (Brunetti); the multiple positive spin-offs on the development of rural communities of housing projects that combine the research of “appropriate and appropriable” materials and techniques of the local populations through participation in the constructive process, which also acts as training (Caravatti); the potential of small projects of tourism accommodation found locally to create sustainable local development that generates benefits for the populations involved, that may be easily copied in the surrounding areas or in similar contexts (Diappi); the need to review national policies sustained by international organisations for some public infrastructures of vital importance, such as primary schools, to overcome a purely technical-regulatory approach for the construction of school buildings and to adopt a new strategic approach that gives primary schools a broader role in forming new generations and within the life of the local community (Bonifacio).

The part concludes with a theoretical recognition of some of the main projects that modern architecture has experimented in the past in non-Western countries, diffusing some key themes and examples that may yet offer good ideas for contemporary architectural research aimed at the quality of life, sustainability and respect for local cultures (d’Alfonso, Galli).

The Part III, *Protection and enhancement of cultural heritage amid conservation and development*, is dedicated to that thread of studies and projects in heritage conservation, an ambit of intervention that is among the first to establish itself in the practices of international scientific cooperation, especially regarding the conservation of important historical-architectural heritage found in countries in the Global South: just think of the UNESCO World Heritage Sites strategy or the international missions to recover great monuments at risk of decline or seriously damaged by natural disasters or war.

For a while now, this field of study and intervention also however extended to shared material and immaterial cultural heritage, involving local territories and communities in conservation activities, and broadening the intervention to the promotion of local development processes that move beyond the models of intensive exploitation for mass tourism purposes, to reach models of sustainable development in which heritage may become the joining element between local resources and needs (economic, social, cultural) and the supra-local policies for the conservation of the heritage and economic development of the country.

The “lessons learnt from 50 years of study and implementation of projects in Armenia” (Giambruno and Casnati) are an exemplary report of this theoretical and operative course, while Boriani’s essay highlights a new frontier in conservation linked to the historical landscape of agriculture and its potential for the development of the contemporary city, a theme that is greatly shared by cities from both the North and the South of the world.

Just like the role that cultural heritage may play in the processes of urban regeneration (Giambruno and Pistidda), “facing the change by increasing

competitiveness without losing the main resource, the local identities”: a challenge in this case dealt with through research undertaken by eleven cities in Europe and Central Asia.

The following essay of Vigotti, through the description of three experiences of field-based research in transition countries, specifically underlines the importance given to widespread heritage safeguard in different geographical contexts (Albania, Montenegro, Myanmar) and develops reflections regarding the influence given by the context over applied conservation policies.

Another challenge linked to the valorisation of cultural factors in order to establish a model of sustainable development, not homologated to the “unique” model of development established by globalisation, is that put forward by Ceccarelli which refers to small urban centres and marginal agricultural territories, depopulated by the disturbing levels of migration towards Asian, African and Latin American megacities which are struggling to survive. An international network of small centres in China, India, Japan and Italy, promoted by a network of European and Chinese Universities (in line with the proposals put forward by the UNESCO Global Report on Culture and the UN New Urban Agenda) is trying to valorise these unconventional development strategies which integrate traditional cultures and activities with new activities linked to science, advanced technology, culture and conservation of the environment.

A further contribution (Pierantoni) leads us to fast-growing cities, in particular those in India, where the potential conflict between conservation of heritage and economic development is openly manifest in all its seriousness, especially regarding the crafts sector which tends to disappear with the communities, culture and places in which it was forged.

In the following Part IV, *Integrated strategies to reduce the territorial risks and the impacts of the climate change*, the focus shifts to strategies for the adaptation of urban and territorial systems to climate change and in particular to the approaches for the management of territorial risks. A highly complex field of study and intervention which needs to be shared between the North and South of the world for research into solutions (theoretical and operative) which are increasingly effective and applicable also in those contexts that have fewer economic and organisational resources.

An initial contribution (Magoni) proposes an overview of the themes of territorial risks in the broadest possible theoretical approach to territorial resilience, which allows us to consider the evolution and capacity for adaptation to change and traumatic events of the entire socio-ecological system represented by a city or a territory, also playing on the human resources found therein in order to improve communities’ and institutions’ ability to find solutions.

This is followed by essays by Atun, Pesaro and Salaheldin, who present more detailed approaches and methodologies for emergency management following catastrophic events and the subsequent reconstruction in reference to some key experiences from the last few decades: the Kobe earthquake (1995) and the Tohoku earthquake-tsunami (2011) in Japan; the earthquake in Haiti in 2011; the earthquake in Emilia Romagna, Italy (2012). The comparison between different approaches and

experiences shows how this trend of studies and the worldwide application thereof has advanced, highlighting its multiple potentials and results.

The part is concluded by a contribution (Mesa Munoz and Magoni) that deeply analyses the strategies for adaptation to another problematic phenomenon linked to climate change—heatwaves—which impact heavily on agriculture and the urban climate. The study proposes the case of Colombia, which like many other Latin American countries is trying to take on integrated strategies to combat this phenomenon.

The previous Part is continued by the Part V *Managing the agro-urban system and the Food-Energy-Water nexus* which firstly deals with phenomena and problems on a broad scale (regional, national) caused by the impact of globalisation on the environment and the territories, in particular on agricultural production systems and the use of prime resources such as soil, water, energy and food.

The growing global demand for food and the separation between the areas of production and those of consumption (and at the same time of their necessary interconnections) is in fact producing processes of change that are redesigning the geography and type of production, demolishing traditional productive methods, transforming the organisation, culture and behaviour of the local communities affected, and often generating conflicts between traditional practices and new ones.

These themes are dealt with in Minucci's essay with a reference to the case of the remote rural Southern Bolivian Plateau, which has since become one of the world's main quinoa production areas, studying the most promising adaptation strategies through a long period of fieldwork in local communities.

The same issues are dealt with by Rulli et al., analysing the recent phenomenon of the wide-scale purchase of fertile land by foreign investors to be used for cultivation—*land grabbing*—which is extending throughout a number of African countries and in other countries of the Global South. In-depth research focussing on Mozambique has resulted in a quantitative evaluation of this phenomenon and its socio-environmental implications, providing evidence of the effects on local populations in terms of reduced access to land, water and the ability to produce food.

Contin's essay, on the other hand, gives us a theoretical reflection on the condition of contemporary metropolitan territories, in the North and the South of the world, where urban areas and rural areas seem increasingly interconnected. Following the author, better understanding and support—through a new narration founded on new interpretative and relational maps—of the “agro-urban metropolitan territory” are the key for a process of truly sustainable urbanisation.

Finally, Pastore and Morello's contribution proposes an approach to urban regeneration that integrates strategies for sustainability (improved efficiency in resource management) with those of resilience (adaptation to new climate conditions) through the concept of “urban metabolism” and its declination on the local scale of “community metabolism”. Some research undertaken by the authors shows in particular the potential of this approach within the context of cities in sub-Saharan Africa, among the urban realities currently undergoing rapid urbanisation.

The final Part VI, “*Transforming Johannesburg*” *International Workshop. A multidisciplinary action-research on collaborative approaches to planning and design for socio-ecological focused urban development*, documents and comments on the results of a field training and research experience (Autumn 2015) in an informal settlement of this large and complex South African metropolis.

The outcome of an inter-university collaboration between the Politecnico di Milano (DAStU) and the University of the Witwatersrand in Johannesburg, the two-week intensive workshop experimented with the potential of these brief and applicative transnational formulas of advanced training, offered both lecturers and researchers from various disciplines and origins the chance to compare and share the theoretical approaches and research methods on urban development inspired by the principles of socio-economic sustainability and collaborative governance. It has also allowed more than twenty master degree students and young professionals coming from different countries and backgrounds (who were joined by some functionaries from the municipality of Johannesburg), to learn and experiment approaches and methods in direct contact with the precarious—spatial and social—urban reality being investigated. Relations with the local community and with other *stakeholders* strengthened both the survey as well as the elaboration of a potential strategy of requalification calibrated on the many and specific problems and expectations of the settlement, characterising the workshop as a research-action with aims to advocate for the needs of the local community.

La Mantia’s introductory essay, followed by the thematic ones by Frigerio and Kornienko and Harnish, come together to replace the philosophy of the workshop, the aims and undertaking, the methods used, the results reached and some reflections on the impact that these training and research initiatives may have.

The presentation is completed by analysis and proposal tables put forward by the five thematic work groups made up by tutors and students.

Within the Extra Material “*Repertoire of Project Works and Reports of Post-graduate Programme ‘Coopera(c)tion: Knowledge and skills for sustainable cities in the Global South’. Editions 2013–2014; 2014–2015; 2015–2016*”, the volume also includes a collection of works undertaken by students in the three editions of the Coopera(c)tion course already completed, which develop the themes and methodological approaches proposed by the course in relation to cases and problems of interest to them. Not all the works by the more than fifty students who participated in the course were able to be published; however, those included testify the huge motivation, different skills and ability to elaborate and compare demonstrated by the master degree students and young professionals originating from a number of different countries and backgrounds. With some very interesting results that have enriched the line of interdisciplinary and transnational research undertaken by the course and presented in this volume.

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Part I
**Urban Growth and Rising Socio-spatial
Inequality: Research Pathways and
Approaches to Urban Planning and
Governance**

Development Against Sustainability? Marrakech as a Case Study

Laura Montedoro

Abstract Due to a fast-growing economy, Morocco is facing several issues concerning a local way to a global modernization. The Islamic society is slowly changing towards new forms of rules to achieve a balance between traditional values and new emergent needs. While the vast rural world keeps a stronger resistance to mutations, cities are laboratories for innovation. In terms of spaces, among the famous imperial cities, Marrakech is the one in which the phenomena are more acute and accelerated. The ancient heart of the *medina* is the great object of external pressures for new touristic uses and consequent gentrification, while the colonial modern parts of the city are progressively replaced and new urban expansions are looking for a development model. Starting from this point of view, the essay describes and interprets the main dynamics in place and attempts to indicate the contradictions and critical aspects that will be the most difficult challenge for Moroccan cities in the next few years: Is there a local way to modernize in a global world? Which tools and strategies for a sustainable development?

1 Development Against Sustainability? A Heritage to Be Interpreted and City Ideas

Among the cities of Morocco, Marrakech seems to play the global game of development and competitiveness on the table of tourism, switching from an elitist to a mass-market model after opening its airport to various low-cost airlines: a city ready to offer “exotic” and unforgettable experiences for each pocket. However, this strategic direction does not seem to be supported by an adequate reflection on its territorial implications and by a clear research on the urban form of the new city, despite the historic quarter (*medina*) being nominated “World Heritage Site” in

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1984 by UNESCO. The notion of heritage and cultural legacy is now largely shared with regard to the “red city”—even beyond the normative aspects—both in its physical consistency and in its immaterial culture. Such awareness should imply programmes and actions for the recognition, protection and enhancement of artefacts and landscapes that in practice are hardly considered in accelerated processes of economic and physical growth. There is an urgent need to reflect on these urban growth and development patterns, which not only threaten the quality of a complex and fragile urban system, but also risk compromising the millennial balance of the territory. The appetites of foreign speculators and the distraction, or naivety, of some local forces threaten the quality of the process of modernization, which seems largely unmanaged.

The required strategies mainly concern three areas: first of all, the territorial sphere (hydrogeological and agrarian) at the regional scale, which urgently needs a long-term strategy that keeps together the preservation of the landscape and its resources with an agricultural economic plan. Here, environmental sustainability issues are central, particularly with regard to water resources and the progressive drying up of the water table; secondly, a more careful and aware control over the tourism industry, whose effects may prove in the near future to be far from being happy and irreversible; and lastly, a critical meditation on the Islamic housing tradition and a sharper research on the quality of contemporary architecture. New buildings—both in case of single replacements, such as in Guéliz, and of new developments, such as those in the east and north of the city—require a serious reconsideration of the city models put in place and of the idea of modernization. There are, of course, some attitudes but, judging by the results, they are highly unsatisfactory both in delivering a strategic and coherent territorial development and in controlling a widespread quality in architecture (Fig. 1).

There is also a striking lack of design experimentation to propose new solutions that preserve the experiential heritage of traditional dwelling and its spatial values. Indeed, we can recognize some attempts for social housing in certain outer neighbourhoods,¹ where it is apparent the effort to reinterpret the theme of the patio and the principle of aggregation of cells, but much more often, among the recent developments, we find settlement schemes that are alien to the context. The contextualization relies on a few recurrent superficial elements: the colour of the plaster, which is mandatory; some traditional elements juxtaposed with spatial patterns that are not rooted in situ; the height of buildings (which cannot exceed four floors because they must be lower than the Minaret of the Koutoubia mosque). It is, in effect, a sort of camouflage producing a patina of tradition, not substantiated by arguments on traditional dwelling and its spaces. The tension towards the “Marrakech effect”, obtained through these devices, often produces a kind of postmodern architecture that is out of time and quite devoid of self-irony, or ends up in a faint superficial vernacular. The theme is old and widespread on a planetary scale. After Koolhaas’s famous “fuck context” and in the midst of a global

¹Program social du quartier Al-Massira.



Fig. 1 Roofs of Marrakech and the Atlante mountain (photograph of the author)

standardization process, what does the interpretation of the context still mean/imply? This question accounts for everything: if it still makes sense today to talk about *genius loci* (Norberg-Schulz 1992)—in Marrakech we have certainly found it—but also how to interpret it in the contemporary world. Since the fifties, after the spread of the International Style, there was much debate in the Western world about the possibility of shaping an architecture and an idea of city that interprets local places: from Kenneth Frampton’s theory of “Critical Regionalism” (Frampton 1984) to the practice of a “critical internationalism” by Eduardo Souto de Moura, passing through numerous experimental experiences, including the remarkable example of Alvaro Siza’s Malaguera neighbourhood in Evora, somehow a not-written manifesto. On the theme of the patio house, modern architecture has expressed an interesting research. Even in Morocco we can find some contemporary brave attempts at revisiting the housing type and its aggregations, such as Michel Ecohard’s Central Career in 1953, or the important experiences of Candilis in Casablanca: experimental projects that, though practised by European architects, are mainly linked to a historic moment of re-affirmation of the national identity which would lead to independence from France in 1956. On this subject, if we consider the whole Muslim world, it is highly surprising that a strongly

conservative society—as that in the most orthodox Islamic countries—is giving way to a Western style of dwelling where it builds its contemporary city, as in the spectacular case of the great Middle East cities of Dubai, Abu Dhabi, Doha, where nothing of the millennial Arab urban tradition seems to have survived.²

In the full awareness that the three fields of action are actually firmly anchored to one another, the interest in urban form and habits of living has generated the main questions that form the basis of this research. Is there an Islamic/African path to the construction of the contemporary city, which escapes from vernacular or post-modern temptations and does not renounce established spatial values of a peculiar and millennial culture of living? Is there an alternative model to western urban development? So far, Marrakech seems to have not yet found a convincing way, but the study further persuades us that research in this direction deserves space and dedication to continue the enchanting urban story of Marrakech. Let us see in more detail some of the dynamics in place.

2 Inhabitants

With its 35,000 inhabitants per square km, the medina of Marrakech is one of the most densely populated cities of the planet.³ Who are the inhabitants of the ancient walled city? For the most part, the medina is inhabited by recently urbanized Moroccans. «Marrakech has been and remains a place of transition, a great souk that drains all of southern Morocco» (Wilbaux 2001: 34).

From the 1920s, the glare of the hygienist European culture, through the action of the French protectorate and the construction of the European-like *ville nouvelle* outside the walls, offers the elite first, then the middle class, a different way of dwelling, alternative to the insalubrious and obsolete medina. For some decades, the replacement of dwellers goes on relentlessly. As soon as they reach a sufficient social upgrade to buy a new property, the Moroccans living in the historic city leave the medina for the most modern and comfortable colonial city. The “the latest ones”—those who come from the countryside in search of fortune or to reunite with their family—then take their place, in increasingly abandoned and run-down estates.

The medina is, therefore, from the point of view of the local population, a city of the poor and for the poor.

²The “Dubai case” testifies of an invention: a standardized yet clearly recognizable city image to export and sell, an operation of city marketing which proved undoubtedly successful, but that is still waiting for a critical assessment.

³To get a measure of the phenomenon: Mumbai, which has primacy in the density in the world, has 31,000 inhabitants per square kilometre. Milan, for an easy comparison, has about 8000.

In the face of this process, which, among other things, had the effect of a physical abandonment of the extraordinary heritage of historic buildings, there has been, particularly since the 1960s, a rising and widespread interest of foreigners for Marrakech and its historical centre.

We will see in the next chapter the reasons for the attractiveness of the red city for Westerners and the process that made Marrakech an urban commodity in the international tourism market. Here, we want to report the gentrification process that has hit the medina massively.

In the sixties, the exoticism of the city attracted especially what today we would call the Western “creative class”⁴ and the international jet set, becoming the caricature of a paradise for “flower children” and being represented as the city of hippies and gay communities.⁵ However, since the end of the 1980s another far more widespread and pervasive phenomenon prompted many foreigners to buy the Riyadh inside the walled city. The low costs of property, a European purchasing power very conducive to investment and an effective real estate advertising campaign have prompted an increasing number of Westerners to buy an old traditional house in the Medina. After an appropriate renovation, it is used as a second home or can be transformed into a tourist accommodation under the motto of ensuring the tourist “the experience of authentic Moroccan hospitality”.

Some numbers perfectly reflect the size of the phenomenon: while foreign residents in Medina were 150 during the summer of 1999, they were already more than 900 in 2003 (Esher 2009: 346). The French are the most present group, followed by the Germans, the Italians, the English, the Spaniards, the Americans, the Belgians and the Swiss (Petermann 2001).

Some rare, enthusiastic and cultured Moroccans also have engaged in the restoration and reuse of many remarkable historic buildings. It is worth mentioning, among all, the entrepreneur Abdellatif Ait Ben Abdellah who has “bet” with foresight on the medina, establishing a Literary Café and a hospitality network based on numerous carefully recovered riyadhs. Also from the point of view of its uses and activities, the walled city has progressively changed its face through the redesign of retail facilities and tourist-oriented services (Fig. 2).

⁴The definition of this social group is relatively new. It has been given by the American economist Richard Florida that refers especially to the urban population of some cities in the world (Florida 2002).

⁵Another element of fascination for young Europeans of the seventies, it must be said, was the availability or the expectation of the availability of cheap opiates. For a generation of Italians, the image of Marrakech is linked to Gabriele Salvatores’ movie “Marrakech Express”.



Fig. 2 Dar Cherifa, Marrakech medina (photograph of the author)

3 Outside the *Medina*: *La Ville Nouvelle*, or What Remains of It

When Morocco became French protectorate in 1912, although the walled city was far from being saturated, the authorities began to work on the idea of expanding the city with a plan entrusted to French architect Henri Prost.⁶

Invited by the military governor Hubert Lyautey, Prost was responsible for studying the foundation of the *ville nouvelle* outside the walls. The area identified for the development of the new city was in the north-west, in the direction of the main links with the Atlantic coast, the capital Rabat and other major cities of the country. The outcome of the French urbanist's studies is the districts of Guéliz and Hivernage, inspired by the British garden city theories. He planned the low-density settlement, based mainly on detached house typologies, on a regular beaux-arts road framework, having in avenue Mohammed V the main organizing element of the new urban system and its umbilical cord connecting to the historical city. It could be argued that the spatial principle of the new neighbourhood is inverse to that of the medina, with a morphological reversal of solids and voids: where you had the internal vacuum of the patio, enveloped in an irregular volume, here you have a

⁶In addition to the plan of Marrakech, in the same period he was engaged in the development plans of Fez, Meknes, Rabat and Casablanca. Henri Prost, a key planning protagonist of the first half of '900, is known for the Plan d'Aménagement de la Région Parisienne, approved in 1939. Equally important was his work as a "colonial" town planner in the Mediterranean. In 1936, he was also responsible for the general plan of Istanbul, the city where he worked until 1951. Among the main publications dedicated to him, see: J.L. Cohen, *Henri Prost and Casablanca: the art of making successful cities (1912–1940)*, *The New City*, № 3, 1996, pp. 106–121.

building, often variously articulated. A sort of photographic negative, organized according to a precise and elegant Cartesian order. In this configuration, surprisingly, the cross section of the great avenue—whose perspective frames the minaret of the Koutoubia and opens to the territory towards Jbel Guéliz, the Berber name of the low sandstone massif north-west of the medina—does not have any frontage, as it is framed either by villas or by very low buildings. The modern architectural language—from late Art Nouveau to Art Deco, through interesting Modernist experiments—provides the face of the colonial city. The large abundance of greenery, in the private gardens of the houses as well as on the tree-lined streets, makes Guéliz a hospitable, pleasant and enchanting neighbourhood, albeit far from the culture of local dwelling.

As already noted, the foundation of the new colonial city goes hand in hand with the ambiguous “invention” of an image of the medina that will mark its characters and transformations for all subsequent decades. The construction of an “exotic myth” and the codification of a Marrakech image in the European imagination date back precisely to the French protectorate’s season. The operation is ambiguous because of the difficult interpretation of its intent: Does the development of Guéliz come from a desire to separate Westerners from indigenous peoples or from the wish to protect the identity of the historic heritage of the old city? More likely, they are both true, in an operation aimed at both developing the city and preserving the medina. Whatever the governor Lyautey’s political will, in fact, with the construction of the *ville nouvelle* two important aspects of urban life emerged: the appearance of the first notion of historical heritage for the old city and the indication of a Western way to the modernization of the city.

Moreover, while in medina this principle will cause in a few decades the already described process of gentrification, Guéliz and Hivernage will undergo, since the 1980s, a pervasive campaign of housing replacement, which is still in progress, with questionable qualitative outcomes and some paradoxical corollaries. Within a century, in fact, the *nouvelle ville* has itself become an asset to be safeguarded and protected. The neighbourhood suffers an acceleration of uncontrolled transformations, both in physical and in functional terms, without a clear strategic plan that recognizes its value and interprets its role in the wider urban framework. «If the postmodern reuse of some central urban areas, as David Ley argues, is characterized by six main architectural elements—human proportions, pedestrian orientation, pluralism (of colours, materials and design), the presence of historical, regional and vernacular reminders, the enhancement of the local context and the attention to the picturesque—then Marrakech can also be counted among the global cities in which this kind of phenomenon is present» (Borghì 2010: 4; Ley 2001).⁷ Postmodern Gueliz is in fact affected both by the reuse of many parts—aimed at not only

⁷Rachele Borghi refers to the essay by Ley D (2001) *Styles of the times: liberal and neoconservative landscapes in inner Vancouver*, in Minca C (ed), *Introduzione alla geografia post-modern*, Cedam, Padova. By the same author, we suggest also the very useful essay Borghi R (2008) *Geografia, postcolonialismo e costruzione delle identità. Una lettura dello spazio urbano di Marrakech*, Unicopli, Milano.



Fig. 3 Guéliz between Colonialism and Postmodernism (photograph of the author)

strengthening the evening and daytime leisure economies through the massive establishment of retail facilities for the global market and numerous nightclubs, but also providing new commercial spaces—and by an extensive development process that does not take into account the historical corpus of the colonial city. An “endangered heritage” (El Faïz 2002), which is probably already widely compromised.

The nice garden city of Hivernage, a little further south, inspired by similar principles, enjoys proximity to the medina, developing on its western side. Because of its location, outside the walls and yet nearby, Hivernage hosts an important number of luxury hotels and institutional venues, while retaining its residential character (Fig. 3).

4 Outside the *Nouvelle Ville*, Between Resorts and Gated Communities

As we have seen, colonial times lay the foundation for rhetoric about the city as a goal for an “Orientalism” at hand. Emblematically, in addition to the construction of a western city, convenient and hospitable to European elites, the Mamounia hotel was built in 1921 on the initiative of the same governor. The guiding principle of

the building makes the policy underlying it even more evident: the maintenance of the medina in its historical and “exotic” characters as a “museum of daily life” in favour of Western tourists looking for a sense of otherness, and the construction of *extra moenia* luxury forts where the same tourists can comfortably stay, choosing and measuring their distance from the historic city. After almost a century, that same principle is the basis for the impressive building development and the extensive parcelization outside the walled city and beyond Guéliz: a tourist and often luxurious version of the gated communities. All of these interventions give rise to a third city, made of enormous enclosures, often guarded by security personnel, which sometimes hide holiday resorts or the great villas of the international jet set or some widespread and popular golf clubs. A poorly controlled development, which in its urban and territorial unbalanced effects, produces a scattered and dispersed environment not dissimilar to that of the western metropolitan suburbs. Appointed as a “Pilot City” for the national tourism development strategy,⁸ Marrakech is experimenting at its own expense a reckless use of resources and intrusive economic logics that do not take into account the delicate balance between the different urban districts. In his beautiful essay “Marrakech, patrimoine en péril” (El Faiz 2002), Mohammed El Faiz denounces three basic planning errors⁹: the national urban policy after Independence, which has invested heavily in the construction industry and, as a result of the last fifty years, has deteriorated urban and rural heritage; the Municipal Governance Plan of 1982, in which speculation forces have been able to direct urban growth to the north and east, eroding the most fertile agricultural land; the parcelization of the Palmerie, protected since 1929.

The consistency of the building activity of the last thirty years is added to the inadequacy of the forms of this recent urbanization: dispersed, disorganized, completely senseless. Unfortunately, however, we are not talking here of the apparent anarchy of the medina, whose latent order we have described is instead firmly confirmed. The city is faced with an uncontrolled land consumption that relies, among other things, on private mobility.

5 The “Relations System” in Marrakech

We still have to understand and investigate the relationship between these three distinct “urban” natures of the red city. Observing its internal movements, not only in terms of accessibility and transport, but also of fluxes—both long term and daily—we are able to make some assumptions about the functioning of the city as a whole, where the three parts give rise to synergies and conflicts.

⁸The reference is to a statement—“10 million tourists by 2010”—made by Muhammad V, King of Morocco, 10 January 2001 (Borghini 2010: 2).

⁹And also a “multitude of architectural horrors” (El Faiz 2002: 34).

A first important type of flow is that of the population moving to the city through a continuous process of urbanization of rural residents, whose destination has always been, historically, the medina. However, the gentrification of the walled city has led its property values to grow exponentially, seriously affecting its accessibility for the weaker classes, often forced to settle in the so-called douars, i.e. poor villages, in some cases slum dwellings.

This phenomenon shows the limits of a model of development based on tourism, which, unwisely managed, did create wealth indeed, but without significantly improving the well-being of the weaker resident population and without actually undermining the structure of a society founded on deep social inequalities.

The second type of flows concerns the mobility within the city, particularly that between the medina and the city outside the walls. Is it a centripetal movement, as in European cities, where attractive activities and public facilities are often concentrated in the historic centre or a centrifugal movement? Conversing with Moroccan inhabitants of Guéliz, one is surprised to learn that many of them have never set foot, literally, in the medina for years, and that their school-age children have never been there. There are different possible reasons for this unexpected circumstance, including, of course, the fact that for a middle class Moroccan who lives in the *ville nouvelle*, the walled city is synonymous with poverty, crowding, micro-crimes, unhealthy conditions, dirt and fatigue. It is a sort of memento: medina is something from which you want to escape, although the potential for tourism is very clear. However, another and equally interesting reason is that an inhabitant of Guéliz has no motive, except cultural ones, for going to the medina.

From the point of view of the functional allocations, in fact, none of the fundamental activities of life is there, none, at least, which is not already available in the new city. Citizens living *extra moenia* can rely on much more varied and rich shopping facilities, though largely standardized; on a more efficient road system; and on a more healthy, modern and enjoyable residential offer. Services—schools, public offices, gardens—are not lacking. You cannot say the same for the people of Medina who, although completely self-sufficient in daily life (we have seen that the city is organized in perfect working quarters), need to go outside the walls for any other activities. For example, the overwhelming majority of the public transport system—both the railway station and the bus station—is, as is easily understandable, outside the walls.

Finally, there are tourist flows. Although there is an increasingly significant presence of tourists in the medina who stay in the numerous Riyadh recovered as Maisone d'Hôtes, the greater majority stay in large accommodations outside the city walls: they visit the medina as an anthropological museum, leaving it behind as quickly as possible to return to the perfumed luxury of the lobbies and the refreshment of wide swimming pools (Fig 4).



Fig. 4 Walls of the Ville Nouvelle (photograph of the author)

6 Landscapes

Marrakech's charm could not be seized in its fullness without considering the extraordinary location of the city: not far from the Atlantic Ocean and the Sahara desert, at the foot of the High Atlas and Middle Atlas—with the highest summit in Morocco, Jebel Toubkal, that reaches 4165 metres—which stands in the background of the city as a warning. The relationship the city establishes with its territory is very powerful and, as has already been emphasized, is certainly one of the reasons for its prosperity in history and its unmistakable character.

This juxtaposition, the palms and the snow, is undeniably only one of the many contrasts that the city lives, which could be described through antinomies. This productive contrast inscribes the city in a double order of references: that of the oases in the desert, whose palms are the most widespread and evocative icon, and that of the mountains to which it belongs through its inhabitants.

Such a powerful landscape, however, is not limited to a regional scale, but is still present and expresses itself also on the urban scale. Here, the thick, dense and intricate system of the building materials—a mass from which the city is built by subtraction—is confronted with two types of large open spaces, immense pauses in the narration of the medina spaces: gardens and cemeteries.

The gardens are the indispensable complement to the city. The entire urban body would be incomprehensible and incomplete if there were no such important kind of spaces where the relationship between nature and artifice creates enchanting and hospitable places. Moreover, there is a «structural relationship between the garden and the city, where the structure is meant as an organic and orderly relation of elements» (Petruccioli 1994: 85). In order to understand the role and character of the gardens in Marrakech, however, a brief reference to the tradition of the Islamic garden, its origin and its meaning is needed. The most common and documented interpretation considers «the garden as a replica of the more or less explicit Koranic paradise» (Petruccioli 1994: 10). The theme has been subject to intense studies; here, we are interested in focusing on the specialty of the gardens. The opposition between garden-court inside the palace walls (Roman tradition) and the garden-park (Persian tradition), proposed by some scholars is denied in the imperial cities of Morocco, where they are both present. A distinction is also made between basic garden (suburban irrigated allotments) and monumental garden.

Attilio Petruccioli also emphasized that, from the end of the eighteenth century, the garden was also a fundamental vehicle for spreading the “orientalist” taste among the Westerners. «A reinvented Islam enters Europe in eclectic forms, as a memory of an imagined reality, the universal recovery of all human civilizations inherited from winning colonialism. [...] The result of this new taste is tangible in the garden [...] where more easily the pleasure of the elsewhere is released [...] followed by a kind of collective infatuation» (Petruccioli 1994: 7–8).

The garden is derived from a hostile, arid and mean nature through the delimitation of a fence. On an urban scale, the fence is provided by the outer walls, which in Marrakech are deformed to the south to contain the imperial gardens of the Agdal. «Agdal is a word of Berber origin that applies to lawns without artificial irrigation belonging to the community; the term has come to indicate parks shaded by trees, evidently artificially irrigated in dry and hot regions, intended for walking or horseback riding, whose trees (olives, fruit plants, cork oaks, etc.) have economic utility» (Barricand 1994: 155). In the red city, Agdal is an extraordinary ancient garden with orchards and allotments, arranged on a rigid geometric grid based on a square module. This is an endless sequence of trees—440 hectares, provided with the most varied plant essences (with the prevalence of citrus and olive trees)—realized by the Almoravids from the second half of the twelfth century (Fig. 5).

Beyond the admiration for a garden of such an extension, one must consider the strength of this element in its connection with the city, to which it is linked by a mutual relationship. «But [...] the city and its wonderful garden, people and crops live together due to a large scale artifice that made them historically and geographically possible» (Luciani, Boschiero and Latini 2000: 12)¹⁰: the water system.

Inside the Agdal, two large water tanks, Dar al-Hanâ and al-Ghersiyya, show the ingenious hydraulic device that made this paradise on earth possible. The system of

¹⁰At the time of the French protectorate, about 51,000 fruit trees had been surveyed, but sixteenth-century sources report 66,000 trees.



Fig. 5 Garden of a Riad inside the Marrakech medina (photograph of the author)

gardens and parks would not be understandable without considering the remarkable abundance of water and the incredible wisdom that allowed to channel it and to make it available on the surface. Marrakech can, therefore, be defined a city on water, albeit hidden. «Especially in the southern regions, of which Marrakech is the capital, the ownership of land is nothing without water» (Wilbaux 2001: 11).¹¹ The relationship with water is the foundation of the settlement rules of the city.

Water is present in many forms: on a domestic scale, with the water tanks inside the patio; on a neighbourhood scale, with the local public fountains that help to design that hidden hierarchy we have already described; on the urban scale, with the display of the large tanks, as in the example already mentioned or in the beautiful Manara gardens outside the walls.

The fate and the safeguarding of the hydraulic heritage are now the subject of an important battle of ideas. The region called Haouz of Marrakech, characterized by the groundwater collected from the mountain and the rains, is in fact today seriously threatened in its delicate balance by the reckless use of resources. The water resources—the hidden heritage under the body of the city—is not only a natural wonder, but also, and above all, an extraordinary man-made system of channels.

¹¹On the same topic, see also Pérennès J.J., *L'eau et les Hommes au Maghreb*, Karthala, Paris 1993.

Starting from the Middle Ages, they built «five underground pipes, *khattara*, for an estimated total length of about 700 km, manually dug through at least 70,000 wells. For over a century, from the middle of the eleventh to the middle of the twelfth, the system provided 3200 litres per second, thus constituting a necessary basis for the settlement of the imperial city» (Luciani, Boschiero and Latini 2000: 13). A work that for its complexity and consequences on the fate of the territory recalls the contemporary remediation activities carried out in Europe by the Cistercian monks in the recovery of the wetlands of the Po Valley.

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Metropolitan Public Realm Frameworks for Coastal East African Urbanization: The Case of Malindi Waterfront as Socio-Ecological Infrastructure

Alessandro Frigerio

Abstract East Africa is one of the least urbanized regions in the world, but living one of the fastest urbanization under the threat of climate change. This unprecedented uncontrolled phenomenon is producing hybrid metropolitan systems with inadequate infrastructure, polarized development, unsafety, socio-spatial inequality and environmental fragility. How to shape rapid growth towards original low-carbon and livable models in a context of informality, scarcity and misgovernment? Through a historical exploration and an overview on the contemporary situation, the chapter investigates the attempts to recentre the problem on the city as public framework, with an inclusive attitude towards whatever considered informal. A designed-based approach explores the role of socio-ecological envisioning scenarios, set on the strengthening of public/common assets, as decision-making tools to facilitate resilient urban processes. The resulting adaptive metropolitan frameworks integrate physical operations on continuous infrastructural systems and nodes, together with in/formality gradient patterns for their sustainable implementation and stewardship. The case study of a project for Malindi, Kenya, elaborated for an UN-Habitat competition in 2016, is discussed. The proposal to intend and design the waterfront of the city as socio-ecological infrastructure is reviewed according to preconditions, expectations, stakeholders, methodology, design and results, with emerging transdisciplinary issues.

1 Coastal East Africa Towards a Livable Low-Carbon Urbanism

East Africa is the world's least urbanized, but fastest urbanizing, subregion and most of its urban development happens informally (UN-Habitat 2014a). It shares common roots and urban history related to the Swahili culture, the British and German colonization, the East African Community political vision, and it is facing

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a decisive moment in its urban revolution. An interscalar and transdisciplinary urban design agenda is emerging in a context of uncertainty and socio-economical and ecological instability (Myers 2011).

Accepting the formal–informal dichotomy as ‘based on the states definition of norms and standards’ and the ‘aspiration to regulate according to these’ (Jenkins 2013), we can consider that in facts some 70–80% of East African urban population is living informally. Informal urbanism is the norm, with its different complex ordering patterns. Therefore, a different inclusive narrative has to be developed around these cities and new paradigms should be explored in the way to deal with their growth for an improvement of living conditions.

A relevant figure reported by Pieterse (2013) shows how in Africa, differently from ‘the popular impression of megacity explosion’, more than half of urban population in 2007 ‘lived in settlements with fewer than 0, 5 million people’. Hence, the role of intermediate cities appears extremely relevant in the composition of this new narrative. In coastal East Africa, the contemporary combination of megacities and smaller centres and their relationship with the rich ecological and agricultural context presents a multiplicity of interconnected issues with the potential to find a local way for a sustainable growth.

How to preserve local low-carbon lifestyle patterns while improving living standards? Is it possible to imagine a postmodernist inclusive and sustainable livable urbanism, rethinking sub-Saharan African urbanization (Swilling 2013; Cartwright 2015)? Moreover, setting the focus on physical urban development issues, how could architectural and urban design set the condition to trigger these processes?

2 East African Urbanism: Cosmopolitanism and Inequalities

The origins of the peculiar urban history of coastal East African cosmopolitan urbanism date back in fifteenth century. Swahili urbanism—merging Persian, Bantu, Arab, Indian cultures and European interferences—flourished on the African coast facing the Indian Ocean thanks to fertile commercial exchanges. The birth of Swahili culture can be said to coincide with that of Kilwa Sultanate, whose power was fostered by a metropolitan maritime network extending from Mogadiscio to Mozambique. These rich commercial relations attracted the Portuguese first, and, at the end of the seventeenth century, the Omani Sultanate that strengthened its presence in the area at the point to definitely move on the African coast, settling the powerful Zanzibar Sultanate. The continuous blending of Eastern and Western cultural influences gave to Swahili port cities a unique urban character, with hybrid spatial frameworks mixing the Bantu value of void space as collective and symbolic and the Arab structure of commercial armatures as backbone for dense urbanization (Folkers 2010). Stephanie Wynne-Jones and Fleisher (2014) points out how, since their origin, Swahili towns were both planned and unplanned: dual

cities built in stone or wood/mud on a system of relational spaces, city as processes, with housing as ephemeral element of consumption.

Only at the end of nineteenth century, after the scramble for Africa at the Berlin Conference, the European colonizers started to settle permanently on the territories they were exploiting in this area. From this point on, local urban history can be periodized according to the evolving relations between sub-Saharan Africa and the global North, in a mutant modernist utopia leading to disillusion¹ (Frigerio 2016). The influence of modernist planning paradigms continued to produce unavoidable conflicts, layering globalized models on existent physical and cultural topographies. Planning efforts persisted in excluding local population and minor stakeholders with disregard of their rights (Nnkya 2008). This attitude replicated dynamics of segregation, producing socio-economic urban processes and spatial configurations to be called as informal, due to their condition of alterity; an alterity that, for numbers and scale, has become for local governments more and more difficult to ignore.

The urban result of a century of accelerated and unbalanced multiculturalism demonstrated the resilience of Swahili urbanism, but even the challenges that it has to face when scaled up to metropolitan dimensions and exposed to unpredictable environmental and economic changes, resulting in rising inequality patterns.

In the last decades of twentieth century, the actions to face the ever-growing urban critical issues in the area took different directions, with various models and scales of interventions on the built environment: formalization or site-and-service initiatives at the local level or great infrastructural projects by multilaterals. At different scales, they relied on infrastructure as urbanization driver, without a synergic enhancing of urbanity patterns and in a controversial lack of political urban vision.² At the same time, to face the consequences of ineffective, segregating or neglecting approaches, several bottom-up initiatives run by non-governmental organization started to take care of the informal world in a non-systemic way—often romanticizing its characters—promoting microprojects with various degree of success, but often a limited impact on a wider scale.

When everything seemed to have been tested in coping with rapid urbanization and its informal side effects—from full-designed to un-designed solutions—an apparent overcoming of the disillusion towards the role of comprehensive planning arose at the beginning of twenty-first century. A revival of total master planning—mostly replicating Western models and disregarding the informal soul of cities—

¹Overlooking planning attempts in the major cities, it is possible to note exploitation and segregation at the beginning than attempts of inclusivity—but still based on the imposition of an exogenous culture—to finally reach the independences—formally political, but only partially cultural—rapidly leading to the informal era, the birth of UN-Habitat (1978) and the multiplication of humanitarian and neocolonialist interferences, reassessing an idea of dependency still difficult to elaborate (Frigerio 2016).

²The recent project for the BRT (Bus Rapid Transit Infrastructure) in Dar es Salaam is a relevant example: high metropolitan relevance without any spatial integration design effort (Frigerio 2014).

took back the scene with a new plan in all the major East African cities³ between 2012 and 2014 (Watson and Agbola 2013). Isolated experimental attempts, blending top-down and bottom-up approaches, traced a sustainable agenda based on a recombination of settling and densification strategies, sensible of existing relational patterns—as in the recent activities of the Department of Urban and Rural Planning of the Government of Zanzibar (DoURP 2014; Folkers 2016). This last seems a much more promising approach as, dealing with informality, it makes an attempt to move beyond erasure or remediation plans towards more inclusive strategies.

3 An Inclusive Perspective: Bringing Informality on the Map

To consider informality as part of systemic metropolitan and urban relations, it turned necessary to build a different awareness regarding its physical consistency (Jenkins 2013). After the formal recognition of ‘informality’ in the 70s, four decades of debates, policies and strategies produced a consistent amount of failures (Fiori 2014), mostly due, according to Fiori (2014) to the ‘almost complete despatialization of the debate on the informal city and of the strategies for dealing with it’. Only at the end of the 90s, a renewed interest on the role of architectural and urban design in approaching the informal city opened a different path, with relevant experiences in Latin America (Gouverneur 2015). In the sub-Saharan context, the African Center for Cities at the University of Cape Town concentrated its research activity on this challenge, promoting multidisciplinary projects to explore the essence of sub-Saharan citiness through the investigation of existent sense of belonging, mapping significative relational patterns (Pieterse 2013).

Mapping is, in fact, a determinant keyword to address these issues from a spatial dimension perspective. Mapping is knowledge, awareness and a first step towards inclusivity. Data gathering through information and communication technologies (ICTs) is producing a relevant shift in understanding and coping with African cities and their not-acknowledged interdependence between formal and informal processes and spaces. Participatory GIS-based mapping experiments,⁴ together with social networks data elaborations, are offering a different perspective on the real

³Dar es Salaam in 2012; Kigali and Dodoma in 2013; Nairobi, Mombasa and Zanzibar in 2014; and others. .

⁴After the first experiments in Nairobi (Kibera, Mathare, Mukuru), on the coast, Dar es Salaam and Zanzibar explored ICT and drone-assisted mapping potentials, as tools to reinforce the awareness of local cultures and to set synergies between formal and informal socio-metabolic flows (Frigerio 2015). The project Dar Ramani Huria (which is Swahili for ‘Dar Open Map’) is a relevant example. It is a community-based mapping project, funded by the World Bank, involving university students and local community members to create highly accurate maps of the most flood-prone areas of the city, essential tools to develop culturally rooted patterns of metropolitan resilience (Ramani Huria 2016).

consistency of East African rapid urbanization and its informal urbanity, revealing qualitative, together with the usual quantitative, information (Sliuzas 2004). Furthermore, innovative uses of ICT allow a different approach to service provision (water, electricity) and economic exchanges in informal contexts. Progress in this field is fostering post-industrial and glocal solutions that are site-specific, but scalable, and able to produce original imaginaries; it influences the inventive use and perception of urban spaces, producing at the same time a relevant amount of data regarding these previously un-mapped patterns.

4 Public Realm Adaptive Frameworks: Socio-Ecological Infrastructure as Metropolitan Ordering Tools

Bringing informality on the map opens the way to urban projects that could explicitly include it in—or better set it at the centre of—multiscalar integrated frameworks of reconciliation. Several international experiences proved how accepting informal settlements as integrated parts of the city ecosystem and investing in the upgrading of their public spaces and facilities can produce positive effects in improving the overall urban quality (Gouverneur 2015).

In the transformative context of contemporary East Africa, the challenge to design integrated but adaptive urban and architectural spaces recalls the classic idea of order as relational process, more than superimposed model. Stability can be reached upon agreement on certain shared priorities (public, collective, common) that, spatially, takes shape in the domain of the public sphere: public/collective/commons realm, assets, facilities, spaces.

UN-Habitat recent recommendations assess the role of streets and public spaces as drivers of urban prosperity.⁵ The researches by the AA research cluster on Urbanism and the Informal City (Fiori 2014) and by David Gouverneur (2015) in his political and academic activities⁶ are other prominent experiences to be quoted, as they both stress the relevance of the relationship between resilience, urban form and public space. Refocusing on the original public gene of the city poses the essential problem of the defendability of whatever defined as public, especially in contexts like the East African, where public spaces are not a common feature of contemporary urban fabric. Recalling landscape urbanism (Waldheim 2006) and ecological urbanism (Mostafavi 2010) intuitions, together with the readings of

⁵Un-Habitat (2013) promoted researches and experimental project to test public space design as tool for urban transformations in slums. The explicit link between public space and quality of urban life has been stressed by the ‘Global Public Space Toolkit’, connected to the Global Agenda for Sustainable Urban Development (Un-Habitat 2014b, 2015) and has been echoed in discussion on the New Urban Agenda (2016).

⁶The concept of *informal armatures* by Gouverneur (2015) emphasizes this idea of ‘a system of public spaces as placeholders for urban infill’, an adaptive framework with morphological and performative implications.

similar Asian phenomena by McGee (2009), the relevance of geographical features emerges as possible robust structure.

Investing in the interscalar reconnection of public assets as socio-ecological infrastructure could confer *de facto* tenure security as first step towards recognition and legalization, could produce positive formal–informal interactions through local stewardships and could foster social and ecological improvements. The sub-Saharan debate on socio-ecological systems (Harrison et al. 2014) suggests ‘to consider the many interactions among physical and non-physical aspects’ to link social and ecological sustainability and practices, even through citizens’ participation (Simone 2004) aiming at reaching multiple goals: low-carbon development, social inclusivity, fostering of local economies and productions, cultural rooting, climate change resilience, interscalar governance, urban quality.

In the framework of this inclusive paradigm, the architectural and urban project assumes an essential relational role, requiring a multiscalar toolbox of maps and operations for transparent decision-making and participatory processes.

5 Drafting a Methodology: Interscalar Mapping and Envisioning Scenarios

Few, but very different occasions give to architects the chance to intervene on public realm in the context of East African cities. The client can be a multilateral organization, or a public administration, a philanthropic organization, or a NGO, a private client, or academia involved in research or consultancy. In the inclusive socio-ecological paradigm rapidly drafted above, each project, at each scale, can be considered an urban project with the potential of a rhizomatic multiscalar effect. The research by design experiences carried on by the Measure and Scale of the Contemporary City Research Lab (MSLab) at the Polytechnic University of Milan investigated this field under the keyword of ‘metropolitan architecture’, with several project—in East Africa (Mozambique, Tanzania, Uganda, Kenya) and other developing countries—combining infrastructure of connectivity, ecological armatures, public facilities (culture, education and health) and public realm (Contin 2015). The methodology emerging from these experiences, as well as from the others previously mentioned, indicates the relevance of maps drafting as tool for reading the context at the various scales and producing envisioning scenarios as facilitating frameworks to build efficacious synergies among the stakeholders.

The base is geography. Territorial features are the robust elements to anchor any physical operation on the metropolitan structure, urban fabric, neighbourhood space. Urban biography is then matched with it, together with the living patterns of the city. From extra large to extra small, the mapping operation, gathering data from different disciplines and know-hows, goes through a metropolitan matrix, mental map for regional connectivity and density distribution (Ortiz 2014); maps of public protection, representing landscape armatures defined by natural risks and values;

maps of public porosity, through public accessibility networks, basic infrastructure provision and public facilities; maps of urban DNA, with morphological studies on the settlements, public spaces and buildings, to understand patterns of settling or densification; finally, an exploration of existing socio-ecological patterns (Alexander et al. 1977), mapping cultural and economic characteristic ways of interacting with space or providing to basic needs in relation to the local space of commons.⁷

This mapping effort produces an interscalar, complex framework of the metropolitan public realm, suggesting actions and operations on the continuous linear systems, as well as on their nodes. They give representation to urban design ecologies allowing a recombination of settling models (Shane 2011). Designing in this framework, with the aim of strengthening the robustness of the public structure of the city, is possible to operate on existing public assets through the main operations of urban metabolism, redefined with particular relation with the East African context, in a gradient from maintenance to transformation: protecting (ecological resources, built, natural and invisible heritage); strengthening (selection, enhancement, improvement of relevant public/common patterns); fixing (repairing by substitution assets at risk, i.e. floodable areas); acupuncture (inserting public in hyperdense or privatized areas to improve accessibility and rights); founding (new designs for new settlements/expansion areas recombining and scaling local patterns). These operations allow to design impact and envisioning scenarios with in/formality gradient, related to specific urban and architectural issues and respective projects, as platforms for stakeholders' mobilization, public participation and negotiation.

6 A Case Study: Malindi Waterfront as Socio-Ecological Infrastructure

In 2016, UN-Habitat, in collaboration with the Urban Development Department of Ministry of Land, Housing and Urban Development of Kenya, organized the International Design Collaboration for Kenya (IDCK) competition looking for creative planning and design ideas for sustainable urban development (Un-Habitat 2016). Kenyan rapid urbanization will bring the country's urban population from the current 12 million to approximated 43 million by 2050, close to 50% of the country's total population (UN 2004), with a strong impact on secondary and intermediate cities. In the 2012–2015 period, UN-Habitat has provided 'Support to Sustainable Urban Development in Kenya' through various initiatives. Among

⁷A report on the future of African cities by the Uongozi Institute, held in Dar es Salaam in 2015, stresses the importance of 'initiatives to reimagine and improve public spaces, can foster safer, more cohesive communities and contribute to job creation and local economic development' without requiring 'significant capital investments for infrastructure nor long lead times to construct'.

them, the support to the Kenya Municipal Program (KMP)—financed by the World Bank—is particularly relevant, as it led to the formulation of Integrated Strategic Urban Development Plans (ISUDPs) and Digital Topographical Mapping for nine selected secondary cities.⁸ IDCK was intended as a way to involve local and international planning schools in this process, asking international and multidisciplinary groups to apply for one of the nine cities (Un-Habitat 2016). The author with a group of researchers belonging to the Measure and Scale of the Contemporary City Research Lab (MSLab) from the Polytechnic University of Milan, Department of Architecture and Urban Studies—in cooperation with Kenyatta University—applied for the Malindi site, facing the challenge to test the approach drafted above.

6.1 Malindi

According to Kenya National Bureau of Statistic Census, in 2009, Malindi metropolitan area houses around 200,000 persons and the town of Malindi around 85,000, with prediction of doubling by 2035 (CGK 2015). Land is mostly dedicated to agriculture or ecological assets, and it is largely undeveloped, with anthropization pressure concentrated on the fragile coastal environment, mostly privatized.

Malindi is one of the most important coastal cities of Kenya, head of Kilifi County, and it has a metropolitan area geographically defined by the Indian Ocean in the east, the Arabuko Sokoke forest in the west, Mida Creek in the south and Galana River in the north. Its strategic position is a key issue for its urban history since the thirteenth century, when it is already witnessed as existent Swahili settlement. Its fortune evolved in accordance with East African history, knowing Portuguese influence, a gradual decline, the refoundation by Zanzibar Sultanate, and at the end of the nineteenth century British colonial administration, with a progressive opening to the global north and the birth of the tourist industry (Martin 1973). The recent evolutions of the international scenario are posing relevant issues regarding its role as international destination and stressing the need to improve economic diversification.

Malindi's Integrated Strategic Urban Development Plans 2035⁹ (ISUDPs) are anyway built on the vision statement: *Developing Malindi as an international tourist destination with world class infrastructure and vibrant economy* (CGK 2015) than drafting a multifunctional economy that could strengthen the existing farming and fishing sectors and introduce knowledge and leisure services.

⁸The nine cities (2015 population in brackets) were Embu (60.673), Kitui (155.896), Machakos (150.141), Malindi (207.253), Mombasa (939.370), Nakuru (286.411), Naivasha (91.993), Nyeri (133.346) and Thika (136.576).

⁹ISUDP Malindi 2035 has been produced between 2014 and 2015 by Kilifi County Government with the consultancy of Intercontinental Consultants and Technocrat Pvt Ltd (New Delhi) in association with Geodev K, Otieno Odongo & Partners and Runji & Partners (Nairobi).



Fig. 1 Project aimed at designing Malindi waterfront as a socio-ecological infrastructure, able to answer to the environmental challenges related to climate change and natural hazard and, at the same time, to provide an interactive platform for social inclusivity, economical enhancement and cultural empowerment—by designing the central area facing Shella as main metropolitan interface

Considering the whole metropolitan region, the nuclear development of the settlements is seen as an opportunity to develop a decentralized polynuclear system, according to a radial growth pattern for a low-density green development (CGK 2015). Investments in public, social and ecological infrastructure are expected, especially in denser areas and informal settlements. The ISUDP provides samples for detailed Action Plans for the implementation of some residential, commercial and recreational priority projects.

6.2 *The Competition Proposal*

With the aim of enhancing the urban design component of the ISUDP, the IDCK's bid for Malindi proposed to work on the Action Plan for the redevelopment of the waterfront—a system of spaces with an important social vocation but strongly degraded—framing it in an overall strategy for the coastline at a wider scale (Un-Habitat 2016). In Malindi, uncontrolled urbanization, mainly boosted by the tourism economy and its side effects, favoured dynamics of privatization of the coastline, with a concurrent rapid growth of formal and informal settlements lacking proper infrastructure and collective spaces, as well as a hazardous pressure on the fragile ecosystem. In this situation, the project set the challenge to reclaim to the waterfront its role: not limited to its 'public space' vocation, but extended to its 'public good' dimension. The project aimed at designing Malindi waterfront as a socio-ecological infrastructure, able to answer to the environmental challenges and, at the same time, to provide an interactive platform for social inclusivity, economical enhancement and cultural empowerment. The project proposed a general environmental and infrastructural strategy for the whole Malindi waterfront (Fig. 1) and then investigated in detail the design of the central area facing Shella—a dense historical informal settlement—as main metropolitan interface.

Metropolitan mental map and issues. Looking at a wider scale, the project suggested the definition of a metropolitan growth strategy for the city organized on a reticular framework rooted to the regional geographical features—differently from the radial model suggested by the ISUDP—with the aim of avoiding an increase of congestion in the centre and allowing the definition of a better integrated strategy for the waterfront. To control the future of the coastline (affected by sedimentation and erosion processes), urgent actions should be undertaken at an even wider scale, considering the entire Galana river basin.

An eco-armature adapting to landscape metabolism. The waterfront is intended and designed as an eco-armature working for the ecological metabolism of the region. To protect and expand the fishing and tourism economies on Malindi Beach, the project proposed to control the sedimentation process through the protection of two mooring and docking areas with deepwater. To defend Casuarina Beach from erosion, a necklace of artificial islets was designed along the coast to foster natural sedimentation processes for beaches accretion. Their position and

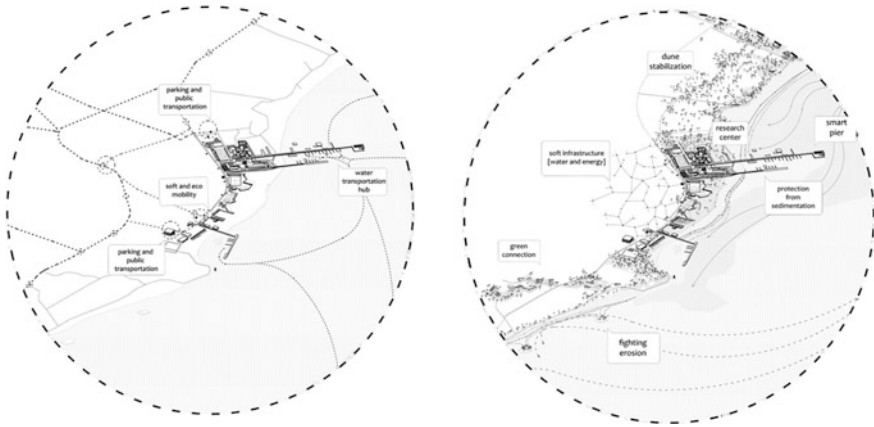


Fig. 2 Accessibility and ecological strategies: parkings for private cars and public transportation stops are located in specific accessibility nodes, while the whole waterfront is only accessible to bicycles and electrical mini-cars (tuk-tuk) managed by local cooperatives. Energy is harvested throughout the waterfront area (Shella included) thanks to spread energy patterns providing also public lighting and Wi-fi connection and, in certain case, able to harvest rainwater for different uses. Moreover, the double pier is imagined as a testing ground for tidal power production

character are linked to an enhanced public accessibility to the beach in selected points (Fig. 2).

Expanding the public lattice. The design effort aims at providing an urban and architectural adaptive platform as ordering device that interprets the existing local urban pattern and the relational logic of its open spaces. The coastline contour line is redefined as a lattice (Alexander 1966) that assembles built and void spaces in a system of scenes. The platform is imagined to be implemented over time, and it integrates multiple patterns with various in/formality interactions between spaces and agencies. The proposed patterns are a sample of a possible multitude that should be developed through participative processes and involve even Shella's existing open spaces to foster its integration with the waterfront and to enhance living conditions in the settlement. The need to improve public accessibility to the waterfront offering it as public space is combined by the project with a low-carbon strategy including solutions for slow and eco-mobility and promoting off-grid and innovative energy-water patterns (Figs. 3, 4).

Promoting knowledge economy and cross-cultural short circuits. The challenges that all the Kenyan and East African coastline is facing in terms of climate change and ocean protection suggested to propose Malindi as preferred location for a research centre devoted to these topics,¹⁰ merging research, education and dissemination activities. The research centre is designed in connection with the new

¹⁰Possibly a branch of the Kenya Marine and Fisheries Research Institute and/or with other international partnerships.

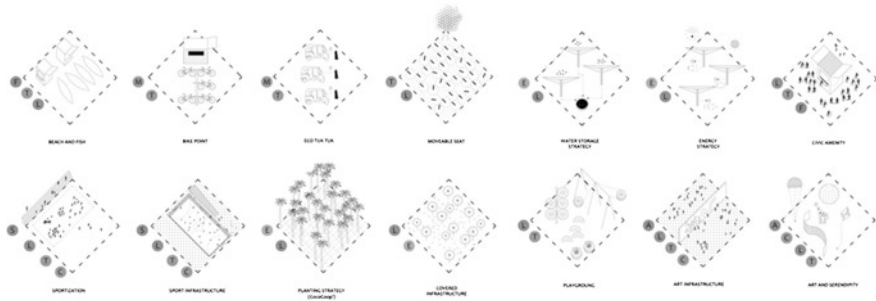


Fig. 3 Public platform is imagined to be implemented over time, and it integrates multiple patterns with various in/formality interactions between spaces and agencies. Ecological and accessibility issues are hybridized with economic interactive cycles (related to fishing, tourism, commerce) and non-economic drivers (heritage, collective events, intangible values and personal stories). The presented patterns imagine for the waterfront a wide set of events and activities with various scales and formality gradient: sport, leisure, music, culture, festivals, commerce, fishing, agriculture, tourism, memory, education, co-working, art, etc., for a vibrant urban environment

double pier harbour, within the main metropolitan waterfront node. This is located where the fish and tourist market already are and it is imagined to become the new symbolic reference for the city, triggering unexpected interactions and cross-cultural short circuits between citizens and visitors.

The project as a process, towards a better resilience. The project aimed at offering a dynamic structure, resilient and robust in assessing its public dimension, durable and temporary at the same time, according to the scale and nature of the urban phenomenon. The resulting adaptive public realm framework set the basis for further expected interactions with stakeholders at the different scales, to drive actions and investments for the sake of a common result. This process of agreement on priorities could be a contribution to the definition of local publicness, and it is in itself a tool to improve the city resilience to social, economic, environmental changes.

6.3 Results and Remarks

The described project was selected as best proposal for the Malindi site with equal merit with another. All the shortlisted projects, for the nine cities, were exhibited and presented at the Nairobi United Nations Headquarter in June 2016. The event represented an occasion for an open and transversal dialogue. The urban visions were discussed with the local government officials and the academic partners from local universities and will be taken in consideration for the review of the Integrated Strategic Urban Development Plans (ISUDPs). The role of urban design scenarios as trigger for participation processes and synergic decision-making was repeatedly underlined as powerful tools by the representatives of public administrations.



Fig. 4 Coastline contour line is redrawn and built as public adaptive platform that assembles built and void spaces in a system of scenes, opening the city to the beach through a permeable system. The double piers, the research centre, the aquarium and the oceanic centre with its spaces for sports and culture, the new fish and crafts markets with food stalls and bars and the marine park for contemporary art build a metropolitan node of interaction between citizens and visitors and the related economies

7 Challenges

High expectations seem to be back on urban (and city) design in its evolving interscalar, interdisciplinary attitude to shape physical space, with the ambitious aim of ‘harnessing urbanization’ for a ‘climate-smart’, ‘inclusive’ growth (Cartwright 2015). Open urban scenarios and projects can produce mental maps for a different imageability of East African complex metropolitan systems. In this perspective, challenges for metropolitan architects include the need to cope with implementability issues as part of the design process; the challenge to extend the design results to ecological and social responsibility and local economic enhancement through un-common solutions; the charge to negotiate and engage with local institutional decision-making habits; the development of a non-ideological approach towards informality; the opportunity to involve non-physical patterns allowed by ICT. The attempt itself represents a part of the path towards what Pieterse (2008) calls the ‘relational city’, as cited by Myers (2011): ‘a model of urban development where the broad and “variegated” collection of urban actors in urban development engage with one another across divides between formal and informal, symbolic and concrete, collaborative and contestatory’.

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Mobile Urbanity in Southern Africa. The Socio-Spatial Practices of Informal Cross-Border Traders Between Johannesburg and Maputo

Paola Piscitelli

Abstract The paper investigates the interplay between informality, mobility, and urban space in Sub-Saharan Africa, by focussing on the practices of the *mukheristas*, Mozambican informal cross-border traders. In the *mukhero*, informality and mobility intersect and constantly reshape each other, in a way that has turned a customary survival strategy into a phenomenon well-blended with the global logics underpinning contemporary urban processes. The *mukheristas* deploy movement across transnational distances as a livelihood strategy to overcome structural constraints and, by doing so, they interconnect translocal urban spaces and heterogeneous networks. By re-tracing their socio-spatial practices between Johannesburg and Maputo through a grounded-theory approach based on multi-sited ethnographic explorations, the paper tries to unfold crucial, but underestimated process pertaining to the constitution of the urban life in Sub-Saharan Africa.

1 Introduction

*“My name is S. C. and I am a mukherista, I do the mukhero.
Many women are doing this business (...).
We cross the border to go to another country to buy some stuff
and sell here and sometimes we buy here and sell outside the country.
It depends on the kind of business the person is doing.
It is not only our job, it is our way of living!”*

(S. C., a Mozambican *mukherista*—Maputo, July 2014)

The word *mukhero* is a Portuguese-Anglo-Bantu neologism coming from the corrupted English phrase «May you carry this bag to the other side?» and refers to the informal cross-border trades between Mozambique and the surrounding countries. Born as a survivalist practice, it has eventually funded its duration on the

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capacity of using the border and leveraging on economic and price differentials between Mozambique and the neighboring countries (Manganhela 2006). Nowadays, the *mukhero* is a common job for many people in Mozambique, often able to offer greater income returns than formal wage labor, and undoubtedly greater freedom and flexibility (Barreau-Tran 2011, Raimundo 2009)). The combination of these factors of success is fundamentally related to the mobility component implied in the practice. Being mobile represents an instrument to circumvent or navigate hard contextual situations and a means for self-determination. Mobility has always been a crucial component of people's life in Africa. Through constant movements in search of work, new lands, and resources, particularly in the Southern and Western part of the continent (Chabal 2009), Africans have shaped societies, cities, regions, and Africa itself as a whole. This happened before, during, and after the colonial occupation, despite the establishment of the colonial boundaries, eventually become national borders (*ibid.*) (Fig. 1).

Marking the way 'with their feet', Africans have intensified the connection between distant urban locations—in Africa and beyond (Simone 2014). If rural-to-urban migration appears substantially decreased today, the circulation of populations involved in a multiplicity of economic activities between and across primary and secondary cities, instead, endures and produces increasingly elaborated transnational circuits of movement (Simone 2011). By building urban and inter-urban linkages across national boundaries, mobility constitutes a crucial feature impacting urbanity. Yet, we do know little about the actual configurations through which this happens.

The present paper engages the issue of the interplay between mobility and urbanity in Africa starting from the unusual perspective offered by the practices of informal cross-border traders, a case that is usually studied with regard to its economic or socio-anthropological implications, while less attention is paid to the way in which it re-articulates urbanity in and between cities. Though, the socio-spatialization of the practices performed by informal cross-border traders constitutes a valuable opportunity to investigate interconnected dynamics shaping cities and territories in Africa.

Starting with a short overview of the coordinates setting the theoretical framework and the method through which the research developed, the paper will focus on the 'urban effects' generated by the *mukhero* along the corridor between Maputo and Johannesburg (Fig. 2).

2 Toward the Conceptualization of 'Mobile Urbanity'

In order to address the nexus between human mobility and urbanism, this work sets forth the 'mobile urbanity' concept as the heuristic tool to read the city through the everyday life experiences of mobile subjects (De Certeau 1984), in terms of their concrete social and place-making practices, as well as of their appropriation of space in different and distant cities. Through the 'mobile urbanity' lens, mobility is



Fig. 1 *Mukherista* passing the border at the Rossano Garcia border post. Photograph by P. Piscitelli

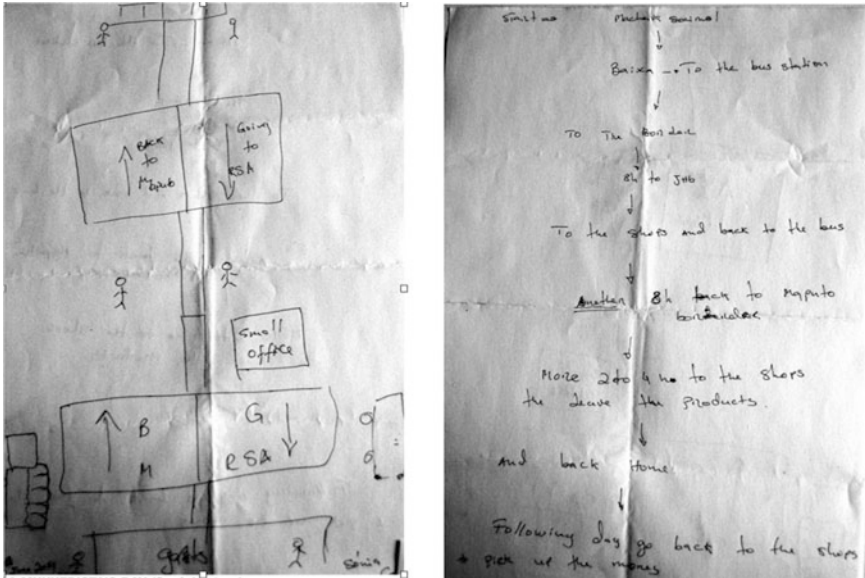


Fig. 2 Everyday routine of a *mukherista*. Drawing by S. C., a *mukherista* interviewed in Maputo in 2014

employed as an urban analyzer to investigate its ‘ontogenetic’ power (Pucci 2016), or, in other words, its generative capacity of constituting urbanity.

Drawing on the assumption that mobility is a highly differentiated activity (Urry and Sheller 2006), experienced differently by people according to the contexts and conditions in which it takes place (Massey 1993), the adoption of mobility as an analyzer follows a critical approach (Söderström et al. 2013), that highlights both the power dynamics from which any mobile practice can never prescind and the agency of people on the move to navigate them. In particular, the agency of mobile subjects is here observed with regards to its socio-spatial manifestations.

Since mobility interconnects places, a critical approaches interested in the socio-spatial agency of mobile subjects demands a ‘relational–territorial’ approach (Collins 2011), able to reverse spatial ‘pointillism’ (Doel 1999),—namely, the leanings to render places as containers—and to rather think and account for space relationally (Massey 2004). The ‘relational–territorial’ refers to the idea that nowadays the ‘here’ refers more and more to ‘elsewhere’ (Söderström 2014) and that the analysis of the spatial interconnectedness can shed a light on issues that otherwise are only partially caught and understood.

This is done by privileging a ‘view from below,’ that considers the city not simply as a string of infrastructures and technologies, but also as a place of bodies, aspirations, and rhythms, or, in other words, as ‘the way we moderns live and act, as much as where’ (Donald 1995). The ‘view from below’ offers re-presentations making count of cities’ real essence, beyond exclusively normative visions or

westernized interpretative frameworks. Through it, top-down narratives can be sewed up with in-depth empirical researches, able to capture the complexity, variety and ambiguity of urban actors in contemporary African cities and to let a broader range of themes and topics emerge (Pezzano 2016).

In addition, the view from below allows also to take into serious consideration the informal cross-border traders as territorial agents. The observation of their daily practices of mobility—meaning by this the ‘embodied and habitualized’ experience of mobile subjects (Miller and Ponto 2016)—leads to a conception of space and territory as becoming, made and remade up by people’s heterogeneous and repetitive uses (Crosta 2010).

The perspective offered by practices is particularly insightful as it recognizes—although without romanticizing—the agency of migrants and mobile subjects, being able to turn their capacity to transform challenging situations into ‘interactive response’ (Morawska 2007).

The practices of mobile subjects generate new ways of urban incorporations within large-scale urban processes that are embedded in particular urban mobility regimes and contribute to significant, albeit transitory, claims to urban space. The ‘everyday’ manifestations of these practices are increasingly intertwined with distant engagements, which make the ‘everyday’ increasingly translocal rather than exclusively local and bounded (Lefebvre 1977; Amin 2004).

The question is, then, what this uneven form of ‘groundedness across distances’ reveals us about contemporary urbanity and how can help to improve our epistemology of the urban.

The present paper embarks on such an endeavor through the observation of mobility practices in contexts marked by strong structural limitations in order to let people’s reaction to material and symbolic constraints emerge.

3 Tracing the ‘Subjects’

Being interested in investigating the links set up by mobility practices in distant urban space, I chose to deploy multi-sited ethnography as the method which allowed me to reconstruct the relationships between spatially non-contiguous, but substantially continuous things, stories, and places.

As a revival of a ‘sophisticated practice of constructivism,’ multi-sited ethnography draws on following ‘the object of the study across sites and scales in order to map the relationships between different actors, locations, and levels’ (Marcus 1995). Following people, as ‘perhaps the most obvious and conventional mode of materializing a multi-sited ethnography’ (Marcus 1995), is quite deployed by migration and diaspora studies, little by urban studies. If applied also in the latter field, it presents the advantage of a multi-contextual spatial gaze, attentive to the various localities assembled by the objects/subjects observed. It is a way of proceeding that involves many challenges, being drawn on the capacity of constant renegotiation of the commitment to the ever-changing, expanded landscapes. It

implies a topological interpretative approach to space while coping with disregardable topographical specificities. Being aware of this and, at the meantime, able to muddle through the different contextual manifestations of the geographically non-contiguous sites under study is fundamental per se and for offering a deep sense of the space(s) and places of the field.

As multi-sited ethnography defines its object of study on an initial baseline that is adapted to contingencies overtime and mixes up with other methodologies, the multi-sited ethnographic explorations carried out were complemented by observations and interviews, variously deployed according to the situation.

Within the overall fieldwork articulated in two main phases—the first mainly in Johannesburg between May and July 2014 and the second in Johannesburg, Maputo and along the Maputo Corridor between October and December 2015—in the first observations (lately become participant observations) and semi-structured interviews prevailed, while latter was a proper multi-sited ethnography.

I interviewed not only cross-border traders, but also drivers, employees at the station, owners of transport companies, hoteliers, receptionists, business intermediaries, customs officials, street vendors, and dealers, in the attempt of recomposing different perspectives on the *mukhero* and thus unraveling the intricate ramifications and heterogeneous components it is made of. Thereafter, through snowball sampling, I got to the identification of privileged subjects for in-depth interviews and narrative inquire, that actually revealed to me the landscape ‘in-between’ (Kihato 2013) conquered and reshaped by mobile subjects. In order to really unpack it, I needed to find people willing to let me accompany them in their travels, whom I found in Ernesto, a former *mukherista*, and Antonia, a *mukherista* carrying dogs from Johannesburg to Maputo. My engagement with informal cross-border traders was unavoidably incremental and required an elevate capacity of inventiveness, improvisation, and adaptation, mostly due to the informal and mobile character of the *mukhero*.

Empirically, I did six and a half journeys along the corridor between Johannesburg and Maputo, for a total of more than 3500 km, plus the several hundreds of kilometers traveled in the smaller (yet intensively covered) areas of the three sites studied more in-depth (Johannesburg, Maputo and the Ressano Garcia border post). In all these movements, I traveled aboard the most diverse means of transport, going from regular busses, to ‘informal’ busses, minibuses, and the private cars of *mukheristas*, with different degrees of comfort and exposition to risk.

All this was necessary in order to map the relations between the distant places interwoven by the *mukhero* and, in the meantime, to get the experienced, embodied reality of movement lived by the *mukheristas*.

More importantly, this method pushed my limits as a researcher and person. It imposed me to improve my capacity of navigating different cultural contexts, understanding them deeply, and being able to reconstitute their traits. It also turned into an exchange between me and the subjects performing the practices that I was studying, which diluted the antithesis between the ‘I’ of myself as the researcher and the ‘them’ of the only apparent unique ‘other world’ researched about, unveiling, instead, its plurality.

This brings about an ‘enhanced challenge of translation’ (Marcus 1995, 2005) of what interpreted in other urban worlds, while they keep changing at different speeds in the grip of contemporaneity. It is an unavoidable task, although arduous, that calls upon researchers’ responsibility of interpreting and translating inter-local dynamics between cities. Pushing our limits as *homines academici* (Nyamnjoh 2012) by exploring forms of actual engagement with the field and empirical flexibility is crucial to improve our conceptual paradigms and make our understanding of urban issues in other contexts deeper, more flexible, and nuanced.

4 The *Mukhero* Practice

The *mukhero* is only one of the many informal business practices spanning borders in Mozambique (Baptista-Lundin and Taylor 2003). It “flourished after the abandonment of the socialist project and the gradual disappearance of the old safety net provided by the state in Mozambique” (Söderbaum and Taylor 2008). Initially, it involved mainly agricultural products but gradually got to incorporate more and more products in order to supply a market in need. Nowadays a variety of goods, from vegetables and fruits to clothes, household small furniture, and electrical appliances, is brought in from the neighboring countries through the *mukhero*.

The *mukhero* has arisen far back in the past as a survival practice, initially consisting in small-scale trades supported by analogous ethnic networks, and then become an internationally spread institution linking Mozambique to African countries, as well as to Brazil, Thailand, Hong Kong, Dubai, and China.¹

The term is often used with a derogatory sense, meaning ‘contraband,’ which is particularly ‘frequent and intentional, when engaging with the state’ (Peberdy, interview October 2015). The informality of the practice, undeniable as it is usually performed through full or partial evasion of trade-related regulations (such as the non-possessioning of legal license) should not deceive and lead to associate the phenomenon with illegal economies. The smuggling in the *mukhero*, in fact, concerns legitimately produced goods (ranging from staple food commodities to low quality consumer goods such as clothes, shoes, etc., to finally, pieces of furniture and electronics), and as such it should be more correctly acknowledged as a fundamentally legal import–export activity, that tries to meet a demand of not otherwise procurable products.

The *mukhero* represents a common job for many people in Mozambique and is comparable to other kinds of mobile (De Brujin et al 2001) and non-mobile,

¹As E. explained to me: «The business in Brazil, China, and India is about this artificial hair. They go to buy in those countries. They make big profits from this business. It’s usually the youngest ones who do this. They are between 20 and 35 years old, the young generation of mukheristas working on a global scale. They transport hair squeezed in backpacks. It’s cheap, easy, and convenient. By doing this business for a few years, they manage to open saloons and buy houses in South Africa». (Extract from an interview done in June 2014, in Johannesburg).

informal activities on the continent,² incremented by the neoliberal policies spreading in Africa in the last decades. In Mozambique, the informal economy has represented the main source of livelihood for people after the destruction of the national economy by the civil war in the 1980s and the failure of the FRELIMO's socialist project. Favored by a *laissez-faire* attitude by the government, it has recast consuetudinary practices—usually arisen before being identified as 'informal'—and used them as resources against poverty and unemployment.

If informality is regarded through a historical perspective, the capacity of reinventing traditional practices according to modern needs appears evident, as well as the need of capitalizing on it (Chabal 2009).

Informal cross-border traders do not consider themselves informal or illegal, but rather as human agents legitimately resorting to the resources they have to improve harsh starting conditions. By doing this through a great adaptability to changes in time and society, they constitute fundamental agents of economic dynamism that cumulatively contribute in a significant way to the origin and destination countries' GDPs (Crush et al. 2015). If all the countries bordering Mozambique are involved in the lively cross-border interactions made up by the *mukhero*, the relationship with South Africa is particularly intense, due to its long-term course. Since before the formation of national states, the region between southern Mozambique and eastern South Africa has always been crossed by flows of people and exchanges, which during the *apartheid* assumed the configuration of white South African capital exploitation of Mozambican black labor (Söderbaum and Taylor 2008). The bonds between the two countries have changed overtime, yet the asymmetrical relationship between them endures. Today, trade, impelled by dramatic situations of poverty, food insecurity, and inadequacy of socio-physical infrastructure in Mozambique, has become the primary motivator for entry in South Africa (Peberdy and Crush 2015)³ and South Africa has become the main source of supply for a country unable to produce on its own like Mozambique. Within the 'historical transnational space' (Vidal 2010) between the two countries, the twentieth-century social figure of the Mozambican young male adventurer working in the South African mines has been replaced by the *mukheristas*, the Mozambican informal cross-border traders.

The research this paper is drawn on was carried out along the trajectories of (mainly) *mukheristas* women traveling between Maputo and Johannesburg. Women aged between 25 and 50 years old, in fact, dominate the sector, representing the 70% of regional informal cross-border traders between Mozambique and South

²Informal trade across large distances and borders is common and widespread in Africa and has recently been recognized as important by the Economic Commission for Africa, which has noted that informal cross-border trade is the main source of job creation in Africa, which provides between 20 and 75% of total employment in most of the countries.

³Between 2004 and 2013, cross-border traffic from Mozambique to South African border towns and great cities has increased from around 400,000 to nearly 1.8 million documented entries per annum, also eased by the simpler procedures to access the country.

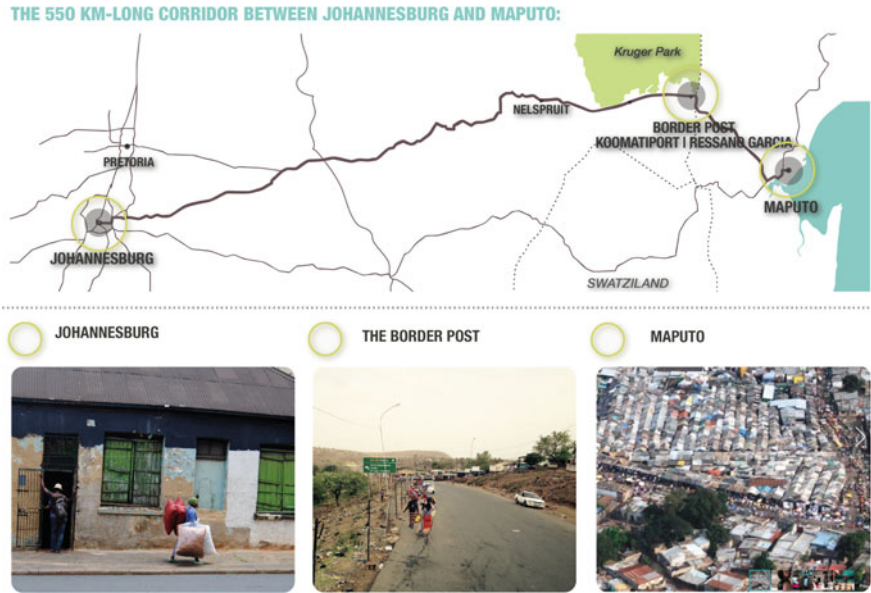


Fig. 3 Maputo corridor. Photographs and graphics by P. Piscitelli

Africa (Peberdy and Rogerson 2000) and the 80–95% of applicants for visitor visas, actually used to trade and shop in SA (Peberdy and Crush 1998) (Fig. 3).⁴

The *mukheristas* buy goods in wholesale stores in Johannesburg—in most of cases, in Dragon City, a huge area of Chinese shopping malls in the city center, and in some other shopping centers in the ‘Town’—to make resale at tripled or quadrupled prizes in Maputo. Here, they deliver the goods to merchants, mainly coming from Nigeria and Burundi, who work both in the wholesale and retail formal and informal markets (such as Estrela Vermelha market, Xipamanine market, Chikene market, Mandela market, Museu, and Zimpeto market). The whole commercial system of the Maputo metropolitan area, including large supermarkets, is fueled by *mukheristas* and this also happens in other provinces of the country.

⁴Female involvement in the practice started in colonial times, when women used to migrate with their husbands and has increased considerably since the civil war (1981–1994), when women used to go to the border zones in quest for food for their children and people while the men were fighting to become predominant nowadays. Women’s mobility has helped to scatter the rigid division of roles in the Mozambican society, marking the exit from their confinement within the household space, as well as the possibility of engaging with other socio-economic spheres. The *mukhero* has represented an essential tool for women’s emancipation and empowerment, as well as a particular driving force of socio-cultural change, especially in the urban contexts. While the informal economy still presents a significant gender gap, with women earning on average less than men, the *mukhero* allows women to accumulate more capital than men and it is not rare that women employ other men, with important implications on gender relationships.

They do this following variable frequencies and rhythms, going from 1 to 4 days of travel, as in the case of those called ‘shoppers women’ by Peberdy (2002), to 1–8 weeks, as for ‘traders women.’ Usually, the further the trading area is, the more the *mukherista* is economically successful. As I could observe on the field, in fact, *mukheristas* are to be broadly divided between ‘survivalists’ and rich, like the ‘*mamanas*.’⁵ The formers manage to secure decent living conditions and support themselves and their families through *mukhero*. The latter end up building viable and usually informal business enterprises, possessing trucks, and managing large sums of money and properties.

The prominent position achieved by ‘rich’ *mukheristas* in the Mozambican economy was referred in the accounts of my respondents as getting ‘up to \$90,000 per month.’ Although such a conspicuously exaggerated figure is obviously hard to verify, given the unregistered character of the business, it outlines how the institution of *mukhero* encompasses a great variety of profiles, including both poor and middle-class people,⁶ whereas for the former cross-border trade is a hard and arduous way to earn a livelihood through risks and harassment, for the latter, having international connections, it represents a tool for getting profits and upward mobility (Desai 2009). Several *mukheristas*, who started informal cross-border trades as a survival strategy ended up building viable, business enterprises, possessing trucks, and managing large sums of money. With the proceeds from the *mukhero*, they manage to grant a good-level education for their children, open up new economic activities and move from their initial residences to more attractive housing locations, thus contributing to the Maputo urban expansion.

5 Findings: The Translocal Urbanity of the *Mukhero*

The *mukheristas* prove to be prominent economic actor, able to blend a traditional survival practice with global logics, thus conveying a process of ‘glocalization’ with important local impacts. Furthermore, they behave as territorial agents actively contributing to new processes of urbanization and modes of urbanity. If the *mukhero* is moved by mainly economic reasons, as it is aimed at earning from the buying and selling of products, the dynamics it implies have, in fact, meaningful effects in terms of produced urbanity (Fig. 4).

First of all, the *mukhero* allows to move between social worlds that otherwise would only coexist without ever joining up. By interacting with all the different

⁵‘*Mamanas*’ is a moniker used for the oldest *mukherista*, implying dutiful respect for the age and the fortune accumulated over years of hard work, by cheering up from original conditions of extreme poverty.

⁶The definition of the African middle class is difficult and controversial. It can be defined and subdivided on the basis of the data provided by ILO into three categories, named: “near poor” (2–4 USD/day), “emerging middle class”, (2–13 USD/day) and “middle class and above” (>13 USD/day).

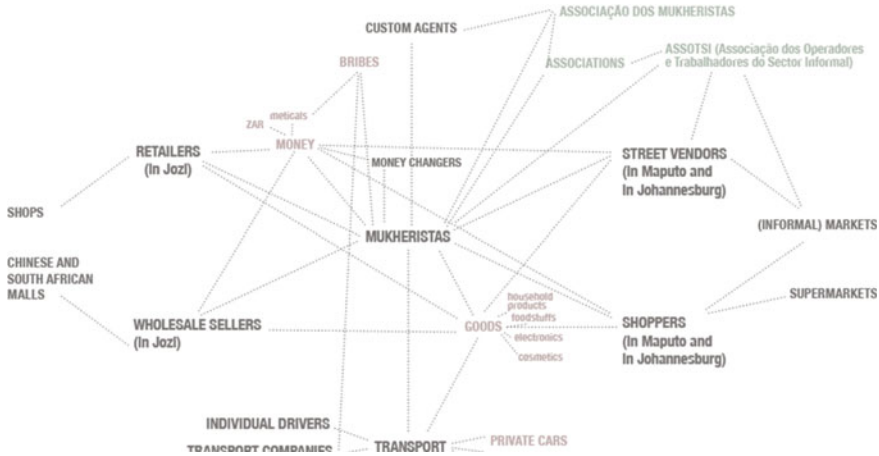


Fig. 4 ‘People as Infrastructures’ in the *mukhero*. Graphics by P. Piscitelli

people they meet along their journeys, the *mukheristas* operate constant negotiations and cross not only physical, but also interpersonal and social boundaries. While crossed, such boundaries get dismantled and reconstituted by *mukheristas*, who thus prove to be at the same time cross-border and proactive borderers. Through economically oriented transactions, the opportunities to meet and dialogue between very different realities are realized, forging a special form of cosmopolitanism, remarkable for Mozambican citizens, and especially women, to whom this was precluded until just two decades ago.

In their routinely performed mobility practices from one city to another, *mukheristas* live their whole life. The constant, back and forth and crisscrossing movement between Johannesburg, Koomatiport, Neilsprut, Maputo, and other urban centers has a tangible impact on their experience and reading of the city, forging a transient rather than a stable urban knowledge. This experience is not just individually, but also socially meaningful, as it represents a prevailing mode of urban life, not only among informal cross-border traders. Transit, as a normal way of life for people in Africa, cannot be defined liminal or marginal. Within this experience, traveling in-between and across cities prevails on the cities themselves, as well as the ‘trans’ takes precedence over the local. In this sense, movement becomes place (Malaquais 2004) and mobility turns out to be a strong force at play shaping urbanity in novel manners.

Moreover, it is not only the urban experience of *mukheristas* to be cosmopolitan and transborder, but the city itself. It is a city whose external and internal borders are in constant flux, expanding and, on occasion, shrinking. This does not mean that they disappear, or that historic structures of power are dismantled. All this persists, but yet it is constantly put in discussion by the daily reinvention of ‘new pathways for living, for personal and collective visions, and for sharing knowledge,’ in a sort of ‘postborder city’ primarily grounded in a diasporic experience of transnational crossings (Dear and Leclerc 2003) and trans-local territories (Brickell and Datta

2011). This kind of urban ‘*territoire circulatoire*’ (Tarrus 1993) is not a ‘given,’ fixed unity, but rather a ‘constant state of becoming,’ marked by openness and change, as well as by the intersection of flows and movements. It is ‘a field of movements; a swirl of forces and intensities’ (Amin and Thrift 2002) which bring about heterogeneous actors.

Besides the *mukheristas*, different populations and social networks are pulled and held together in the *mukhero*, i.e., traders, custom officials, border guards, drivers, sellers, money changers, but also hoteliers, private warehouse holders, and even associations, setting up that ‘infrastructure of people’ (Simone 2004) speaks of. At the same time, various materialities, going from big malls, warehouses, and deposits to informal markets, shops, supermarkets, diverse means of formal and informal transportation, hotels, and temporary accommodations, are put in conjunction, used and re-signified across localities and scales.

This complex combination of persons, objects, and spaces through ‘constantly shifting connections’ (Simone 2004) allows the *mukhero* not only to hold up, but also to keep running and, while running, to sustain a translocal urban structure, hinged in the border, as well as in distant cities. Both the porous border between Mozambique and South Africa—the real fulcrum of the system—and the over-mentioned translocal places in Johannesburg and Maputo are part of the same ‘city,’ the city of the *mukheristas*, indeed.

Assuming this perspective means to pay attention to the different contextual manifestations of socio-spatial forms produced by such a practice and at the overall and deriving effects as well.

It means, in other words, to be aware both of the liminal places invisibly used or temporarily reoccupied by *mukheristas* in the xenophobic context of Johannesburg, and to the macroscopic and most tangible spatial outcomes produced in Maputo, not only respectful to the fed ‘market infrastructure’ (informal markets, markets, and supermarkets), but also to the new urban produced under the form of new economic activities, social groups, forms of consumes and urban expansions. The recomposed system shows an amazing dependence of the Maputo urban economy on Johannesburg and other South African (and not only) cities for the procurement of fundamental goods, but at the same time, an unleashed potential of generating important social infrastructures from a minimal set of elements. Through tentative and precarious process of remaking their own lives in cities, *mukheristas* remake the city itself (Fig. 5).



Fig. 5 Heterogeneous urban object connected by the *mukhero*, Graphics by P. Piscitelli

6 Conclusion

By looking at the socio-spatial outcomes of the translocal traders' mobility practice, this paper has argued the need for planning to be, first and foremost a practice of knowing (Davoudi 2015). A deep understanding funded on intersecting epistemologies (like that between mobility and urbanity) aimed to address complex phenomena on the ground is suggested as the preliminary step to enrich our knowledge of cities beyond the north/south divide (Robinson 2006), before any interventions imbued by Western developmentalism.

Africa, with its collection of new principles articulating diverse forms of urbanity, constitutes an exceptional 'working device' (Simone 2011) to this purpose, and it is still all to be unraveled.

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Humanizing Urbanism. On Embracing Informality and the Future of Johannesburg

Costanza La Mantia

Abstract This paper aims to give an evocative rather than technically descriptive portrait of the city of Johannesburg, attempting to reveal how a logic which structured the city around control and segregation is disrupted more by the informal flows of life than by the rhetoric of spatial and economic transformation that characterizes the city since the demise of apartheid. In the face of a specifically engineered physical dispersion and segregation, and in tension with both physical realities and government policy, the urban poor have been *re-territorializing* the city, undermining the legacy of rigid apartheid spatial segregations. This is opposing the paradigm of a world shaped and controlled by power and rational social planning with one built around relational networks and basic needs, and characterized by informal practices. The paper argues that if liberated by the vocabulary of a hegemonic Westernized culture, informality can reveal itself to be a counter-strategy capable of generating a means of response to the failure of certain urban mainstreams tied to a market economy.

1 Divide et Impera

Johannesburg, also called Jozi or Jo'burg, is a city of walls and fences. Historically shaped by a strong racially charged vision of population control, it is a city in which the legacies of racial divide are still strongly visible in its spatial characteristics, as well as in the socioeconomic divide still prevalent in the city (Bremner 2010). The city speaks clearly about the difficulty of living in its space, marked by highways and fences, as well by racial and social divides.

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Under apartheid, public space and urban life were racially and spatially segregated and, even when overlapping, “black and white inhabited different worlds, or rather the world they inhabited meant very different things,” producing “a dual city and a dual nation, diverse urban worlds existing side by side in the same geo-graphical space” (Bremner 2006, p. 9). Planning and design were key tools in shaping the apartheid city—a kind of racially engineered planning and design seeking to partition the city into controllable and disconnected zones. Districts—corresponding to precise racial groups—were meticulously divided by using natural barriers (rivers, hills, ridgeways, etc.), constructed barriers (highways, railways, walls, mine dumps, etc.), or simply by open buffer spaces. More than twenty years after the dismantling of apartheid, contemporary Johannesburg is still a highly fragmented, sprawling city, where segregation, inequalities, and sociospatial divides manifest themselves in what Lindsay Bremner calls a precise “spatial doubling pattern” (Bremner 2010).

Jo’burg apartheid street patterns—a web of linear corridors, converging at the center—reveal a physical means of segregation and control. There was little chance to cross the city from east to west or north to south without passing through the city center: a clear symbol of hegemonic control manifested in a physical system. Upon the fall of apartheid, the movements of previously controlled populations became unimpeded, beginning a process described as the *re-territorialization* of the city (Bremner 2010). As the stage set of an all-white city crumbled, the population supporting its *fictional world* fled from the city center, driven by a sense of decreasing security and control (Shepard et al. 2008) the very same apartheid urban structure led the center to be the city’s first *re-territorialized* area (Bremner 2010). The *suburban poor* took to the center, moving from deprived suburbanities to old office buildings in the former central business district, so forming the more than 1000 vertical slums of Johannesburg where people—especially illegal migrants—live in miserable conditions and that the municipality identifies as “bad buildings.”¹

But the new urban dwellers also settled in residual spaces of the city, re-populating abandoned industrial buildings and occupying mine dump wastelands in the peripheries, forming the well-known landscape of townships made of myriads of shacks, aggregated in the suburban areas and infilling the pockets of the city. Furthermore, the same radial pattern of streets and highways, connecting the city center to Cape Town, Durban, Mozambique, and Zimbabwe, turned the city inside out, centering the post-apartheid urban life in a “sprawling city of white enclaves”:

¹The Municipality of Johannesburg officially identifies these building as “bad buildings.” Even though there are not official estimations of the numbers of these vertical slums, activists keep their number and conditions under control «Bad buildings are poorly maintained buildings, usually in the inner city, which threaten the health and safety of occupants. Johannesburg has approximately 1500 bad buildings and at least 180 informal settlements», from “Cities Need to Plan with the Poor, Not for the Poor,” by *The South African Civil Society Information Service* (<http://sacsis.org.za/s/story.php?s=1564>).



Fig. 1 Informal traders in Jo'burg inner city (Photograph by L. Burocco)

gated residential communities, golf courses, casinos, and shopping malls. A new kind of “speculative commercial landscape” began to reshape the city (Bremner 2010).

Jo'burg is a former gold mining city, and still today, its past remains visibly readable in the deep spatial scar of the mining belt: a large, mostly un-urbanized tract of land containing the gold deposits that helped generate the city's wealth². The mining belt remains today as a symbolic and physical representation of the divide between the wealthy white north and the poor black south, a metaphor expressing an unresolved relationship and the persistence of a still strong socio-economic apartheid (Fig. 1).

²In 120 years, more than 40,000 tons of gold have been extracted from the Witwatersrand basin, along with cadmium, uranium, cobalt, copper, zinc, manganese, titanium, and other heavy metals (Rossouw et al. 2009). Mining activities and dumpsites occupy approximately 12,200 km² of land area in the Witwatersrand basin: some of which now serves as residence for a dense urban population in Gauteng Province, including a large part of the Johannesburg area, defining the *mining belt*. While much of this land is occupied by informal settlements, a rapid formal conversion of buffer areas around the dumps to residential land use is taking place, mainly operated by former mining companies trying to reposition themselves as real estate developers, while the gold reef is being depleted.

2 The Hidden Face of a City of Cities

In Jozi, if you ask someone where he/she is from, you will often get a response with the name of a neighborhood. This habit speaks about the many souls and faces of Johannesburg. There is no one single *city* in the imaginary of people, in which everyone recognizes him/herself. In some ways, the fragmentation of apartheid planning resulted in a contemporary Johannesburg lived and perceived as a mosaic of social status, races, circles, and precise *geographies of separation* (Harrison et al. 2004). And while the extremely rich—but often neglected—social fabric of the poor districts and informal areas is something common to many African cities, what is unique in Jo’burg is a sort of perceptible tension beneath the ordered surface of the city. This tension disrupts the rules of a rigid spatial planning linked to social control—the legacy of the apartheid—and negates their boundaries through the movement of people across the city. It dilates, conquers, and fills highly controlled spaces, bringing life to them, contrasting the still spatially prevalent technocratic and highly engineered vision of the world with a pulsing, swarming, and multi-colored humanity (Bremner 2010).

This appears as the strongest dichotomy informing contemporary Johannesburg: a city with a very thin public-realm, highly car-oriented, and substantially connoted by a structural lack of spaces for socialization (other than private enclosures). Regardless, people, especially the poor, are *re-territorializing* the city with “their movements, their squatting, their informal living, and their progressive conquering of new spaces in a transforming society” (Bremner 2010). People are undermining the legacy of the rigid apartheid spatial segregations and use of space, and in doing so, they are revealing the human face of a strongly engineered and highly fragmented city. Even informal settlements, while being the lived embodiment of exclusion from development opportunity in South African cities, are buzzing and lively neighborhoods that represent the capacity of the urban poor to adapt, manifest agency, and build livelihoods and social relations, appropriating and modifying their environments against the odds, in very harsh conditions and with limited resources (SACN 2014).

The hidden face of Jo’burg is therefore subversive to the city’s physical structure. It opposes the paradigm of a world shaped and controlled by power and rational social planning with a vibrant, teeming humanity that builds space around relational networks and basic needs (Simone 2012), where social and spatial orders are interlinked and respond to precise site-specific instances and community dynamics: infilling, adapting, moving, trading, building, and inhabiting. And informality—in all of its forms—is the way in which this face manifests itself.

3 Informality and the (s)Pace of Life

Informality is the simple “practice of enabling people to find multiple venues and devices to feel connections with each other and a firm workable solidarity” (Simone 2012). It is the prevalent mode of urban production in many cities of the world, and certainly, in Africa it is the dominant one (Simone 2004; Pieterse 2008). Informality in Jo’burg takes many forms. It provides the city with great flexibility, allowing homeless residents to house themselves, those who fall out of formal employment to continue earning money, and those without “formal” skills to continue contributing to their communities. It is very difficult in South Africa to find a job if you are outside the wheels of bureaucracy. For instance, illegal immigrants—constituting a big quota of informal residents—have no visa, no documents, and therefore no documented skills: This makes them unemployable. Furthermore, informal dwellers have no legal residence and if not “formalized” they cannot access the formal welfare system or even just open a bank account. But informality provides a safety valve in the urban system: accommodation for new comers, people that do not qualify for subsidy, and the very poorest. Informality provides shelter flexibility for diverse forms of household and provides for those the formal system is unable or unwilling to house (Harrison 2009).

Expressions of informality can be highly responsive, quick and temporary, self-empowering, and highly effective, innovative, and inexpensive. Informality empowers individuals and communities until the gears of formal governance finally provide for them, and allows groups to occupy spaces and depict alternatives to the ways in which society functions. Even the daily commute still mostly relies on what was born as an informal transportation industry: Maps of the routes correspond to a table of hand gestures. During the apartheid, private minibuses—commonly known as “black taxis”—filled the service gap between the need for urban transport and the capacity of the state system. In the post-apartheid era, they have been legalized and are still the backbone of the transportation system for most townships. Due to the sprawling structure of the city, and to the long tradition of private transportation, mobility is still one of the biggest issues in terms of integration. Despite the efforts of increasing public transportation through a series of new programs and projects such as the Rea Vaya (the local Bus Rapid Transit) or the Gautrain (a high-speed train connecting the northern districts of Jo’burg to Pretoria and the Airport), a structural lack of integration and intermodality still precludes the development of an efficient and inclusive public system, able to cover and reconnect the city. While the informal taxi industry thrives, offering a wide network with large coverage of the city’s neighborhoods (Fig. 2).

Recalling Ananya Roy—who defines informality as “*liberalization from below*”—we can say that here, more than in other places, informality is a *liberation from below*: a rebellion, an alternative way to set up a socioeconomic and spatial system that relates to human needs. It is a democratization of spaces and economies



Fig. 2 One of the many informal recyclers streaming the city streets searching for trash (Photograph by L. Burocco)

that shapes itself through the life and movements of people across the interstices of bureaucracy and control (Roy 2012). It does not merely consist of and pertain to the life of the poor or marginalized; it is an *alternative organizing logic*—one responding to the laws of life. It is a counter-practice that is more human-centered than the dominant one, and which has the power to become a “counter-strategy against the dominant mode of space production” (Ibid). In the informal spatial paradigm, the concept of order bends to necessity, responsiveness, and creativity. Conversely, government typically sees informality as a negative phenomenon due to the urban mainstream envisaging of order, comprehension, and optimal functioning as the only way into the urban future (Pieterse 2008, 2014). But if liberated by the vocabulary of a hegemonic Westernized culture, informality can reveal itself to be a counter-strategy capable of generating a means of response to the failure of certain urban mainstreams tied to the market economy (Fig. 3).



Fig. 3 Composition showing the skyline of Jo’burg inner city from a residential neighborhood, characterized by fenced and walled spaces, and by a graffiti expressing people’s claims for a different city (Photograph by B. Boshoff)

4 Architecture of Segregation, Re-Segregation, or Integration?

In Jo’burg, about the 20% of the total households are informal, between shack settlements, backyard shacks, and squatted buildings (South Africa Census Data 2011). At least one in every four of Jo’burg citizens fall outside the regulatory system of government and do not have the protection in terms of health and safety enjoyed in formal areas (Philip Harrison 2009). In this scenario, informality—and especially post-apartheid townships—represent the main challenges faced by the City government as well as by all levels of South African government on matters of housing, service delivery, and effective local governance. Since the current South African Constitution was enacted in 1997—with an implicitly perceived promise of giving a house and yard to every South African citizen—an unsustainable, somewhat self-defeating mechanism has been put into place. Poor people migrating to the city began building “temporary” shacks, mostly with found or cheap materials: a provisional home while waiting for the government to provide a house for them.



Fig. 4 Shot of one of the many “bad buildings” in Johannesburg’s inner city (Photograph by L. Burocco)

However, awaiting a so-called *RDP house*³ could even last for 20 years (Marx and Royston 2007) (Fig. 4).

In anticipation of an *RDP* house that may never materialize, people often put few resources into improving life conditions in the townships, starting with their shelters, leaving them vulnerable to floods and winter fires. Much of the townships are in fact located on what would have been considered unsuitable land for more formal development. During the summer rainy season, much of this land ends up in runoff areas prone to flooding. During the winter, residents often heat their houses with charcoal, leaving entire neighborhoods vulnerable to fire. The *RDP* housing model has indeed been highly disruptive to the quality of the city and the living environment. Typically, state-provided housing for the poor in SA is poorly located, repetitive, and produces “sterile” environments: There exists no mix of functions,

³The *Reconstruction and Development Program* (RDP) is a post-apartheid policy framework set in place for responding to the extensive housing stock deprivation for previously disadvantaged citizens. Between 1994 and 2001, the RDP delivered over 1.1 million cheap houses, accommodating 5 million of the estimated 12.5 million South Africans without proper housing. Critics of the RDP point to poor housing quality as the chief problem being faced. Critics also note that new housing schemes are often dreary in their planning and layout—to the extent that they often strongly resemble the en masse bleak building programs of the Apartheid government during the 1950s and 1960s.

typologies, or social classes (Huchzermeyer 2011). Despite the formal delivery of 2.5 million houses, the nationwide housing backlog has increased from 1.4 to 2.5 million since 1994–2009 (Tissington 2011). The majority of the black population still remains in what were once called “homelands,”⁴ denouncing the lost chance of reshaping the social and racial divides through the reshaping of the city.

If at the end of apartheid South Africans were promised townships to become towns, the ruling ANC party has for two decades replicated the old housing strategy of building “bedroom communities,” while evicting informal settlers and/or putting people on a waiting list for a state-delivered house (Findley and Ogbu 2011). Although moved by different intentions, the post-apartheid South African government has been trying to respond to the unattainable promise of giving a house and a yard to everyone by repeating the same mistake: building low-quality houses on poorly located land. Not only is this an unmatched challenge, it sends a very wrong message by de-dignifying human agency. But the truth is that government does not build the city; it builds housing. People build the city. And government must play the role of driving city development for the inclusion for the poor, as what people want is the right to develop themselves, as human beings (Roy and Al Sayyad 2004).

There is a need for a big shift in the way the issue of housing the poor is faced, and this shift should probably start with the townships, as a series of more recent national programs like the NUSP are trying to frame. In the last few years in fact, the South African government has tried to change the focus from delivering housing to enabling human settlements—starting from renaming the responsible national department—and has developed policies focused on in situ *upgrading*. With this intention, the National Upgrading Support Program (NUSP) was conceived in 2009 to support the National Department of Human Settlement (NDHS) in its implementation of the Upgrading Informal Settlements Program (UISP). The program was very innovative for South Africa, pushing for in situ and integrated, participatory upgrading, with a strong focus in integrated community development. Nevertheless, little was done in implementing the program correctly, mostly due to the mind-set of both the governmental institutions and their officers, to the overlap and power struggles among different Governmental Agencies, and/or for incapacity to manage conflict with and within the communities.⁵

To transform the spatial legacy of apartheid into a landscape able to better reflect the multiracial aspirations of South African cities, townships must incrementally evolve, building common spaces, empowering and supporting its inhabitants, leaving space to residents’ need to be engaged in the socioeconomic and spatial

⁴*Homelands* were areas of land set aside for black residents during the apartheid era. It was intended that all black residents be relegated to a particular homeland.

⁵There are, however, a series of good practices in terms of in situ, participatory upgrading—fruit of the work of NGOs, universities, and research centers, as well as capable and motivated professionals. But these approaches remain far from being understood and brought “at scale,” also due to a substantial overlapping in the different levels of Governmental agencies, often conflicting each other and approaching upgrading in very different ways.

challenges (and opportunities) of building a collective vision for the future. In these terms, the RDP mechanism has been lacking to engage—and in some way atrophying—the most powerful resource of informality: people and their agency (SACN 2014). The way in which the City of Johannesburg has faced—and will face—the issue of housing the urban poor can ultimately either reinforce apartheid spatial patterns or help to dismantle them, reshaping the city into a more inclusive, humane, and just one.

5 Sweep the Poor Out: New Mayor, Old Story

Another emblematic aspect related to the institutional inability of dealing with informality emerges from the way in which informal traders and poor residents in the inner city are seen and treated by the municipality. In October 2013, informal workers were cleared out of specific areas of the city center by the municipal government in a series of forced actions known as the “Mayoral Clean Sweep”⁶ brought forward by former ANC mayor Parks Tau. Consequently, a number of the legitimate informal workers took the City to court for loss of income in one of those typical, long legal battles advocating Constitutional rights—often the only weapon of the urban poor. Most recently the new mayor, Herman Mashaba, elected in August 2016 and belonging to the Democratic Alliance, the main ANC opposition party, has been running a “shock and awe” campaign around the removal of thousands of unauthorized inhabitants from *bad buildings* in Johannesburg’s center. Mashaba said his goal for downtown Johannesburg was to move people out of “hijacked” buildings, and get private companies to renovate them⁷. Of Johannesburg’s 5-million residents, about 400,000 live in the inner city, attracted by the proximity to occasional work opportunities, schools, healthcare facilities, and reduced transportation costs (City of Johannesburg 2013). They are the invisible labor that support Johannesburg’s daily functioning (car guards, domestic workers, taxi drivers, cleaners, informal recyclers, and informal traders), and many of them live and access basic economic opportunity through informal economy, and by squatting or renting illegally occupied building from slumlords.

Informality is the popular idiom of African urbanization. It is a mode of production of space and must be understood as a logic through which differential

⁶For more detailed information about the *Mayoral Clean Sweep* and the sanctions system applied to street sellers, see Tasmi Quazi and Richard Dobson, *Redefining “Clean-up” of informality*, from the blog: *Asiye Etafuleni* (<http://aet.org.za/2013/11/redefining-clean-informality-2/>).

⁷For more detailed information about the new Mayor Herman Mashaba’s approach to inner city regeneration, see Dennis Webster and Alana Potter, “*Herman Mashaba’s pro-poor plans for Joburg seem a bit rich*” (available at <https://www.businesslive.co.za/bd/opinion/2017-05-12-herman-mashabas-pro-poor-plans-for-joburg-seem-a-bit-rich/>), and Keaton Allen-Gessesse and Lwazi Mtshiyi “*The poor pay the cost for Joburg’s inner-city overhaul*” (available at <https://www.businesslive.co.za/bd/national/2017-06-01-the-poor-pay-the-cost-for-joburgs-inner-city-overhaul/>).

spatial value is produced and managed (Roy 2005, 2009). City government is clearly in crisis in regard to the urban management of informality. Its ad hoc responses range from authoritarian “cleanup” operations to revised bylaws with increasing sanctions. This worsens tensions between urban regulators and informal workers and residents, building on the rhetoric of “cleanups” to create a system based on harassment of informal workers and evictions of informal residents. It is true that many of these people live in terrible conditions. But the response of the municipal institution is often either nonexistent or violent. While the search for long-term solutions for housing the poor and allowing them to use the city to earn their living are nowhere to be seen, gentrification aggressively displaces the poor, causing the most vulnerable to be rounded up and tossed onto the streets (Fig. 5).

Planning for the post-apartheid Johannesburg requires accessing a human dimension. It requires the de-structuring of the hypocritical rhetoric of inclusion to really embrace the people and their needs, discard fears and distrust, and let a new public life flow into the city, bridging sociospatial divides. It requires something that is thousands of miles from the reproduction in vitro of a fake urban life, as it happens in some new development areas of the inner city: gentrified small pockets of the former CBD, where young businessmen are trying to s(t)imulate a comprehensive urban regeneration process (Walsh 2013). A well-known example of this ongoing gentrification—controversially sold under the rhetoric of inclusion—is the Maboneng Precinct, a recent development that foresees to transform more than 50 squatted and/or abandoned buildings in the new pulsing heart of the inner Johannesburg. Maboneng is the brainchild of Propertuity, a private developer founded in 2008 with the vision of transforming the entire area into a racially integrated, mixed-use community and a comprehensive and mixed-income residential offering.



Fig. 5 Recent eviction in the inner city, under Mayor Mashaba new regeneration plan (Photograph by S. Sibanda, June 2017)

Truth is that Maboneng was carved out of Jeppestown, a working-class neighborhood in Johannesburg's CBD. And while Property's experiment has been developing rapidly since 2009, the surrounding Jeppestown is still mostly occupied by low-income black people that are not all that welcome in the highly controlled four city blocks constituting the Maboneng Precinct and its upmarket bars, fashionable restaurants, creative work spaces, and loft-style apartments. Maboneng represents that kind of development is that often leads cities to become more and more spatially unequal. These spaces are more like a "diorama of city," with pretended social mixing, induced mixed-use, and smiling, ubiquitous armed security. And while lower classes are welcome to fill the middle-class needs for cheap labor, at the same time, these very same low-income residents are pushed further and further in the search for affordable housing close to job opportunities (Fig. 6).



Fig. 6 Famous street in the Maboneng Precinct (Photograph by L. Burocco)

6 A City at the Crossroad: From Housing the Poor to Building a Humane City

The underlying narrative in contemporary Johannesburg is the one of a double-souled city. A city whose past, still strongly written in its spatial characters, clashes with its aspiration of social integration and spatial transformation toward a less divided society. The antithetic dialectics of colonial/postcolonial, apartheid/post-apartheid, and formal/informal still actively shape this duality and require a deep interrogation on how to move beyond them. To what extent has Jo’burg worked for integrated townships? To what extent has the city been integrating informal economies in the mainstream of city life? And, to what extent have RDP interventions and post-apartheid housing programs been reassembling and re-stitching the city, redefining a public realm that has the power of really transforming society?⁸ All these questions seem to remain wide open, constituting a problematic framework that the city is striving to address.

A possible answer is that Johannesburg should start to substantially invest in the commons, in the public space, in services, and in supporting mechanism and policies, leaving a rightful space for action to the agency of people—to the human ability to shape its own living environment. This starts with the reconsideration of space in South Africa as a benefit for all, as the most important common to be defended and made equally accessible. It also requires a reconsideration of “informality as the place of resilience, of important livelihood strategies and of urban people staking their rightful claims to the city” (Meintjies 2013).

Recognizing the need to re-center African urbanism around human needs, and building a new vocabulary for *informal adjectives*, is indeed linked to an emancipation of a postcolonial identity of African cities (Pieterse 2008, pp. 108–109). Nevertheless, Johannesburg struggles to let informality pump life in its veins. A postcolonial take of informality should therefore seek to disrupt the formal/informal binary (Valrey 2013) and look at it as a possible pathway to reconsider community dynamics and demands in order to encourage co-production and co-management of collective urban landscapes, adding more modes of organization and action into the (urban) political arena (Amin and Thrift 2013).

But the gap in engaging informality is still large, beginning with understanding the phenomenon itself, especially when switching from single good practices to policies at scale. For the post-apartheid city of Jo’burg, the key instrumentality is therefore a kind of human-centered planning and design: a planning and design for the people and with the people. Without understanding and engaging informality, the city will most likely deepen exclusion and inequality, and keep struggling with

⁸From an interview with Prof. Phil Harrison in *The Urban Challenge*, documentary released in occasion of the World Architecture Conference “Sustainable Human(e) Settlements,” held in Durban (South Africa) on September 2012 and available at <http://vimeo.com/47652514>. Phil Harrison is the South African Chair in Spatial Analysis and City Planning at the University of the Witwatersrand, and he is a member of the South African National Planning Commission.

the duality of its identity. It is time to respond to fragmentation and the spatial underpinnings of inequality. It is time to re-give dignity to human agency and to charge the politics of planning and design with the task of dismantling apartheid sociospatial legacy, shaping a more humane and less divided city.

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Urban Planning in Islamabad: From the Modern Movement to the Contemporary Urban Development Between Formal and Informal Settlements

Daniele Beacco

Abstract The purpose of this research is to identify the planning principles for the capital city of Islamabad in Pakistan located in the homogeneous cultural area known as Punjab region, during the late period of the Modern Movement. The establishment of new cities in Indian regions created the possibility to observe physically some solution of late modernism theories. Nowadays, it is possible to verify their positive or negative relapses and contributions along with the critical analysis of existing literature made by contemporary researchers. They meditate on the theoretical improvement that a recent planned city like Islamabad could give towards the contemporary architectural discipline in a defined region of a developing country. In addition to these aspects, this study will focus the attention on the spreading of contemporary formal and informal settlements that are nowadays supposed to be in a critical point; past and actual planning policy and the differences of urban growing in strict planning city like Islamabad and in the more organic old city of Rawalpindi identify two different characters in occupying the free soil and reshaping the city in its physical qualities and social strata. Beyond the diagram system developed for Islamabad by Constantinos Apostolou Doxiadis, based on the linkages between new way of life with the presence of machines in urban context and the preservation of community identity, is it possible to think about planning and pluralism in the city of Islamabad? Could the studies of traditional cities play a role in shaping the most sustainable community? These questions are investigated having qualitative nature of the data that reminds us to be careful with any conclusions drawn and to use this research only to lead further studies.

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1 The Idea of the New Pakistani Capital

Urban principles based on basic actions like living, working, enjoying and moving are commonly related to the functional city described in the first era of Modern Movement along with the CIAM organization (*Congrès internationaux d'architecture moderne*); however, Islamabad has been shaped with a particular urban character.

At a first sight, its plan could resemble the typical modernist urban scheme, but it is important to notice that this capital has been designed in a period where “the post-war CIAM sees a reduction of rigidity in design planning and anticipated what in the 1960s some of these approaches began to overlap with explicit anti-CIAM direction such as the ideas of advocacy planning, self building and user participation” (Mumford 2000). This period becomes pivotal for the increase of debates around the contemporary urban studies beyond the 95 points of the Athens Charter that in 1933 defined the functional city; twenty years later, some of the Modern Movement assumptions faced the development of new research frontiers in urban analysis towards the exploration of the phenomenological studies of neighbourhood, cluster and association.

The Greek architect and town planner Constantinos Apostolou Doxiadis, selected for the project of the new city of Islamabad, is part of this new redefinition of CIAM objectives, and in early 1960s he become the architect of the new capital in the newborn Muslim nation, Pakistan.

At the same period, new cities like Chandigarh with the planning activities of Le Courbusier, the city of Bhubaneshwar made by the German urban planner Otto Konigsberger and later the planning of Gandhinagar by local Indian architects (Balkrishna Doshi and H.K. Mewada) become the most prominent Indian sub-continent projects where “power structures, architectural insights and technological progress create important settings for carrying out modern experiments which thus become a place, a city. They all share a certainty of born of hope, to create living conditions for a better world and better society” (Kreutzmann 2013).

Islamabad, in its fundamental character, is a result of a political decision and could be defined as a “unique political act” (Stephenson 1970), like the foundation of the new Brazilian capital Brasilia and the near Chandigarh. In reality, the new Pakistani city differs from other previous capitals in its size and function (supposed not to be merely political), aiming to become a big urban centre able to represent also in percentage the average urban index of functions and social strata of the entire new Muslim country.

After the initial construction, Islamabad started to be considered an elite city, where the social multiplicity was disregarded. The city nowadays has a relevant number of bureaucrats with a temporary staying, neighbourhoods divided by similar social income group like a contemporary gated community or previous British colonial cantonment. This exclusive urban scenario was supported by the

first military regime suggesting that “Islamabad will be a place like Shimla¹ where influential people would live in peace” (Junaidi 2015).

At the first stage, this planning segregation was promoted by local political class that wanted Islamabad as a specialized city: “the influence of the diverse in origin and cosmopolitan population of Karachi on government administration would be eliminated if the capital were to be a capital only without non-official civilian population located in it and pulling it in different direction (...). The capital should be in a place where the business community does not come into contact with administration on a social level” (Hull 2010).

Analysing the first idea of Islamabad, it seems in contrast with willingness of the President and General Ayub recently published in a mail correspondence between him and the Greek planner. As a new capital of a newborn democratic state, Doxiadis promoted the social plurality: “a capital city exercises great influence on the entire country. Thus, its inhabitants should not belong only to one social group (economic, political, ethnic, etc.), but should belong to as many groups as possible—in ratios corresponding closely as its feasible to the national ratios—so that its population is the best possible representation of the nation as a whole, and not of any specific group” (Doxiadis 1965).

2 The Plan and the Reality

An ensemble of squared sectors creates a grid iron structure divided by main roads measuring approximately 1.2 miles that makes the general and measurable structure of Islamabad conceived as a dynamic city expandable in one preferred direction. Roads as never-ending linear infrastructures resemble, at the first glance, the Le Corbusier project *La Ville Radieuse*, where long corridors for the viability glorify the use of cars, providing a deep rethinking of the urban scale and the new comforts generated by arrival of the machines in urban context (Fig. 1).

In reality, the new aspects that differentiate this project to others of the first era of modern movement are its increasing attention towards the urban structure of neighbourhoods. In the same period, something similar has been performed with projects in UK where the architect Alison and Peter Smithson planned a neighbourhood capable to capture new features towards original compositional solutions, searching architectural variety able to reconfigure the urban block that resembles more to a cluster than a standardized house scheme, avoiding in that way inhabitants alienation.

Besides the large amount of studies, parts of the original proposal of Doxiadis have never been implemented. The most representative part of the city that follows the original project proposals is the sector G6 where it is possible to see how the

¹The Indian city located in a mountain area of Himachal Pradesh was chosen by the British Raj since 1864 for his summer staying. It is till nowadays considered an elite city.

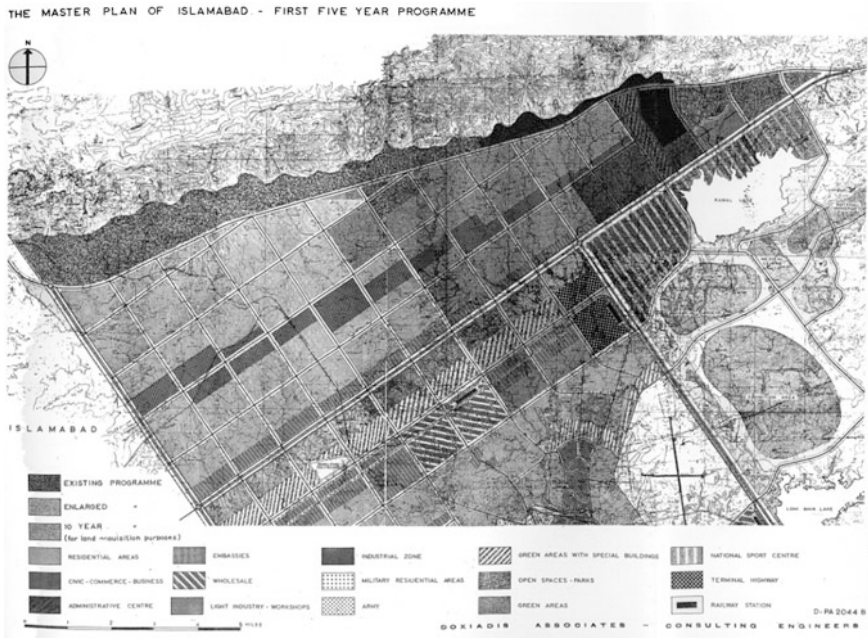


Fig. 1 Original master plan of Islamabad [Reproduced from Doxiadis (1961), *The spirit of Islamabad*]

planner mitigates the segregation of different social classes creating vibrant community living in proximity. The process created and used by Doxiadis to develop an harmonious urban community is named Ekistic. It is an experimental method that pretends to develop a scientific procedure to create the most sustainable human settlements combining knowledges of different disciplines such as anthropology, ecology, psychology, aesthetic, cultural and political aspects.

In order to create the right space size for human being, interacting with nature, men, society, shells (buildings) and networks, Doxiadis tried to display a method able to promote a urban model in a developing country, allowing rapid orderly growth, dealing with the incertitude of future (typical of this part of the world), leaving some flexible design solutions to the small scale of community clusters.

His scientific statement could be perceived rigid and aseptic towards the complexities of local urban facts, but some spatial organization principles are not based on a white slab or abstract geometric schemes; Doxiadis expressed the concept of imitation as a starting point for any city plan design declaring that “in the field of human settlements, and we are inclined to attach too much importance to the example and tend to imitate it” (Doxiadis 1965).

The possible investigation regarding this “domestication” of Modern Movement aspects proposed by Doxiadis, in line with the latest post-war CIAM theoretical framework, needs a deep research through his reports, diary and notes recently published.

It is interesting to notice that basic action enlisted by the CIAM before the Second World War is not sufficient to express society complexity in this part of the world where some citizen, beside the actions enlisted in the Athens Charter like living, working, moving and enjoying, has to pursue the daily action of surviving. For this purpose Doxiadis, in translating western planning concepts in the global south regions, tried to study the aspect of traditional communities in a modern plan, not only just towards new lifestyle habits represented by a growing presence of the machines, but also maintaining ancestral social aspects in defined rational designed communities.

He was also able to detect that the old arrangement of different castes or civil group strata in the same *mohalla* (traditional name for neighbourhood) is a resistant social structure. He tried in his urban design to re-compact different social citizen representatives, perpetrating the necessity to reconfigure the inhabitants proximity as a typical social organization of subcontinent regions. In this, specific social environment is possible to see different families from distinct income groups interacting with the same urban precincts as a typical local relationship between servants and served people.

The original plan materialized in the sector G6 (Fig. 2) expresses a rational method in planning a city creating in the same neighbourhood a high standard of facilities and complexities in terms of different architectural typologies and social strata, where the closest part near the street adjacent to the parliament sector is occupied prevalently by villas for high-income class and the remaining parts of sub-sectors named “classes” for the medium and lower income. A general survey of this sector gives an immediate impression that all the social strata in Islamabad have a place in a single neighbourhood like in the historical *mohalla*. This aspect induces to make a parallel analysis within the traditional city where the old *mohalla*, defined during the Mughal period in the twenty-six century, had its particular architectural composition: “the grand mansions with multiple structures and courtyards were

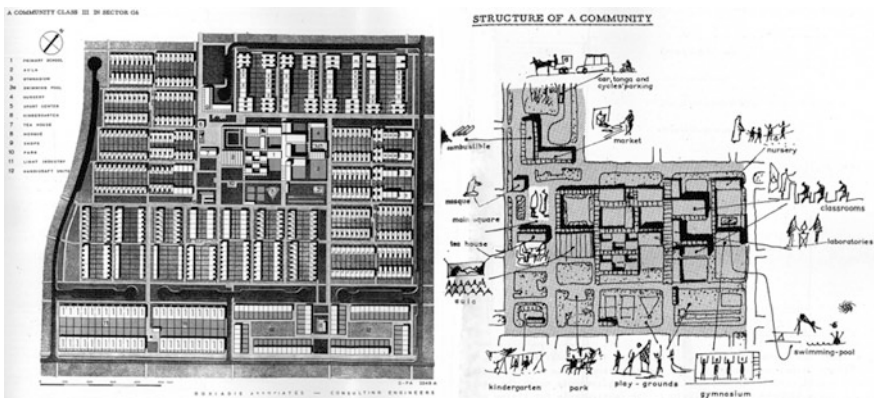


Fig. 2 Community class in G6 sector and the structure of a community [Reproduced from Doxiadis (1961), *The spirit of Islamabad*]

more like small communities that contained the private quarters of the *amīr* and also housed his treasure, harem, record office, stables and a vast retinue of service people” (Hosagrahar 2005). This self-contained neighbourhood was studied by Doxiadis who noted in his travel diary the necessity to be aware of the local social traditional structure: “the village squares, dwelling houses, community buildings and the estate and the plantations of which there is a great variety, will furnish data enabling suitable and sensible solutions to be provided” (Doxiadis 1960). He recognized and identified the traditional neighbourhood, where “old scales are surviving in up to certain sizes of city sectors” (Doxiadis 1962).

He incremented his observations regarding the traditional neighbourhood rules, the impossibility to standardize Islamabad plan like any other western plan: “it is here that the patriarchal structure of the Bengali family becomes apparent. The grouping of several huts around a rectangular courtyard proves the existence of several single families (each owing a hut) inside the greater unit of the patriarchal family who is living in the same enclosure around the same central courtyard in the most prominent place on which is usually the hut of the family house (...). We should be definitely thinking of community planning and town planning solutions which will express in a physical way the idea of living in groups of families which we recognize here” (Daechsel 2015).

Islamabad itself expresses the willingness to become a modern Muslim capital able to represent the aspiration of a newborn Islamic Republic of Pakistan. The Islamic features investigated by Doxiadis are visible in the squared road system and axial compositional methods that remind some of the historical Islamic city plans.

In fact, once again Doxiadis had been influenced by the local traditional urban structures: “finally Islamabad, a symbolic city of Islam, cannot ignore the rules of design and synthesis which are characteristic of Islamic culture. Every large and important synthesis of Islamic culture is based on pure geometry. We have only to think of the great mosques of Fatehpur Sikri and its synthesis on the basis of vertical axes, of the fort of Lahore, or the fort of Delhi, to be reminded that Islamic culture always designed with pure geometry. Even if we go to the smallest details in Islamic culture, we shall find that basically geometry gives the pattern right down to decoration” (Doxiadis 1960). This last statement although highlighting the geometrical characteristics that, in Islamic architecture, are normally visible in monumental buildings rather than residential and commercial ones expresses the desire to design Islamabad with local heritage features, recognizing the axial elements as a particular and unique aspect of the rational urban organization adopted for the Mughal city plans.

His references towards the old city are more evident in this statement: “each sector is about equal in size to the old city, and the city of the present and the future consists of many city of the past, and the scale of the past can show us how to deal with areas which do not extend beyond the area of the city of the past, i.e. in area such as our sectors” (Doxiadis 1962). Even in urban parallelism between Rawalpindi and Islamabad (Fig. 3), Doxiadis stated that “this comparison shows in some parts of G6 a texture similar to that of the old city of Rawalpindi. In other parts, however, especially where the car is in control, the old texture is broken by it” (Doxiadis 1962).

Comparison between the old city and sector G6

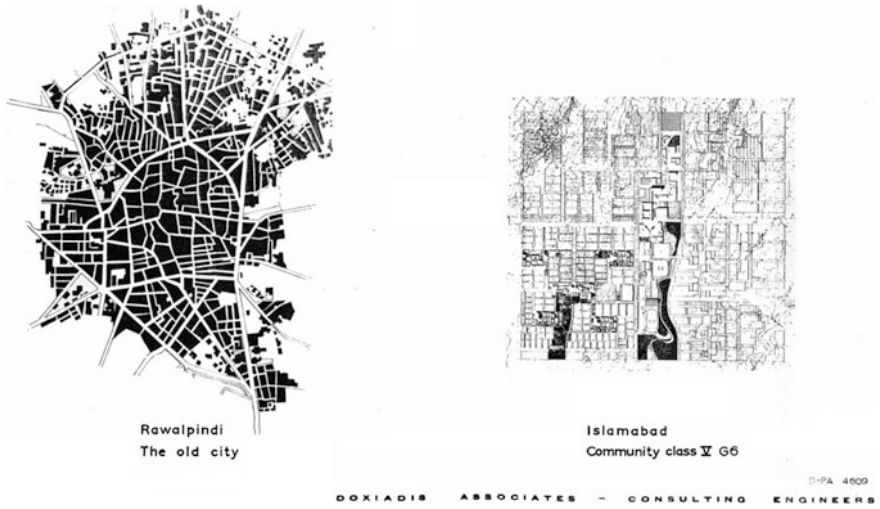


Fig. 3 Comparison between Rawalpindi and Islamabad in their urban texture [Reproduced from Doxiadis (1962), *The scale of the city*]

3 After Doxiadis

The plan and the implementations did not perform accordingly, and the result is that “the plan has focused on building hardware (physical infrastructure) as compared to develop software (institutional framework) necessary for implementing the plan” (Maria and Imran 2006).

The inclusive planning design of Doxiadis and the elite feature of the city idealized by local politicians created the prerequisite for a partial failure of the plan. On the macro level, we can assume that the initial master plan supposed to integrate Islamabad and Rawalpindi is nowadays leaving the two cities in their own independent shapes, the capital with recognizable squared shape and the near old city in organic one.

Islamabad “was conceived as a twin city of Rawalpindi” (Doxiadis 1961) in sharing physical service infrastructure like airport and roads, but in reality the capital (considered a city for elites) became more exclusive and made the old city useful as a centre for lower income people and daily workforce commuting, shifting his role from twin to a servant city.

Some of the strategies of Doxiadis planning have been breached during the construction of recent sectors. The typology variety and different social strata are no more visible as well as in the G6 sector. Nowadays, a series of real estate initiatives display the development of new urban parts that are designed “to cater for people of divergent socio-economic backgrounds; the reality is that different series of sectors are increasing, becoming localities for a people belonging to specific income group and social status” (Mahsud 2013).

Beyond the action of living, working, moving and enjoying, the action of surviving is performed among the low-income inhabitants that are able to produce physical facts ready to clash with the visual composition that characterizes the planned formal city. The details of the first master plan relies on a promotion of more pedestrian streets, greenery along the rivers that cross each sector as pleasant parks designed to connect elements between the sub-sectors.

In the planner's mail correspondence, it is possible to perceive the lack of attention towards the solution adopted in G6 sector stating that "any time or interest for housing or as wilfully ignoring all the new ideas and planning principles which Doxiadis had enthusiastically introduced on his earlier visits to the country" (Daechsel 2015). This lack of interest in new planning solutions triggered the spread of multiple illegal occupation named locally *katchi abadis*: these settlements are a direct answer to the progressive loss of urban expansion control and exclusion of lower classes in the Islamabad city territories. That specific social class is no more included in the plan like the exemplary G6 sector, and one evident fact is that the new house schemes for the lower class income are actually occupied by the growing middle class. Beside that, the design and location of these new house schemes do not match the affordability and the needs of lower income inhabitants who are normally looking for a place in proximity with the upper society residential area in order to perform their duties as domestic services.

Analysing the dynamics of this process of residential proximity relations between different classes, is it possible to notice that this urban fact is a result of social and traditional resistances that able to rebuild the traditional human relations of the typical historical *mohalla* in the shape of *katchi abadis*.

This phenomenon is evident in F7 sector, one of the most expensive areas in the capital, where is located one of the first illegal settlements. It is named French colony (Fig. 4), and it is one of the 11 illegal settlements recognized (Sajjad 2005). It is an area along an urban river where 6000 people live in precarious conditions in terms of hygienic solution in proximity with direct discharging of sewage in the supposed clean river and green banks. This community has experienced the efforts to legalize its area, but the upgrading of basic infrastructures is still incomplete and in worse conditions compared to the infrastructure standards in G6 sector (Fig. 5).



Fig. 4 Sector G6 and the *katchi abadis* in French colony F7 sector

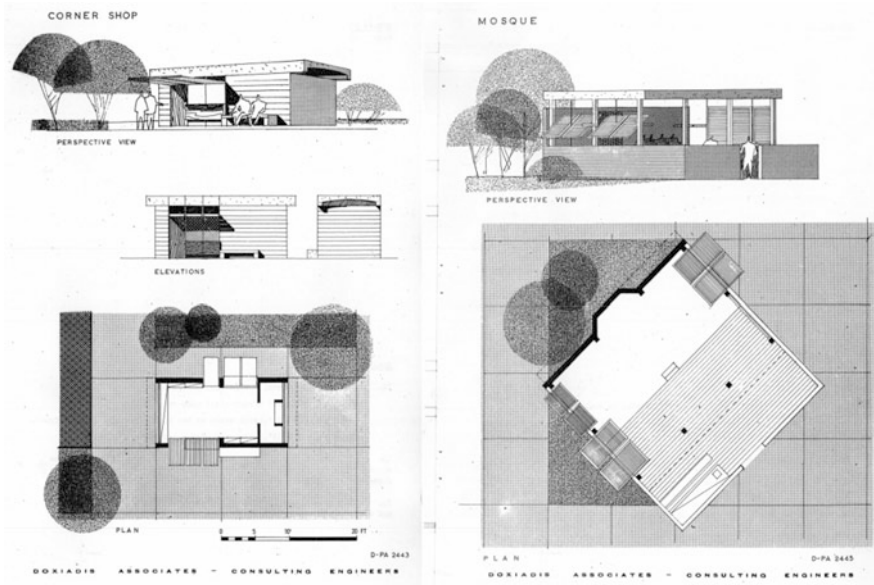


Fig. 5 Detailed drawing plans for a corner shop and a mosque [Reproduced from Doxiadis (1961), *Community buildings for sector G6*]

It is also interesting to notice that in the master plan Doxiadis developed strategies and solutions like the hundreds of little corner shops (named locally *kohka*) and mosques. Unfortunately, some of these structures are nowadays standing in illegal precincts and represent one of the main issues of illegal occupation and urban conflict across the capital.

In addition to that, another urban management failure could be perceived observing how a rational plan constituted of numerous complex urban elements became a mere blue print within simplified zoning principles, in which only the formal shape of the squared blocks remained identical to first proposed drawings. In these blocks, the permeability of urban composition of low-rise residential schemes proposed in the original master plan has been substituted by high-rise buildings, something in contrast with the new solution of introduced by Doxiadis able to overcome the old modernism practice that preferred multi-storey isolate building without considering the traditional characteristics of indigenous settlements.

In conclusion, if we analyse the drawings elaborated by the planner and his associate's studio, some aspects of illegal occupation would be avoided just following architectural detail solutions. In addition to that, is it evident that the lost chance to see physically built the Doxiadis proposals of inclusive communities based on the traditional neighbourhood features left Islamabad lacking in its original modern Muslim civil identity and more vulnerable towards future urban conflicts.

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Pacification of Favelas, Mega Events, and the Creation of New Inequalities in the Global South: The Case of Rio de Janeiro

Sebastian Saborio and Giuliana Costa

Abstract Since the 1980s in Rio de Janeiro, local authorities have conducted the so-called drug on war policy, which has fought mainly within the favelas between the police and drug gangs occupying these territories. Because of the high level of violence that characterized the city since that time, it has been perceived globally as a “city in war.” In recent years, with the aim of attracting investors and private capital within the city, Rio de Janeiro’s policymakers favored a global-scale urban competitiveness strategy aimed at organizing mega events. In fact, the city hosted the Football World Cup in 2014 and the Olympics Games in 2016 among others. However, in order to prove itself as a competitive city, Rio had to clean up its image as a “violent place.” For this reason in 2008, authorities created the “Pacifying Police Units,” a program to recover some of the favelas previously occupied by criminal groups. This policy created inequalities for the lower strata of the population.

1 Rio de Janeiro: Securitization in Place

In December 2008, the Security Secretary of Rio de Janeiro created one of the most ambitious security policies ever conceived in Brazil—the Pacifying Police Units (UPPs). These units have been promoted by local authorities as “community and proximity police forces,” installed in *favelas* previously dominated by drug gangs. One of the official objectives of UPPs was to put an end to the so-called drug war, installed in Rio de Janeiro and fought within marginalized urban areas since the 1980s. In fact, the police are now implemented in territories which were possible to

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enter only through sporadic and violent raids. Nowadays, 38 UPPs units are in place in 264 of the 1021 favelas existing in the city, with the presence of 9543 policemen.¹

The process of pacification began in the same year as Rio de Janeiro attracted the attention of the whole world, when the city was selected to host consecutively the FIFA World Cup and the Olympic Games. On October 30, 2007, FIFA announced that Brazil would host the 2014 World Cup and that in Maracanã—the famous Rio de Janeiro stadium—there would be many matches, including the final one. However, the presence of armed gangs in favelas located near the Maracanã stadium and near other tourist sites has posed serious doubts about the level of security that the city would be able to offer tourists. This has prompted FIFA representatives to require local authorities to take the necessary measures to remedy this situation. It is precisely in this context that on December 19, 2008, the State Military Police of the State of Rio de Janeiro (PMERJ) launched the program of UPPs. The decision of the city administration to “bring peace” to selected territories (where paramilitary forces were embedded) coincided with the need to maintain FIFA’s promises in relation to security. In addition, the pacification of the favelas was conducted in order to convince the members of the International Olympic Committee (COI) to crown Rio de Janeiro as the seat of the 2016 Olympics, a decision that took place one year later. Thus, on October 2009, following the positive opinion of the COI, Rio de Janeiro became the first city in history to host consecutively the world’s largest and most prestigious sports events.

Mega sports events play the role of catalysts of urban processes, bringing them out, accelerating and strengthening them (Costa 2012, 2013). In the case of Rio de Janeiro, authorities would probably proceed toward a militarization process of favelas even in the absence of mega events, but certainly without them, it would not have the breadth of the current pacification process. Mega events in Rio de Janeiro have not only speeded up securitization processes by buying new technologies or enlisting new police officers. The authorities have also had to extend their range of action to the military occupation of entire portions of the urban territory. Indeed, 37 of the 38 UPPs are located in the South Zone tourist area of the city and in the vicinity of the Maracanã stadium (Garcia Castro and Ramos Novaes 2015), creating an “urban safety belt” around the places that hosted the mega sporting events (Palermo 2013).

The nexus between UPPs and mega sports events is made clear by the timing with which the process of pacification and the places that have been chosen to be part of this policy have been implemented. Nevertheless, the authorities have immediately demonstrated reluctance to associate local favelas’ military occupation with the need to ensure the safety of foreign tourists during the mega events. In fact, the massive amount of public money that was allocated to the implementation of the program would not have been justified by the citizens of Rio with the sole purpose of guaranteeing the success of the two mega events.

¹www.upprg.br.

Palermo (2013) noted that only after the occupation of the favela Mangueira—faced by the Maracanã stadium—the Security Secretariat made a reference to the existing link between UPPs and mega events. The link between pacification and mega events becomes clear whenever an UPP is installed before a mega event. For example, a few days before the 2013 World Youth Day—an event in which Pope Francis brought more than a million pilgrims to Rio de Janeiro—an UPP was created in the favela Cerro-Corá, which is located at the foot of the Christ the Redeemer, the iconic statue of the city that in those days received the pilgrims visit. The same happened before the kick-off of the 2014 World Cup, when the favelas known as “Complexo da Maré”—located near the Rio de Janeiro International Airport—was occupied by the army to create the conditions necessary to install a new UPP.

2 Being Less Violent and More Competitive in the Global Arena

In the last decades, cities compete with each other to attract private capital and investment within their own territory. In this urban competition that takes place on a global scale, local governments must be able to convince international investors to have the resources and talents needed to multiply their earnings (Sassen 2009). This conviction is related to “urban marketing” and “city branding” activities in which city’s brand is promoted and sold as a guarantee of profit (Harvey 2012).

Rio de Janeiro’s political representatives, supported by local media, have presented mega events as a unique opportunity to increase the level of global competitiveness of the city and, consequently, to create the conditions needed to receive investment that would improve life conditions for all. Strengthened by this rhetoric, which until 2013 produced a high consensus across the various social classes, Rio de Janeiro has implemented a competitiveness strategy geared toward the implementation of mega events. In fact, the city hosted the Pan-American Games (2007), the World Military Games (2011), the Day of Youth (2013), the Football World Cup (2014), and the Olympics (2016).

In urban studies, it has been widely demonstrated that the choice made by city administrations to host mega events is always part of a strategy to promote the local economy through the implementation of urban transformations, mainly in the infrastructure sector (Costa 2013). Mega events attract a huge amount of global capitals in the local context and provide a unique opportunity to build a broad political consensus between the population and the various political and economic forces in the city. These are, in fact, the main reasons that encourage local governments to embark on competitiveness strategies geared to the implementation of mega events.

However, this does not look enough to explain how Rio has been able to host both the World Cup and the Olympics in two years. The explanation for this

success seems to be due in part to the political cycle of the city. In fact, the political consent of the Olympic Project—a document with which Rio de Janeiro has been nominated as the seat of the 2016 Olympics—was possible thanks to the fact that at that time both the Government and the State of Rio de Janeiro were led by political PMDB members. In addition, this party at the time was allied to the PT, from which come both Dilma Rouseff, former president of Brazil, and her predecessor, Luiz Inácio Lula da Silva. Undoubtedly, this political situation also favored the implementation of the pacification project, which has so far played an important role in the preparation of such events. In fact, a security program of this magnitude would never have been possible if it had not been considered a political priority by all the government scales. This priority seems to be due to the fact that mega events represent for governments an opportunity to demonstrate to the entire world that they have high levels of political and economic stability, as well as high organizational capacity (McMichael 2013b). Also, the process of pacification, which is closely linked to the implementation of mega events, has been accelerated due to the fact that since its inception, the main objective of the authorities was to create 40 UPPs before 2014, the year in which the FIFA World Cup took place. This led the city to almost achieving its goal (38 of the 40 UPPs envisaged), but at a hard price. The need to implement such a large number of UPPs in a few years meant that the Security Secretariat became a “police factory,” training police officers less than expected and, consequently sending them on the ground without providing enough skills to work in such complex territories.

However, in order to be competitive, cities need to meet certain criteria. Among others, they must prove to be safe. In other words, crime and violence should not be an obstacle to the interests of private investors (Arantes et al. 2002). In fact, crime, especially the violent one, is one of the factors most influencing the flight of capital, both domestic and foreign (UN-Habitat 2013; Begg 1999; Peirce 2008). So, to attract capital, Rio de Janeiro needed to clean up its image of a “violent city.” This has led the authorities to reconsider the usefulness of the strategy used in the “drug war.” Certainly, the fact that the favelas have gradually become the stage of an urban war since the 1980s has not benefited the international image of the city. In addition, the gang’s domains on territories located in central areas of the city meant to potential investors that the authorities were unable to assure the security standards necessary to make private capital flourish.

Before the beginning of the pacification process, the city had a homicide rate of 38 people per 100,000 inhabitants. Between 2001 and 2010 in Rio de Janeiro, more than 10,000 people, mostly residents in favelas, died because of police actions (Misse et al. 2013). Among these, 1333 died in 2007, the year before the establishment of the favelas pacification program. But high rates of homicide and police violence against disadvantaged social categories are characteristics that do not fit in cities that want to emerge as global and competitive metropolis. It is in this context that UPPs enter the city scene. The process of pacification of the favelas supported the dismissal of “the city in war” dress in favor of “the Marvelous City,” one part of an impressive urban marketing campaign (Jaguaribe 2004). This brand aims to sell

the image of the city as a fertile, productive, and happy place where investors can find the best conditions to develop their business.

According to official statistics (ISP 2015), in the period from 2007 to 2014, the homicide rates have fallen from 30.9 to 7.4 per 100,000 inhabitants in the pacified favelas. Also in the city as a whole, homicides have decreased, from 38 to 19 per 100,000 inhabitants. Even more radical is the decrease in deaths caused by the police within the pacified territories. Indeed, in the same years, the latter have fallen by 85%. Ganem Misse (2014) points out how these figures show that before the UPPs were established, the police were responsible for more than 50% of the violent deaths in the favelas. Moreover, although it is true that in these territories homicides have declined, it is also true that in the same time period the number of disappearances increased by 56%. Despite this, institutional rhetoric has only given importance to the positive aspects of the pacification process, arguing that the decrease in the number of murders is the irrefutable proof that UPPs have made Rio de Janeiro a less violent and safer city.

At the international level, the pacification of favelas was presented as necessary to carry out the mega events scheduled. The institutional rhetoric has given importance only to the positive aspects of the pacification process, arguing that the decrease in the number of murders is the irrefutable proof that UPPs have made Rio de Janeiro a less violent and safer city. The relationship between UPPs and mega events has also gained a lot of space in international media. For example, the day in which the police forces took control of the favela Rocinha, the largest favela in the city, the New York Times announced that a pilot effort was made by the government to take control of the lawless areas of the city in view of the 2014 World Cup and the 2016 Olympics (Penglase 2014). In this way, televisions and newspapers around the world echoed the urban marketing strategy that sees UPPs as a key to clearing the city image. In summary, the pacification of favelas has proved to be an indispensable factor in presenting Rio de Janeiro no longer as a “War city” but rather as the *Cidade Maravilhosa* (the “Marvelous City”, a name given since ever to Rio).

3 Compete Globally, Lose and Win Locally

In order to be accepted by the local population, the global competitiveness strategy geared toward the implementation of mega events was presented by the authorities as crucial to succeed in planning and implementing urban regeneration actions that would solve some of the city’s major problems. In particular, one of its aims was the pacification and integration of the favelas. Official documents say that the mega events would create a “better city for its inhabitants, promoting structural changes in the transport system, urban infrastructure, environment and social development” (Costa 2012, p. 284).

The idea that mega events represent an opportunity to improve the socio-economic conditions of citizenship is crucial to legitimizing public expenditure for

their implementation. Nevertheless, many studies have shown that mega events do not have a positive impact on the cities that host them (Szymanski 2011). Above all, there is no evidence that they carry any economic benefit to the poorest social groups (Minnaert 2012). This is mainly because factors such as the public housing, transport, healthcare, education, and public spaces are seldom considered in mega event projects (Bienenstein et al. 2012). It is not surprising, then, that the improvement of the social welfare system is never one of the results of mega events.

With UPPs, authorities seek to present social projects and development programs that are being implemented today in Rio de Janeiro as the direct consequence of major events. Costa (2012) points out how the PAC (Growth Acceleration Program) was proclaimed by the COI as the most important legacy that the Olympics would leave to the city, although this program represents only the continuation of the previous program “Favela Bairro,” which has been in force since 1993, long before the city was chosen to host the mega events. Nevertheless, it can be stated that there is a relationship between the PAC and mega events. In fact, the PAC, as well as the UPPs, focuses mainly on the favelas located in the South Zone tourist area and in favelas that have a higher level of visibility. Many of the infrastructures built into favelas with this program funds, such as the Alemão cable car, high-impact projects. This suggests that the true goal of the PAC is not to integrate the favelas but to create a kind of “integration show” (Cavalcanti 2013), which benefits from the current Rio de Janeiro urban marketing strategy.

From what has been said so far, it is possible to say that mega events are, first and foremost, a strategy for private capital accumulation. But this does not mean that they are the root causes of a “predatory planning” (Graham 2012), which occurs in many South Global realities, although they certainly have the task of speeding up and legitimizing it. In fact, mega events serve to deploy a legitimate rhetoric about removals, deregulation, and securitization processes to the detriment of poorer communities in urban contexts (McMichael 2013a). For example, in the city of Rio de Janeiro, from 2009 to 2013, 20,299 families—equivalent to about 67,000 people—were expelled from their homes to implement infrastructural projects related to mega sports events (Azevedo and Faulhaber 2015). However, if we consider all the cities that hosted the 2014 World Cup in Brazil, the figures are much higher. In fact, there are about 170,000 families, mostly from favelas, who have been denied the right compensation after being removed from their homes, contrary to the provisions of the Brazilian and international human rights law. In the Brazilian case, the legitimate power of mega events has been made clear by the fact that the institutions presented such clearances as necessary to build stages and improve transport systems (Comitês Populares da Copa 2012).

In this landscape of urban transformation, UPPs play a central role in securing many of the areas designed to receive restructuring and revitalization projects. Indeed, in order to revitalize an area, first, it is necessary to make it safe and neutralize the potential conflict of the population that resides there (Vieira da Cunha and Da Silva Mello 2014). For example, the revitalization of the port area through the urban project called “Porto Maraviha” was only possible after the pacification of the favelas in the surrounding area. In fact, UPP first disarmed the drug traffic

system in the neighboring favela Providência and subsequently monitored the protests of residents against the expulsion of some residents' homes and against the construction of a cable car similar to that built in Complexo do Alemão.

Despite the UPPs being perceived by a large part of the favelas population as a new form of oppression (Saborio 2014a), for the middle classes in the city, the securitization of the surrounding areas of peaceful favelas represents an opportunity to see their businesses flourish. As noted in the UPP's official website, a 2012 research conducted in the formal city neighborhoods adjacent to 17 pacified favelas shows that as a result of the UPPs installation, the profits of traders in those areas have increased from 26 to 36%.²

But the economic interests involved in the pacification process go far beyond that of small entrepreneurs. Large private service providers have benefited greatly from the implementation of UPPs. In the period prior to pacification, favelas residents were able to access free of charge, through pirated connections, services such as electricity, drinking water, and cable TV. In other cases, instead, as a result of clientele mediation between political figures and local communities, these services were provided by the government equally as free or at least at popular prices. The launch of the peace process has led to a "war on illegality," which significantly reduces the phenomenon of piracy in peaceful populations. Consequently, these services have been run by private companies, which, with rare exceptions, tend to limit special rates and claim to be paid at a market price. This fact has inevitably led to a dizzying increase in household spending, worsening their living conditions (*ibidem*). So, the process of pacification has led to the regularization of services, thus bringing an economic gain to the companies that provide them. For example, thanks to the process of pacification, Light, the private electricity company in Rio de Janeiro, has increased its earnings in the pacified territories from 1 to 7.4 million euros a year.³

In addition, the pacification of favelas represented the opening up of the formal market within these territories, which has prompted bank agencies and multinational companies, such as Coca Cola, to lend funding to the government to invest directly in UPPs (Willis and Prado 2014). Even businessman Eike Batista, owner of the EBX Group, active in infrastructure and construction, financed the R \$15 million media campaign in favor of the Olympics, and the process of pacification of favelas with R \$100 million.

The pacified areas are not just important for the mega events. They are also "regions of great interest in real estate" (Azevedo and Faulhaber 2015). Given the availability and predisposition of high and middle classes to live in places that are considered safe (Vetter et al. 2013), the value of rents and properties in the areas surrounding the pacified favelas increased. For this reason, it is possible to say that the categories that have benefited more clearly from the existence of UPPs are real estate owners and, to a greater extent, the construction companies such as Eike

²<http://www.upprj.com/index.php/faq>.

³<http://br.boell.org/pt-br/2014/06/26/upp-o-sonho-acabou>.

Batista's ones. Indeed, in 2011, the Rio de Janeiro real estate market had a growth of 44% (Rolnik 2012). Specifically, the rise in property and rental prices was related to the areas surrounding the pacified favelas. For example, some properties faced with favelas, which cost about R \$30,000 before the arrival of the UPPs, were subsequently sold for R \$200,000 or more. But also the real estate market in favelas has grown following the pacification process. In 2010, only one and a half years after the implementation of the first UPP, the housing real estate market grew by 400% (Freeman 2012). These forms of real estate speculation can favor the so-called white removal processes, in which less able categories can not afford to pay the increase in the cost of living in certain areas, and therefore, voluntarily decide to move to more areas cheap. In fact, within favelas, rents and prices of essential services, such as drinking water and electricity, pushed poorer residents to abandon their homes. For these reasons, Harvey (2012) predicted that if the current trend is to continue, in fifteen years all those hills currently occupied by favelas will be covered by condominiums made up of multi-story buildings with fabulous views over the Rio's Bay, while the former inhabitants of the favelas sent to live somewhere remote periphery.

Finally, as mentioned above, the creation of the favelas' pacification program has led to a significant reduction in murders and cleansed the police image. Nevertheless, as has been shown (Saborio 2014b) that UPPs have replaced the violence of "war on drugs" with less visible but more insidious police violence. In fact, instead of being deployed through the use of war rhetoric, the new urban militarism sanctions the state's violence against marginalized social classes, presenting the same under a "peace" discourse. This allows the authorities to gain consensus among the new global and local élites and to expand the role of military doctrine within the urban context. Although police deaths within pacified areas have dropped dramatically, this does not mean that the recruitment of 9543 policemen destined to occupy the 232 favelas represents a reconfiguration of military spaces in urban areas.

The redefinition of power relations between the state and the citizens of marginalized areas did not take place in an inclusive logic but through the imposition of formal control structures within them. Ostensible patrols, checkpoints, limitations of cultural activities as well as repression of dissent through the massive use of non-lethal weapons are some of the expressions by which the state's authority is permanently present inside the pacified areas. New inequalities are in place.

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The Role of State Involvement in Slum Improvement: A Critical Examination of Cofopri Approach into a Peripheral Barrio of Lima, Peru

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Abstract International agencies and local governments have implemented a wide range of approaches to the problem of informality in many cities of the “Global South.” However, these approaches have some failures and problems. In the case of Lima, Peru, the land titling program was implemented through the creation of the Commission for the Formalization of Informal Property (COFOPRI). The net impact of this organization related to slum improvement has been questioned. Therefore, this study analyzes the COFOPRI interventions and current conditions; its effectiveness in A.H Cantoral informal settlement of Lima, the most largest and intervened area; in order to have some results from the past experiences as well as stipulating important hints and some ideas for the future. The study adopted a qualitative and quantitative methodology based on literature and secondary data. The study revealed lack of cooperation between informal residents. The findings from this research also impact upon housing improvement, social integration, and economic opportunities. Significant challenges were identified related to collaborative planning, political interest, and management capacity.

1 Introduction

The process of rapid urbanization was based on an industrialization model with a centralized economic growth in a big urban center such as Lima (King 2003). Many “pueblos jóvenes” or “asentamientos humanos”¹ were developed into peripheral areas of Lima, which now become part of the urban nodes called “conos.” The informal land situation has been increased by the high cost of land development in central urban areas and because formal land market was unable to accommodate the migration influx (King 2003; AlSayyad and Roy 2004). Since the 1990s until now,

¹The new low-income settlements were known as young informal towns since the 1970s.

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a national policy has been formulated and translated into the titling program, providing legal tenure security. A public institution called COFOPRI (Commission for the Formalization of Informal Property) is created with *exclusive* and *excluding* functions. The biggest objective was a massive titling that established a mechanical relationship between getting a title and access to credit, and the reduction of informality in urban areas at national level. In addition, it was supported by the Urban Building Registry, World Bank, UN-Habitat, and United States Agency for International Development (USAID). COFOPRI has played a major role as stakeholder and administrator, especially in the Fujimori period in which it was a clear political will of the central government to bring forward (Calderón 2001). COFOPRI was supposed to finish by 2012, but central government has used this public institution as a tool to garner political support by granting titles that it is still continue until now. Within this context, it is interesting to see if COFOPRI's contribution was to improve or worse the living conditions of informal settlements through the analysis of the weaknesses and strengths, its effectiveness and complex relationship with other international agencies. Under this perspective, the study documents the process of land regularization and aims to highlight what are the urban changes after the process of formalization and who are the really beneficiaries. The effects in the urban space for informal settlers will involve socioeconomic and environmental issues that we will discuss using the case study of A.H Cantoral informal settlement in order to make important suggestions, in which can translate in some guidelines and fix some virtual experiences and actions of governmental institutions, especially to the problem of informality in many cities of the "Global South" that still remain a work in progress for United Nation's urban agenda in 2020.

2 Formalization in Latin America

Many policies have been adopted in Latin America countries to deal with informal areas, such as formalization policies, which is the process by which informal occupiers are not recognized by law or formal channels and obtain such recognition. This may happen through individuals taking needed steps to achieve the formal state recognition (titling, upgrading, urban redevelopment, etc.), or by the state moving to confer such recognition on its own initiative (political interest).

2.1 *Legal Recognition*

This policy has been to recognize or legalize informal land development, specially related to the practice of squatting: through juridical-administrative tools (indemnity, regularization procedures for titling) or through public policy (amnesty). This response is the clearest example of state's necessity to know and recognize what really happens or what should be under their territory. Some authors (Calderón

2001; Payne and Fernandes 2001; Bromley 2002; Durand-Lasserve 2006) criticized its effectiveness. The critics hold that regularization policies benefit people who do not pay taxes, the unclear title benefactor: the occupiers, social transgressors, tenants or the owners, and unclear distinctions between informal settlements on public versus private land. In Colombia, land cannot be treated with the same legal approach as occupation in public land; in Brazil, regularizing informal settlements that originated from individual or collective land occupation requires a different legal approach from that used to confront an irregular land subdivision created by the illegal actions of land developers and promoters (De Soto 2000; Gilbert 2002; Fernandes 2011).

2.2 *Urban Upgrading in situ*

This policy provides infrastructure (proper streets, public lighting, etc.), facilities (police, schools, social services), and basic public services (water, energy, sewers) to mostly consolidated informal settlements in nonurban areas. However, most interventions occur *before* building process and land titling, while it is the opposite in the formal domain, where land titling is followed by servicing, building, and finally occupation. This “ex-post supply” is not simply a generous act, most of government interventions usually involve no cost for the beneficiaries, in order to recover the invaded territory and to show its sovereignty (Bayat 2003). Occupying land without or with limited access to public services would be a way to make housing more affordable. This choice is logical because it allows them to capture land value through time. Furthermore, provision of basic services (ex-post dynamic) encourages informality not only by consuming public funds but also by making informal land markets (Smolka and Biderman 2011).

2.3 *Urban Redevelopment*

Urban redevelopment as a way of compulsory sanctions through demolitions, the government tries to recover informal areas (due to the lack of legal requirements) or intended to discourage and limit the development of unauthorized construction. In the case of on-site redevelopment through gradual demolition and in situ construction of alternative housing, the government tries to guarantee the security (Fernandes 2011). These interventions mostly target deteriorated informal areas where housing conditions are unsafe and closed to vulnerable urban areas. There are few pilot projects of this type in Latin American countries implemented by leading NGOs that are capable of mobilizing government support and ensure the interest of residents. There are other interventions such as complete demolitions. This mode is adapted to hazardous squatting informal settlements, under the justification of environmental and public health and the need for public spaces.

3 COFOPRI and the Formalization Process

COFOPRI was created as a decentralized public institute, subject to the regulations applicable to public entities, with its own endowment and administrative, functional, technical, and economic autonomy. By this law, COFOPRI was empowered to conduct proactively the regularization of ownership for the identification and sale of land for low-cost housing. It also established COFOPRI as an Executive Branch Agency with members appointed by the President of Perú and chaired by one minister of State designed by the President. Currently, the Minister of Transportation, Communications and Housing chairs the institution. A national coordinator appointed by the President leads COFOPRI (responsible for the massive land tenure regularization program) and the RPU, Urban Registry (responsible for the registration of all the properties generated by the massive land tenure regularization program). The program for the land tenure regularization aims at the *social and economic integration of the low-income people, with proper recognition of the savings and investments made on the sites they occupy*, as well as the worthiness of their properties through titling. Through land tenure regularization, properties owned by the low-income informal sector can be integrated into the real estate market and may become more tradable. The first step for achieving this objective was to implement a comprehensive, integral, and expeditious land regularization program.

3.1 Actors and Roles

Governmental institutions involved in the process of formalization are:

(i) Urban Property Registry (RPU), as the institution in charge of the registration of settlements and plots; (ii) Real Estate Registry (RPI), where investigation of the legal status of landholdings is conducted; (iii) Mining Registry (DGM): Surveys are made in this institution to prevent overlapping areas with mining concessions; (iv) National Real Estate Superintendence (SBN): Surveys are made in this institution to prevent overlapping areas with State lands; (v) Special Program for Agriculture Land Titling (PETT): Surveys are made in this institution to prevent overlapping areas with agriculture cadaster units; (vi) National Institute of Culture (INC): Surveys are made in this institution to determine if the site is located on archaeological remains; (vii) Civil Defense Institute (INDECI) is the institution which establishes restrictions to land use on risky areas. Coordination programs for the community; (viii) Institution in charge of the potable water and sewerage in Lima (SEDAPAL): It coordinates technical information with this institution.

Local authorities The municipalities were obliged to transfer the legal expedients of informal settlements of their districts involved in regularization campaigns. COFOPRI is empowered by law to take legal jurisdiction of district to implement the process of regularization. The urban irregularities found by COFOPRI are communicated to the Urban Control Unit of the municipality.

Community participation Community participation and collaboration are promoted before and during all the process of regularization to secure the success of the program of land tenure regularization. Information offices are opened to attend new requests from informal settlements in order to incorporate them in future campaigns. Before the process takes place, the population is widely informed on the advantages of having their property registered and the methodology of the process is also explained. During the process, householders participate in the fieldwork, measuring their plots or putting the physical signals. Final decisions concerning their site are taken in coordination with the community and stated in an act with the leaders of their association to legalize the actions.

Private sector Private companies are encouraged to participate in the technical survey works of the regularization process through outsourcing. When the settlement presents overlapping situations with private land rights, negotiations are promoted between the parties.

International agencies International agencies, especially the World Bank, and multilateral organizations may provide technical assistance and financial cooperation for informal property regularization projects.

3.2 The Campaigns and the General Strategy

The massive COFOPRI program was implemented through campaigns of 2 months each. Each campaign involved 50–70 informal areas, which meant approximately 30,000–35,000 plots. Focused areas were chosen by different criteria, such as feasibility to become formalized, geographical situation, dwellers requests, and existing legal and technical documents. The general strategy is to conduct legal and physical surveys in the focused area to identify and study common problems of the settlements involved in the campaign. The survey works for topographical and cadastral data needed for the physical formalization of the settlement, anticipating personal requirements. The legal framework is needed to support the formalization process. Coordination with the public actors involved for a fast and efficient implementation of the massive program of formalization.

3.3 The Procedures for Land Tenure Regularization

The procedures for formalization through the titling program (see Fig. 1) have the following stages:

(i) *Diagnostic* that involves the identification of informal settlements on the fieldwork and thereafter measured (technical tools). It aims to gather general information (physical, social, and legal); (ii) *Settlement evaluation for formalization* related to the physical and legal analysis in order to determine if the informal plots

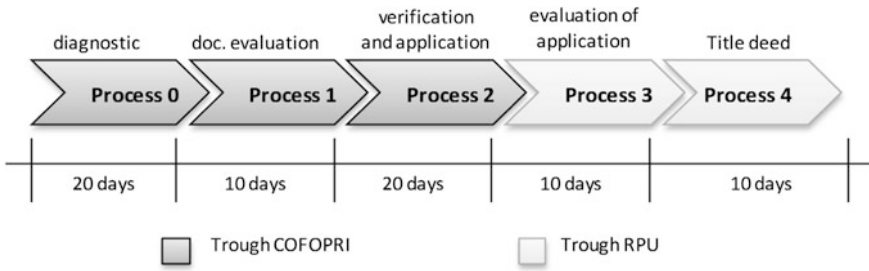


Fig. 1 Phases of Titling Program (Source Authors’ elaboration, 2015)

are located on public or private property and if there are any constraints on their evaluation of documents. The final products are the cadaster drawing and layout plan which will be registered at the RPU; (iii) *Verification and application to register* if they are physically living on their plots (door-to-door census). Then, the main objective is to inform residents of the scope of the process and the documental requirements; (v) *Evaluation of the application*, once that RPU received the compiled documents, they make a physical analysis, where verification of measurements, borders, areas, topographical references, point of connections, and other technical data takes place. Also the legal analysis in which they ensure there is no double official registration of the same property. If all documents are without observations, they proceed to the final registration; (vi) *Title deed* is the final product and process, after that sometimes the institutions made a control of the product (some typing mistakes), after that the title deed go to the Archive Official of Property Registration.

3.4 The Results

COFOPRI has played a major role as stakeholder and administrator, responsible for formulating, approving, and executing the formalization program nationally, especially in the Fujimori period in which it was a clear political will of the central government to bring forward (Calderon 2004). The results impressed the Peruvian government during last decades; COFOPRI covered almost 90% of all informal properties and almost 95% of the cadaster data information of all cities. Since 1996, COFOPRI has helped local governments to take over land titling responsibilities in informal settlements, after they had been fulfilling this role for sixteen years. With the creation of COFOPRI, the procedures to grant titles became more simplified and coordinated at different administrative levels, reducing the time from seven years to three months or less. From 1996 to 2006, almost 700,000 title deeds were distributed in urban areas in Lima metropolitan area, but in the last decade this production has been decreased (see Fig. 2). COFOPRI was supposed to finish by 2012, but central government still uses titling program as a tool to garner political support.

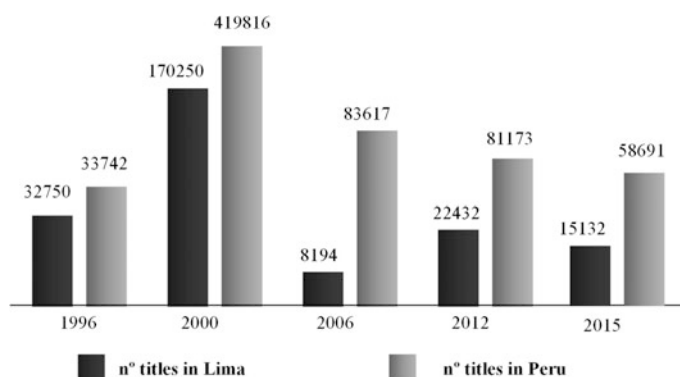


Fig. 2 Titles granted from 1996 to 2015 (Source Author's elaboration, 2017)

4 From Informal to Formal Settlement: A.H Cantoral

The informal settlement Cantoral is located in the district of San Juan de Lurigancho. This district was included in the massive program for land tenure regularization in 1998. The district of San Juan de Lurigancho is located in the East Cone of Lima, and it is the biggest district of Lima with 15% of the total population of Lima. The informal settlement was founded in May 1990 and was an area that ENACE² used to deposit all waste from construction for social housing to the police force. The desert area was hard to live; however, 31 people decided to come together and form the informal settlement Cantoral and raise economic funds to start the process of cleaning and levelling the land.

4.1 SocioEconomic and Urban Land Situation Before Cofopri

The informal settlement Cantoral has a population of 20,650 inhabitants; the first invasions mostly came from the southern parts of the country. The family average size is 5.7. About 60% of the population are in schooling age. Some economic activities are developed in the site, such as informal commerce. Women have an active participation in generating family incomes, working as sellers or housekeepers. Most of the plots are located on the hillsides, on hazardous zones. In 1999, constructions still were very precarious; houses were built with temporary materials such as plastics, timber, or mats. Houses had only one room, without potable water and sewerage. Electric services were available in the settlement, but not drinking

²ENACE (Empresa Nacional de Edificaciones) was the institution in charge of the implementation of government housing solutions until 1998.

water and sewerage services. Vehicle and pedestrian roads were traced but not paved making dust a pervasive problem. Steep roads allowed vehicles to access only to the lower parts of the settlement. Creation of public spaces is reserved for community facilities such as health, education, and recreation (“Vaso de Leche Committee,” Pronoei, “Comedor,” Public School, etc.). However, new householders had invaded some parks and some areas for community facilities, especially in plots where physical barriers did not exist. On June 1990, the informal area was accepted as a part of municipal housing program. For many years, they tried to legalize their land situation. On October 1993, the settlement finally got its legal recognition by the Municipality of San Juan de Lurigancho as an identified and qualified permanent human settlement called “Human settlement Cantoral.” The perimeter plan was approved by the municipality, and then by Cofopri included new areas that were occupied by latecomers, with an area of 155,759.24 m². However, the human settlement was recognized by the municipality but was never registered in any registry before Cofopri. It presented overlapped areas with the coastal peasant community of Jicamarca and ENACE (see Fig. 3). The perimeter plan approved did not represent the real boundaries of the settlement because it did not include the new informal areas. The subdivision plan did not show the real dimensions and areas of some plots. Also, the fieldwork found that 20% of the plots were located in hazardous areas with weak foundations and landslide risks.

4.2 Cofopri’s Intervention

The first problem was the overlapped areas with ENACE, the former official housing agency. COFOPRI had legal authority to support the action and made necessary arrangements with this institution. The overlapped areas were shown in a perimeter plan, and the mandatory acts were prepared to register it at the Urban Property Registry. The regularization was solved through the law for land titling

Fig. 3 Overlapped areas of A.H. Cantoral with other land rights (Source COFOPRI, 2011)



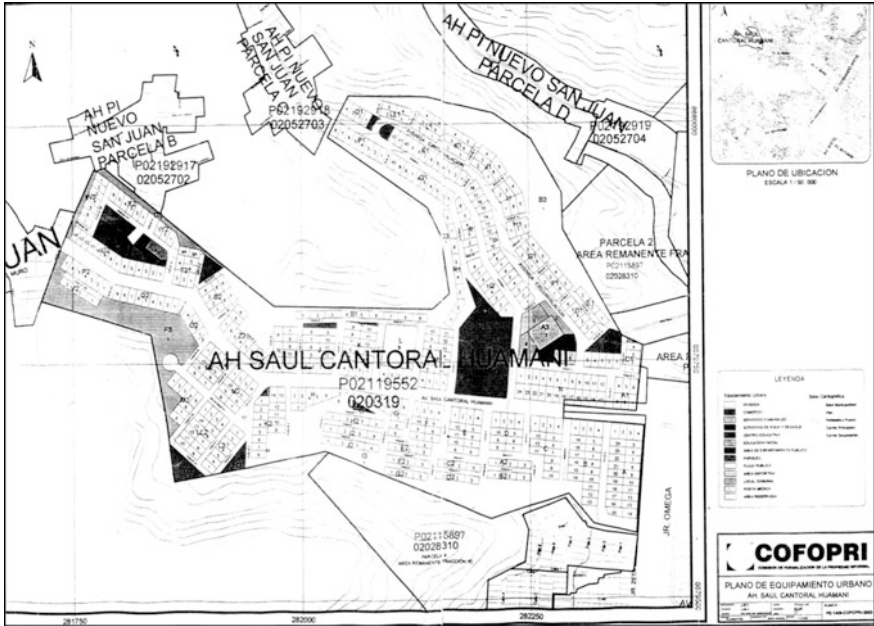


Fig. 4 Overlapped areas of A.H. Cantoral with other land rights (Source COFOPRI, 2011)

of the coastal peasant communities.³ The mandatory act was elaborated and registered at the Urban Property Registry. COFOPRI prepared a new perimeter plan with geographical data referred to official maps. A former subdivision plan was updated. Risky zones found in the settlement were consulted with INDECI to get its official recommendation to reduce exposure to natural disaster. INDECI allowed the location of plots in these areas, recommending civil works to prevent landslides and improve the foundation system. As the settlement of Cantoral did not have previous records, COFOPRI had to inscribe it in the Urban Property Registry (see Fig. 4). The perimeter plan showing the new area and the plot plan reflecting the legal and technical regularization done was supported by mandatory acts for the registration. The titling program delivered 496 titles. Twenty-two plots are reserved for communal facilities and commerce use.

³This Law allows COFOPRI to formalized urban settlements and dwelling centers occupying communal land as long as the peasants' community may have not acted to vindicate their ownership over the land in question.

4.3 Changes After Cofopri's Intervention

The A.H Cantoral has been suffered some changes at different aspects after almost 20 years of formalization of the titling program:

(i) *Socioeconomic aspects:* The risk of eviction is lowest, and having a formal title would be more valuable for them in negotiating one or more property rights. Title properties are delivered to both genders. On the other hand, social conflicts have been decreased when was defined boundary issues. But it has been increased robbery, young vandalism. In addition, sociocultural programs have been decreased through all these years. Population became more individualistic. Only the school remains the only social activity, and there is a lack of proper infrastructure to all urban community facilities. The population have been used their saving capacity outside of financial institutions, and private banks are afraid to lend to “risky low-income people.” Some families have more than one formalize property (which is prohibited) which means selling one of them for profit purposes.

(ii) *Environmental aspects:* Formalized areas became more prone to being contaminated by new informal land use practices (land invasion). Most of the plots are still located on the hillsides, on hazardous zones; slopes go between 30 and 50%, with landslide risks. Constructions still very precarious, houses are made by temporary materials. Despite designated areas for green areas, there are empty areas or occupied areas by another informal settlement instead (see Fig. 5).

(iii) *Urban planning aspects:* Lack of provision of basic services and urban infrastructure could pose serious health risks to the population. Vehicle and pedestrian roads are traced, but only main road is paved (see Fig. 6). There are few



Fig. 5 Actual map of A.H Cantoral occupy reserved areas (Source COFOPRI, 2015)



Fig. 6 Lack of infrastructure and public services (Source Author's elaboration, 2015)

stairs made by the population used as pedestrian roads to their homes, made of stones mostly, few of them made by concrete. There are few areas reserved for community facilities. There are not recreational parks, despite numerous empty areas designated areas for parks and gardens. There is still a low percentage in the A.H Cantoral of green areas (3.8%) under the health standards (6–8%).

4.4 Interview to the Founder and Leader of A.H. Cantoral

1. *Right now, what is the work activity of most people in A.H Cantoral?*
Most people work in handicraft activities, or informal commerce and small companies, based on local production, also people work on transportation services.
2. *Your economic incomes have been improved after the formalization?*
Yes, I believe. Most families have been improved their economic incomes. The 20–30% of the population sell some of their plots.
3. *Are there communitarian facilities to bring population sociocultural services?*
Yes, but all of them are working independently, people choose not to cooperate after the titling program promoted by Cofopri, they just cooperate in order to have their titles, and after that it have been disappeared through time.

4. *So, there is lack of organization in the population and false poverty?*
Yes, I think so. Majority of population does not have ambition or aspiration to have a better live in and outside of their homes. There is a lack of order in the social services. False poverty also came mainly from people that took advantages of formalization; they sell one of more plots that they acquired. Those people are not poor; they have all commodities in their houses.
5. *Is there illegal leadership in the A.H Cantoral?*
Yes, definitely, they took advantages of their position and became land traffickers. They make believe people to have facilities to divide, designate, distribute, and sell some public reserved areas in A.H Cantoral.
6. *The municipality arrives here to bring some socioeconomic support?*
No. They never came to bring sociocultural programs and neither to bring some infrastructure. The only municipality that came here was in the period of 1990–1995, before the formalization process by Cofopri.
7. *What kind of social problems do you find in A.H Cantoral?*
There is younger vandalism with drug problems, mostly as consequence of the lack of presence of the parents. Also, we have a lack of urban infrastructure.
8. *What kind of policies do you like to be improved in your community?*
More social and urban programs that support youngest after they finished the school. I feel that after the process of formalization, the governmental support and help from international organization have been disappeared through the years.
9. *What kind of support from international organization did you receive?*
First, it came some Ireland religious group, then Spanish cooperation MAS that helps us with the construction to our homes, then the Italians to support us with the installation of water service. All these support was before our title deeds. After that, we did not see them again.

5 Conclusion

COFOPRI has been improved traditional procedures for titling, defining a new system for the formalization of land tenure in a more efficient way. However, COFOPRI does not accomplish its goals, because the social and economic integration of formalized settlements that they pursue is just a mere superficial policy. This titling program does not take a proper consideration of land use and urban development planning. On the other hand, the regularization program promotes more informal occupation to the already congested formalized communities. The State and local governments should take adequate measures and establish a land policy to regulate and manage land use. The titling program creates consolidating poor urban quality formalized areas, such as the case study of A.H Cantoral with high density growth and scarce urban land, the few remaining reserved areas are invaded or sold out by land traffickers (local leaders and local governments, COFOPRI, etc.). Also the program itself is usually used as vehicle for political

patronage in “titles for votes” schemes, instead of promoting urban, social, and cultural integration with the rest of the city. Consequently political convenience in one hand, and in the other hand necessity by the community, creates a vicious cycle of informality. Within this context, COFOPRI must work with public and private institutions involved in the provision of services and sociocultural program, either providing or exchanging technical resources and full training programs for education, health, and economy production, especially for young population. The institutions involved in land issues must define same procedures and resources to update, generate, and improve their technical data using one data for official maps. Improved urban quality and the community facilities, rational land uses for future development of the district, and higher urban density may be some of the advantages of a local new strategy for already formalized settlements. Current urban regulations for planning require a major revision and update, in order to respond to the new demands of housing and urban development. This process should involve the community participation should also be promoted to participate through its representative organizations taking an active role in local urban planning.

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Undergrowth Urbanism: The Role of User-Generated Practices in the Informal City. A Methodology for Analysis and Intervention Based on the Case Study of Paraisópolis in São Paulo

Valentina Mion

Abstract *Undergrowth Urbanism* is defined as an urban dynamic generated autonomously by the inhabitants and independently of official planning mechanisms. By analysing the nature of these dynamics, an attempt is made to demonstrate how they are essential for the functioning of the city even though they have no direct link to the conventional channels. Because of the level of consolidation and evolution it has obtained, Paraisópolis is taken as the main case study and representative of many dynamics existed in the informal city. The most relevant phenomena are identified to distinguish the invariants and variables, the points of convergence and divergence of actions taken, and the possible shared principles and phenomena that might be useful for a comparative analysis. The results of this process is a matrix that enables comparison of different cases by referring to constant parameters that bring out the components and the disturbances of the system. The significance of the matrix is to bring out social dynamics and tactics for self-administration that can be used reactively in the regeneration process. The aim is to arrive at the identification of sensitive points where regeneration projects could have more success.

1 Observing the Informal City: The Case of Paraisópolis

The earliest manifestation of the phenomenon of the informal city was in Brazil, in the most important urban centres where shanty towns (*favelas*) already began to appear in the 1950s. In the first places that experienced the phenomenon, Rio de Janeiro and São Paulo, these shanty towns rapidly became consolidated as informal settlements. The earliest example of a *favela* in São Paulo is Paraisópolis, which has

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passed through a great many stages of development and consolidation, and now embodies (either as a present or a past condition) most of what could be defined as the characterising features of “the informal condition”. Initially a precarious settlement without services of any kind, inhabited by workers from the rural zones of the region of Bahia, over its history Paraisópolis has become a solid community that is now recognised within Brazil and elsewhere. Today it has been provided with basic urban infrastructure and services, and its inhabitants are supported in various ways by the governing bodies of the city, by a number of private bodies (NGOs and other not-for-profit organisations), and by the commitment of the local community itself. But although these are conquests that have been important and determinant for the future of this community, they have not been decisive and considerable problems remain to be addressed.

Despite those advances and even though today’s designers and urbanists are ready more and more to share in a new political and urban awareness that includes a reflection on the destiny of these informal settlements, there is no widely available knowledge about their actual morphological, architectural, and social characteristics. Research in the field has been somewhat sparse and episodic, and on the whole is still not sufficient for genuine understanding of the socio-spatial potential of these complex structures, which in fact are significant elements that offer an alternative to the tools traditionally used for defining urban structure, and the usual ways of constructing cities. In essence, the socio-spatial conformation of the *favela* is an alternative of spontaneous derivation that is worth comparing with other more or less gravely deteriorated conditions of social segregation and exclusion within urban organisms. The *favela* has its own internal rules and cultural codes, directly produced by real conditions, and are the exact opposite of the top-down processes by which the space of the city is officially organised.

In today’s Brazil, more than 100 years since the first *favela* began to be occupied by its earliest inhabitants (*Morro da Providência* in Rio de Janeiro), these informal settlements can now be considered as historic urban realities that possess spatial and cultural value of their own. For that reason, they can now be a subject for study and analysis, and can be used not only as a reference for the preparation of development plans and projects to improve their inherent conditions but also, and much more importantly, because they are representative case studies of an informal condition that has been modifying and consolidating itself over time, and for that reason can aid understanding of the dynamics taking place more recently, in a variety of other places.

The *favela* of Paraisópolis is situated in the district of Vila Andrade, in the southern outskirts of São Paulo approximately 17 km from the centre and bordering with the well-known upmarket neighbourhood of Morumbi.¹ Today it has come to occupy a surface area of approximately 798,695 m² and has an estimated

¹Today, *Morumbi* is one of the richest neighbourhoods of São Paulo and Brazil, where a good part of the homes of the São Paulo managerial class are concentrated. But alongside the rich mansions of the Brazilian upper class some shanty towns have developed: Real Parque, Jardim Panorama, and Paraisópolis, the second largest favela of the city. This district has the highest concentration of

population of 65,000 (although in recent years the exact number of inhabitants has been controversial; the local authorities, and some of the NGOs operating in the area, claim that Paraisópolis has more than 100,000 inhabitants although this has never been officially confirmed).

Historically, Paraisópolis originated in the 1950s with the illegal occupation of a semi-rural *bairro* (neighbourhood) where land designated for future luxury upper middle-class development was taken over by entire families coming from north-eastern Brazil, attracted by the employment opportunities in the industrial sector, who began to build houses on the empty lots. This set off a slow process of gradual densification and consolidation as the initial shanty town grew into a settlement and went on to pass through various stages of development until by the 1990s to all intents and purposes it had become an authentic urban community in the true sense of the word. Since the year 2000 this process of urbanisation and growth has become very intense and the density of residential construction has quickly doubled; in fact, by 2005 Paraisópolis had reached the maximum possible physical size within the topographical and environmental limits of the locality, and is now one of the largest *favelas* in Brazil.

Although Paraisópolis has now reached saturation point, over the past ten years it has continued to change and has been undergoing various processes of consolidation with different characteristics and at different speeds. The earliest historic sub-nuclei have become consolidated into clearly identifiable nodes, and a level of functional *mixité* has now been reached within them that now makes them important for the settlement as a whole.

These consolidated nodes now include services like banks, large stores, and local cultural associations, along with an infinity of small businesses that have developed at street level and have transformed Paraisópolis into a lively urban island that is very great important for the wider region. But even though the process of consolidation is continuing, in various parts of the *favela* there is still a predominance of extremely precarious wooden shacks, erected right beside open-air refuse dumps.

In an effort to improve conditions in these informal settlements, therefore, in recent years the local authorities have been building numerous social housing projects, even though spontaneous construction is still proving much more productive and is continuing to add vertical extensions to a constantly increasing number of the existing buildings. One important project for the provision of basic urban infrastructure (*Projeto Paraisópolis* promoted by the *Prefeitura do Município de São Paulo*) was designed and implemented between 2005 and 2013. It had the virtuous, and unusual aspect of having demonstrated remarkable sensitivity for the local context and the inhabitants. During the period of its implementation, in fact, great efforts were made to create a sensitive long-lasting relationship with the inhabitants, to establish trust and a spirit of give-and-take and to understand local

(Footnote 1 continued)

income in the city, one of the highest indices of development in the region, and its inhabitants have the greatest purchasing power in the city.

requirements and aspirations more deeply. Up until then, anything relating to governmental initiatives had been met with a palpable attitude of rejection because of the many promises that had been broken and the projects that had been proposed and presented, but never materialised. So build credibility for the *Projeto Paraisópolis*, during the first two years of its implementation a great many meetings were held with the inhabitants, in a participatory approach that little by little succeeded in persuading everyone, sometimes not without difficulty, that it would be credible and realistic to create new housing in Paraisópolis to a better standard without necessarily moving out most of the population (Fig. 1).

Whilst not all the residents share in this spirit of participation, it has already become very strong and has increased considerably over time, indicating that the community has been going through a cultural development of its own. Life in the favela means living in a condition of *proximity*, where everyone knows everyone else or is indeed related to many others, and where it is easy for anyone to find small shops and supermarkets, workshops, and services of various kinds very close to home. The community that lives in the *favela* and uses these facilities is the same community that frequents the local church, school, or cultural association, so if a family has to move to a house of a different type, or to a different neighbourhood, these relationships could be lost, and even if the new home is not particularly far away, these connections could be modified and relationships could change.



Fig. 1 The roofs of Paraisópolis (Photo of the author)

When the public authority allocates a new home, the family is expected to pay rent for approximately the next 20 years, at the end of which the home becomes their property. But this has produced a phenomenon that is now assuming pre-occupying proportions: some of the assigned social housing is being sold prematurely by families who decide to sell the home before it has genuinely become their property, and who release it into a system of illegal or *informal* type.

These transfers of property are part of a logic that is very widespread in the community, and is indeed one of its primary rules of operation; by tradition, the simple fact of living in a house is assumed to mean that its inhabitants are free to make use of it as they wish. And because the *favela* has always functioned autonomously, these new rules introduced by the formal system are given secondary importance, even though this local autonomy is not based on any system of self-management by the inhabitants but on a much more complex, labyrinthine system that finds its logic and the mechanisms of its functioning in its relationship with the system of the informal economy. So whenever a new home is assigned to a family, it passes directly into the hands of third parties who to all intents and purposes act as professional intermediaries who identify the families who want to sell and those who want to buy: estate agents in every real sense, who even go so far as drawing up purchase or sale agreements, and stipulating contracts between the parties.

Very little documentation of this phenomenon is available and it is not easy to acquire reliable data about its extent; nevertheless, our testimonies collected in the field show it to be a reality even though its existence continues to be denied by the local authority, which finds it difficult to admit that there are still aspects associated with its basic urban infrastructure programmes that can escape the control of the formal system.

In parallel with the consolidation of the physical environment of Paraisópolis, consolidation of the social environment was a long process that has gone through a great many phases. The *favela* only took shape as a community over many years, during which its inhabitants lived in conditions that were often complex and forced them to travel on a tortuous pathway before they were able to reach a level of awareness and maturity that eventually made it possible for them to see concrete results and improve their settlement by taking spontaneous action of their own. One important such event took place in 2001 when they set up the *Associação de Moradores*, which assumed the role of an authentic *local administration*² and today has become a well-structured body with its members elected by the residents. Beginning from 2005, the *SPAÉ* project (*São Paulo—Projeto de Urbanização de Favelas*) was activated in Paraisópolis on the initiative of *SEHAB*, and at a later stage, within the sphere of the same project, collaboration began from 2007 onwards with *S.L.U.M Lab (Sustainable Living Urban Model Laboratory)*³

²in the same year, the favela of *Heliópolis*, the largest in São Paulo in terms of size and number of inhabitants (the estimated population is approximately 200,000 people), also set up its first *Associação de moradores*, later recognised as a *bairro*.

³A research and design workshop born out of the collaboration between Columbia University and Urban Think Tank—ETH Zürich.

to create an *Informal Toolbox*: a catalogue of the systemic conditions existing in the *favela*, together with a list of prototype projects that could be adopted to improve it. In the wake of this first collaborative project, numerous Brazilian and international academic institutions adhered to the initiative, delivering positive outcomes and succeeding in creating valuable exchanges of views between the professionals and the resident community. But despite the successes of the SPAE project it must be emphasised that like many initiatives that come from outside, even when they are supported by the local institutions, its impact was not significant and the positive effects it did succeed in delivering were soon forgotten; today its only identifiable remaining traces are in publications and on web pages, and its effects on the real territory of the informal city have been very few. And there is another major limitation inherent in the very nature of international initiatives: the difficulty of establishing an authentic relationship with the places in which they are implemented.

Another opportunity came in the form of the *São Paulo Calling* initiative, which then also led to the birth of the *URBZ Brasil—São Paulo* collective in 2012. The first URBZ group had been set up in Mumbai in 2008, and this new Brazilian branch played an active part in the activities associated with *São Paulo Calling*, demonstrating profound sensitivity and an ability to understand the context; an approach made all the more effective thanks to the group's collaboration with the Paulista architect Fernando Botton, who had already been active in the area for some time.

The *URBZ* approach is based on a conviction that it is the residents who are the major experts in the issues that affect their own neighbourhoods, and that their day-to-day experience of the context in which they live and work is essential knowledge for urban planning and development. Their real needs and difficulties, which must be addressed when intervening in this context, the functional rules for doing so, and the easiest paths to take, must all derive from that local experience as a natural, direct, and authentic form of knowledge that cannot be ignored by politicians, planners, urbanists, and architects who are expected to maximise the quality and impact of their work. In fact, when the *São Paulo Calling* event ended in 2012, *URBZ* decided to set up a headquarters for their collective in Paraisópolis itself so that the work begun with the community could become continuous and so that they could become a constant presence in the area. The projects put forward by *URBZ Brasil* consist of small-scale, point-by-point design proposals based on needs expressed by the residents themselves, and that very often begin from spontaneous action that is already under way. The solutions resulting from this approach have no pretence to be definitive or resolutive in relation to the problems that these informal settlements face, but are based on the conviction that continuous action, in the form of small-scale interventions, is important for the community itself, is recognised by it, and can guarantee solid and effective results that improve the quality of life.

As time has passed, Paraisópolis has become better known than the other *favelas* of São Paulo, thanks in part to the significant number of firms, entrepreneurs, and well-known personalities who have added their support to that of the traditional actors already active in the settlement (about 150, according to current estimates).

In general terms, therefore, it can be said that a significant number of virtuous initiatives, many of them spontaneous, are on site and operational at Paraisópolis, improving the quality of life in the *favela* and providing services for the inhabitants.

2 Understanding the Informal City: A Methodology for Analysis and Intervention

Today in all the *favelas* the resident communities, supported by trained professionals, are implementing initiatives that are tending to trigger practices of ongoing amelioration. In this paper we define these “virtuous practices” as *Undergrowth Urbanism*, focussing on the informal city of Paraisópolis because in that context the dynamics of those practices have become particularly extensive.

Our proposed methodology for analysis and intervention uses an analytical matrix to bring together everything known about a particular informal city, to make analytical comparisons of different examples, and more specifically, to analyse the different “virtuous practices” that are implemented within them. Using Paraisópolis as a case study, our analytical matrix makes use of four diagrams: a *City Profile* data sheet, a *Neighbourhood Profile* data sheet, a *Structural Matrix*, and a *Matrix of Practices*. By completing these matrices, any case study can be investigated in particular ways depending on which parameters are taken into consideration, or can be compared with other similar cases. The priorities and methodologies of the interventions for improvement that are most likely to succeed can then be defined, based on the characteristics that emerge from the analysis. The communities themselves, supported by the professionals and the institutions, each with a defined role that complements those of the others, are then responsible for putting these interventions into effect. They consist of micro-urban projects small enough to be managed directly by the community assisted by the professionals, and with funding and resources guaranteed by the institutions. We base this a *modus operandi* on the conviction that the generating energy for these initiatives already exists in the *favelas* and should be exploited in positive and propositional terms, so that it becomes the real driver for change in the informal city.

The *City/Neighbourhood Profile Data Sheets* (Fig. 2a, b) provide a general overview of the local context and assemble all the basic information required for interpreting the data correctly.

The *Structural Matrix* (Fig. 3a, b) provides a picture of the current status of the *favela* and identifies the physical, economic, and social characteristics that emerge as most important. It is configured as a table with multiple entries, using qualitative or quantitative definitions or evaluations to suggest and clarify various possible conditions, one by one. In its finalised form it returns an ensemble of invariants that establish a “ground zero” describing an existing situation on which to intervene and that can be taken as the essential reference data for developing initiatives or project proposals to be activated in the area.

The *Matrix of Practices* (Fig. 4a, b) highlights how the basic structure of a settlement can be modified by intervening on it. It analyses the most significant variables that act on the particular context under analysis and that modify one or more of its most important substantial characteristics, identifying the types of action, intervention, and projects that would have the ability to induce a “virtuous” response. This analysis is applied to each of the virtuous practices, projects, and proposals that are believed to be most significant, and generates a framework of reference that enables their likely impacts to be evaluated. Since the same methodology can be applied just as much to proposals for new projects as to projects already implemented, the *Matrix of Practices* enables projects that have already been implemented in an informal settlement to be compared with new proposals. It enables parameters, or combinations of parameters, to be identified that would favour, or would not favour, the success of any given project proposal so that the criteria for intervention and the priority areas for designing any project can be extrapolated from them. By this means it can be used to isolate a number of “virtuous characteristics” that can be adopted as tools to stimulate future development of the settlement. Unlike the *Structural Matrix*, which can only be applied to specific cases, the *Matrix of Practices* can be applied an infinite number of times to any number of proposed actions and projects, so long as a sufficient amount of data is available.

Once any existing situation has been selected and parameterised, the application of these more general matrices provides a summary that would be difficult to obtain by analysing every proposal as a new case. The *Matrix of Practices* in fact disregards exhaustive analysis and focuses instead on particular aspects, which in our case relate to Paraisópolis as a particular settlement studied in detail. Thanks to the particular history of that informal settlement and the variety of situations through which it has evolved, a significant number of analytical parameters and possible case studies can be identified.

Cognitive analysis of a particular case using the *Matrix of Practices* enables a prior selection to be made of the data and characteristics on which attention should be focussed as much as possible, so that those phenomena that are considered determinant for the current or possible future development of a settlement can be addressed specifically.

By considering the effectiveness of the projects proposed for a particular context, or of those already implemented, it becomes possible to evaluate the potential or possible success of any new proposal based on how that case will respond to the parameters that are generated by the matrix. This methodology is intended as a way of defining priorities that enables identification of the projects most likely to deliver positive results within the particular context analysed.

As the number of case studies analysed increases, it is worth noting that the effectiveness of each individual matrix will also increase.

2.1 Application of the Method

(Fig. 2a, b, 3a, b and 4a, b)

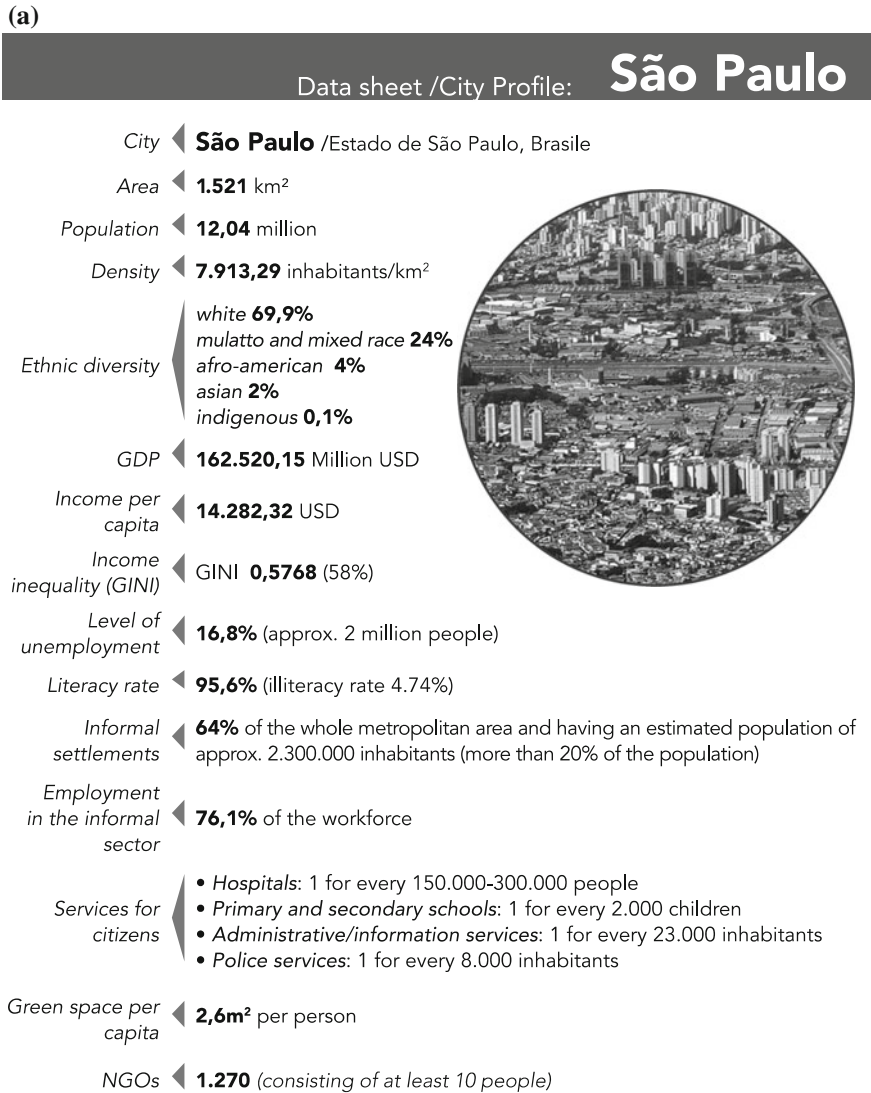


Fig. 2a City Profile Data Sheet applied to the city of São Paulo (Paraisópolis case study)

(b)

Data sheet /Neighbourhood Profile: **Paraisópolis**

Neighbourhood ◀ **Paraisópolis** /São Paulo, Brazil

Area ◀ **79,86 ha** (0,79 km²)

Population ◀ **65.000** inhabitants

Density ◀ **813,8** inhabitants/ha

Ethnic diversity ◀ **white 9%**
mulatto and mixed race 76%
afro-american 14,5%
asian 0,3%
indigenous 0,2%

Income per capita ◀ **153,052 USD** - formal sector

Level of unemployment ◀ **46,8%** - formal sector

Literacy rate ◀ **74,3%**

Employment in the informal sector ◀ **50%-70%** we estimate that this phenomenon may affect more than 50% of the population working exclusively in the informal sector. Considering both types of employment (formal-informal) this increases to 70%

- Services for citizens ◀
- *Hospitals*: a single facility (Hospital Israelita Albert Einstein) serves a total of approximately 132.000 people
 - *Primary and secondary schools*: 2 facilities identified within the community
 - *Administrative/information services*: 5 facilities identified within the community
 - *Police services*: 1 facility identified

Green space per capita ◀ **0,74m²** per person

NGOs ◀ **182** (with at least 5 people)



Fig. 2b Neighbourhood Profile Data Sheet applied to Paraisópolis case study

2.2 Outcomes and Observations

The analytical matrices can be interpreted with very different purposes in mind. Because the particular instance of Paraisópolis is only a single example, in this case the process is inherently introverted and comparative because it deals with the structural features of one case and a variable number of practices associated with that case alone. In more general terms, however, the structural matrix provides a

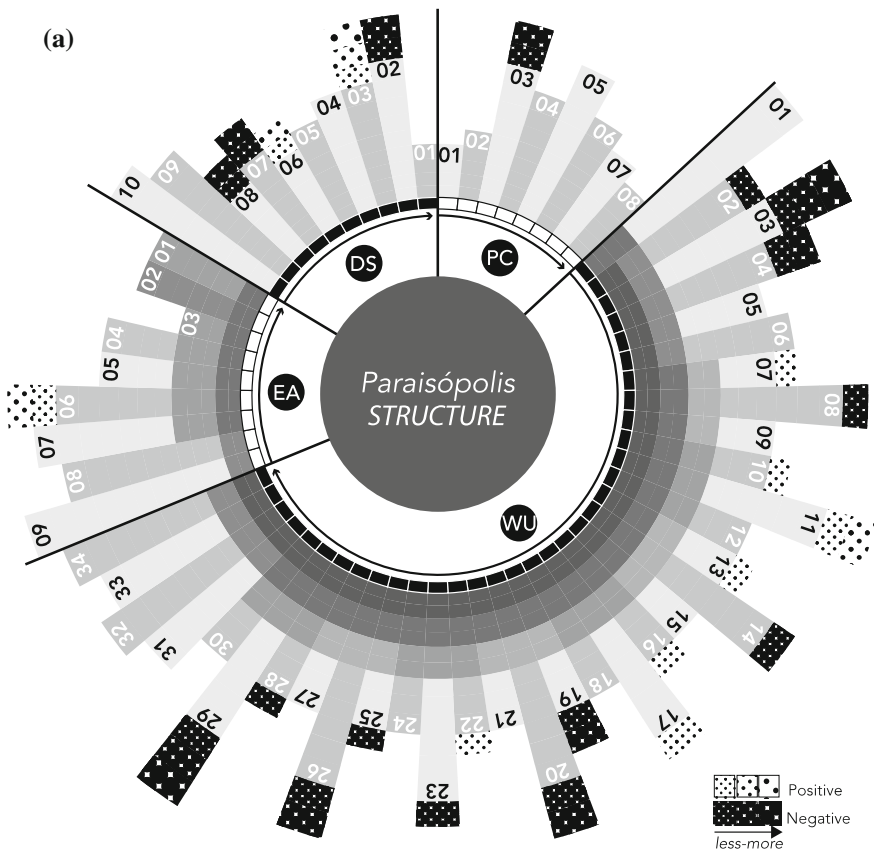


Fig. 3a Structural Matrix (part 1) applied to Paraisópolis case study

definition of the starting situation (the existing status) of any settlement, making it possible to identify recurrent tendencies and acquire elements for constructing its generic profile.

One aspect of any settlement that this type of analysis brings out with clarity, does not necessarily depend on a temporal factor, and can be detected by the presence of recurrent traits (e.g. the use of public space or the presence of services) is the phase of development of that settlement. Another important aspect that emerges is the identification of the energies that drive the phenomena; if we want to understand what makes an informal city work, this analysis is fundamentally important not only for identifying the role of the different actors that influence it but also—and above all—for identifying which of these parties should be involved, or with whom a dialogue would be required, in relation to any given project proposal. The structural matrix brings out the spontaneous tendencies that are most prevalent, in other words the specific practices or actions that have the ability to characterise and structure the space of the settlement, highlighting the reasons that drive the

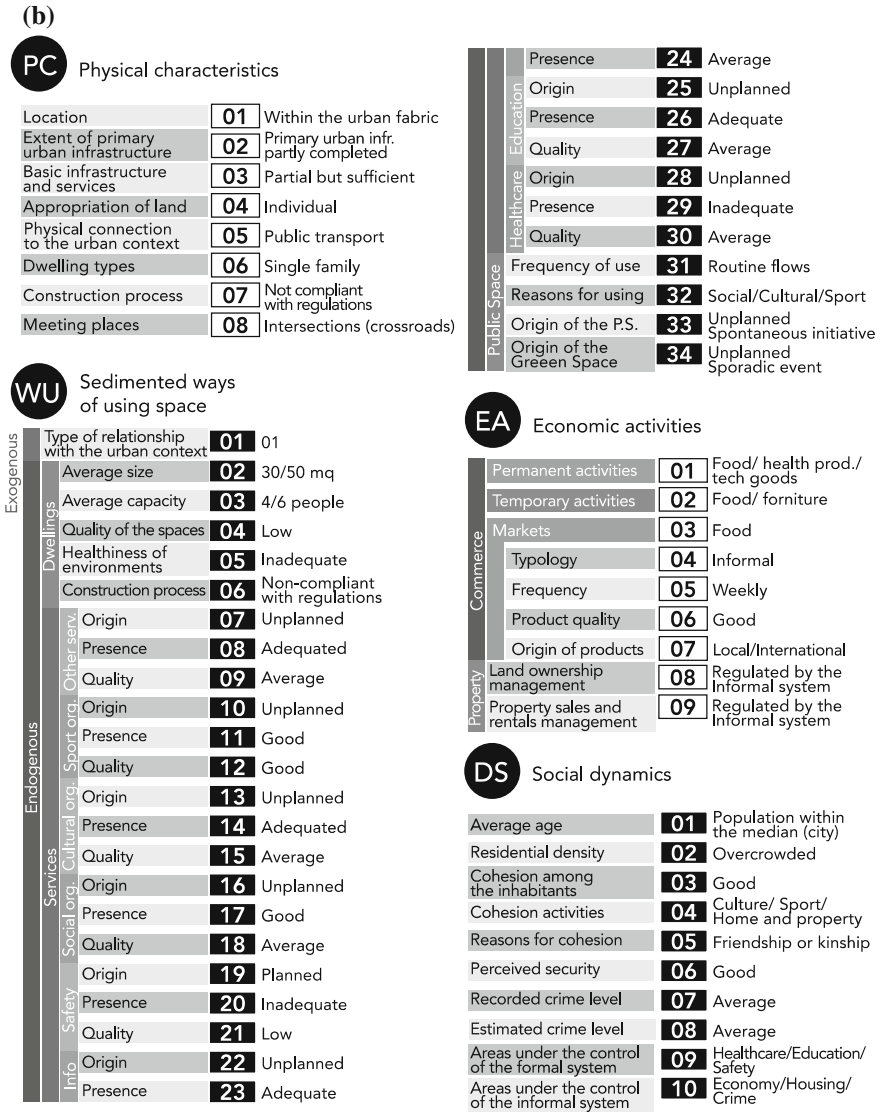


Fig. 3b Structural Matrix (part 2) applied to Paraisópolis case study

inhabitants to organise spontaneously and the areas on which their interest is most strongly focussed. Furthermore, by using various parameters that relate to the resident population, the basic features of a community can be isolated (age, social cohesion, the reasons for the cohesion, etc.) making it possible to identify which components of social type are determinant, to a greater or lesser extent, on the existence of virtuous practices. When this procedure is applied to Paraisópolis it returns a picture of a very solid community in which the local organisations have

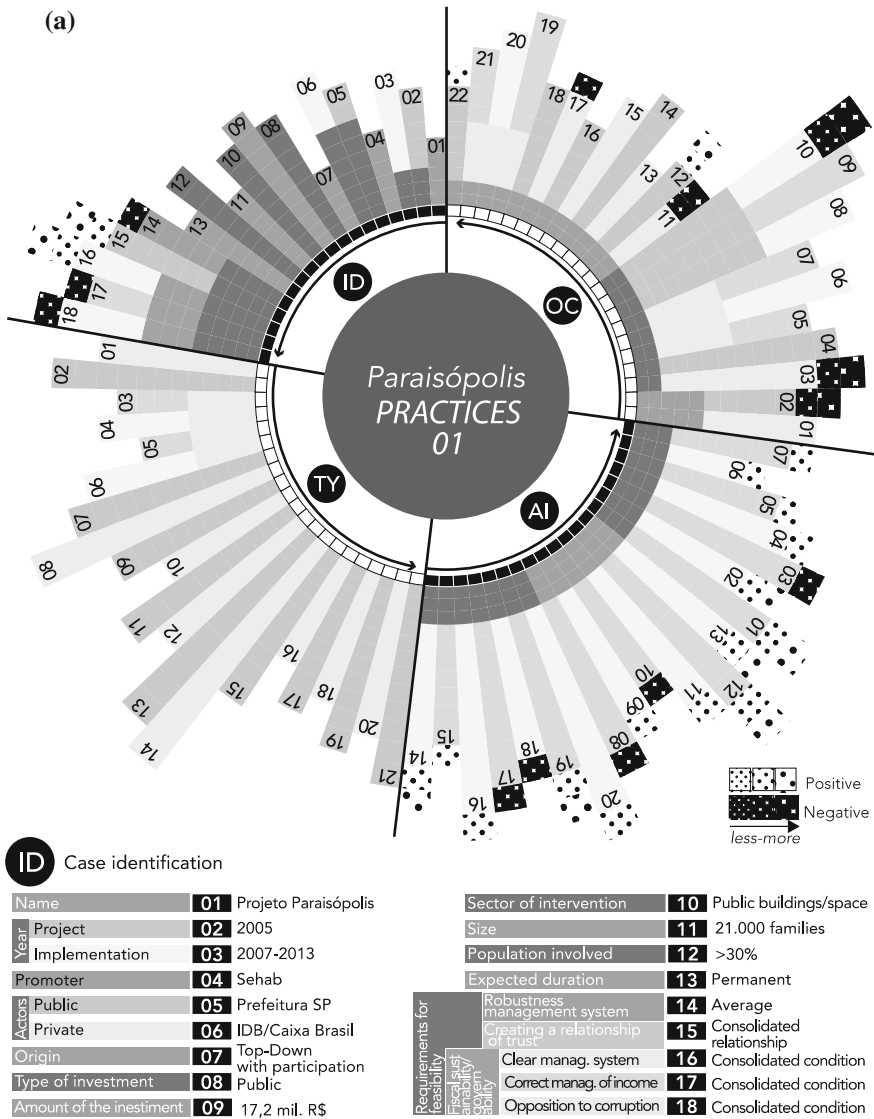


Fig. 4a Matrix of Practices (part 1) applied to Paraisópolis case study

come to play a fundamental role in the decision-making processes that concern its particular territory. The parameters that have a negative evaluation emerge clearly and in such cases, the criterion of usefulness relates to how the priorities for intervention were defined; in fact, concentrating the effort on the areas of greatest weakness can lead to a general improvement of the conditions and the quality of life of the neighbourhood in general, since very often, in informal settlements, the tragic nature of some particular aspect means that no action is taken in relation to

(b)
TY Tipologia

Use of urban fabric	01	N.A.
Control of urban fabric	02	N.A.
Infrastructure projects	Basic Infrastructure	03 Electricity/gas Waste water/discharges
	Mobility system	04 No data
	Public Space	05 Spaces for sharing
	Particular works	06 No data
Works to improve/maintain existing infrastructure	07 Electricity/gas Waste water/discharges	
Works to improve/maintain existing mobility system	08	N.A.
Works to improve/maintain existing public space	09	N.A.
New construction	10	Dwellings (publicly built)
Improve existing buildings	11	Dwellings (privately built)
Activities of public utility	12	N.A.
Reinforce existing activities	13	N.A.
Works to improve/maintain constr. systems (sphere)	14	Dwellings (publicly built)
Works to improve/maintain constr. systems (purpose)	15	Structural works Healthiness of envir.
Health protection	16	N.A.
Waste management	17	N.A.
Cultural/sport initiatives	18	N.A.
Educational/social initiatives	19	N.A.
Security initiatives	20	N.A.
Initiatives for social cohesion	21	N.A.

Social sustainability	Promoting high-quality social services	14	Not relevant
	Strengthening social cohesion	15	Objective not assured
	Improving security level	16	Objective not assured
	Improving attention to health	17	Objective not assured
	Improving the educational and cultural system	18	Not relevant
	Reducing segregation	19	Objective not assured
Reducing spread of poverty	20	Potential purpose	

OC Outcomes

Preconditions	Time since activation	01	More than 2 years	
	Progress	02	Concluded	
	Achievement of declared purposes	03	Partial	
	Achievement of potential or envisaged goals	04	Partial	
	Direct repercussions	Overall effect	05	Negative
		Sphere mainly affected	06	Spatial
		First feedback	07	Long-term (>2 years)
	Indirect repercussions	Overall effect	08	Neutral
		Sphere mainly affected	09	Social
		First feedback	10	Long-term (>2 years)
Specific Outcomes	Use	11	Daily	
	People involved	12	10-30%	
	Ages of people involved	13	25-40 years old	
	Gender of p. inv.	14	No data	
	Average income of p. inv.	15	Very low (<\$1000)	
	Employment of p. inv.	16	Informal work	
	Effectiveness of the works	17	Permanent	
	Durability of the works	18	Deteriorating	
	Maintenance works	Foreseen	19	No
		Spontaneous	20	No
		Not foreseen	21	Yes
	Level of recognition by the community	22	Medium level of interest with indirect involvement	

AI Aims

Environmental sustainability	Safeguarding the environ.	01	Not relevant
	Mitigation of contamination	02	Potential purpose
	Upgrading waste management system	03	Not relevant
	Improving water quality	04	Declared purpose
	Improving the sewage management system	05	Declared purpose
Responsible use of resources	Responsible use of resources	06	Potential purpose
	Reducing risk zones	07	Declared purpose
	Controlling urban growth	08	Declared purpose
Urban sustainability	Improving human habitat	09	Declared purpose
	Improving living conditions	10	Declared purpose
	Sustainable transport	11	Not relevant
	Improving public space	12	Not relevant
	Local economic development	13	N.A.

Fig. 4b Matrix of Practices (part 2) applied to Paraisópolis case study

numerous other aspects. Likewise, the parameters that have a positive evaluation also emerge, highlighting those aspects on which it is possible to work positively and thus, the areas of greater concentration of spontaneous generative energies whose action generates a spontaneous process of improvement. In such cases, identifying those factors may help to indicate the possible areas for intervention that have the greatest chances of success.

The *Matrix of Practices* is even more useful when it is applied to the design process: once a system of reference and its starting conditions (a structure) have been identified, this matrix can be used to analyse how that system is modified and which reactions are triggered as a result of intervening on it. The *Matrix of Practices* is subdivided into different sections: identification of the case to be analysed, the presuppositions, the types of action foreseen, and the aims and outcomes. Each of these sections can be interpreted along with the others or on its own.

The most straightforward method of interpretation is based on examining outcomes. The assumptions, typology, and intentions of an intervention can be analysed, their probable outcomes evaluated, and the different outcomes can be identified that might result if these inputs are changed. Clearly if an ever-increasing number of interventions is considered, recurring or significant traits can be extrapolated and the usefulness of the *Matrix of Practices* increases as the number of practices analysed increases.

In the case of an informal settlement like Paraisópolis, the ability to use comparative analysis to identify which practices would be “virtuous” clearly demonstrates the value of the procedure. Many virtuous practices are in fact often excluded from official assessments and budget allocations for local governments and communities, either because insufficient data are available or because it is assumed that these practices would not generate meaningful change. But if such considerations are left out of account and a *Matrix of Practices* is used to establish a set of unique parameters, government programmes and community initiatives can be analysed on the same level and it becomes possible to identify various phenomena and factors that would otherwise not be visible.

In general, we have noted that bottom-up practices deliver better results on the ground because the population is more heavily involved and this can stimulate spontaneous processes that maintain the resulting outcomes or lead to further regeneration. Moreover, practices of this type usually only require limited financing, which reduces the financial risk for the funding bodies. But we have also observed that over the longer term this positive trend tends to weaken as funds and resources are gradually depleted; this is where the public administration can play a fundamental role, since it alone can prevent the onset of this problem, or address it when it arises. One thing that does seem obvious is that all parties must work together to define which spontaneous practices should be adopted as a basis for intervention, giving preponderance to the social factor over other physical, topographical, and economic aspects.

Once the areas and the priorities to be addressed have been identified, a number of virtuous practices are selected by professionals, who define the most important characteristics of the proposed interventions, based on how directly they relate to the community as an active party in the decision-making and the design process (in other words, making use of the generative energy of local communities). Priority is given to modest interventions that can be put into effect without the need for large public or private investment. The professionals work to establish a relationship with the institutions and define, in concert with the local administrations, the possibility of drawing on resources and funds. In this process the local administrations no

longer have a design role and focus instead on the economic and administrative management of the interventions, leaving the design aspects to local and international professionals whilst the community plays a transversal role of participation that continues all the way from the initial definition of the priorities to long-term maintenance of the works when they are completed.

This is the most plausible way of responding to the phenomena that are highlighted using the matrix. Defining the roles of each of the parties and, of course, establishing an overall balance between them, is a key factor for the success and durability of any urban intervention, and makes it possible to identify the interventions that have the best chance of success and that should therefore be prioritised in the regeneration process.

The top-down and the bottom-up approaches to urban intervention and regeneration are often perceived as antithetical, whereas in fact it is impossible to imagine how any successful strategy could develop without a correct balance of both. For any new approach to urban design in the contemporary city, particularly in informal settlements like the *favelas*, the real challenge lies in this ability to bring different actors closer together by consolidating their capacity for collaboration.

On many occasions local communities have shown that they have excellent ideas and a great creative ability to put forward solutions that improve the quality of life of their own neighbourhoods, but the problem of communication with the institutions and the search for funding and resources for implementing bottom-up proposals are a major impediment to the operational possibilities of such communities. For that reason, we believe that the mediators (skilled professionals who occupy an intermediate position between the administration and the community) should play a crucial role in fostering communication and directing the energies that already exist in those communities. However, when it comes to matters of urban, environmental, and social sustainability as key ingredients in selecting the projects to be implemented, these can only be evaluated by professionals, preferably those who have a direct involvement with the territory or a presence in it.

In fact, the categories of formal and informal cannot be analysed by oppositional or exclusionary methods, since each nourishes the other in a completely two-way relationship. For that reason, city planning and the urban project must turn their attention to the informally developed processes and knowledge that have so far been overlooked in the processes of city design, and must focus more on the local scale, beginning from an awareness of the value that the territory and its relationships have come to represent, and developing their value as a structuring element from which to generate different perspectives for thinking about urban space.

When the design process has a systematic ability to intercept the different trends that are dispersed within a territory, it acquires a tool for dialogue that enables more formal modes of design to come into contact with the contextual knowledge associated with more informal processes.

In my view, to make this vision of design effective a methodology for analysis is required that organises our available knowledge about the already existing informal dynamics and makes use of this knowledge in as realistic a way as possible. Ultimately the goal of this matrix-based methodology is to facilitate an approach to

design for the informal city that makes the effort to systematise this knowledge throughout the duration of the whole process.

So aside from its operational usefulness the matrix has a cognitive value and our contention is that up to now there has been no proper systematisation or cataloguing, in temporal and historical terms, of the issues that relate to the informal city and that this has an influence on the success or failure of the policies and interventions that continue to be put forward in these contexts. And although each settlement is always an individual case with its own peculiarities and characteristics, all settlements appear to generate dynamics that persist and reappear even in contexts that greatly differ. It may be that in part, these dynamics are generated by globalisation processes that are also causing them to be interpreted in similar ways, with similar design ideas. This is in fact frequently suggested as an analogy, but is the outcome of an unthinking process that leads the inhabitants of the *favelas* on the one hand, and the designers and the institutions on the other, to approach the phenomenon of the informal city in ways that are presumed never to have been used before or that derive from a particular case. Thus the process of analysis and design in the informal city tends to restart from zero again and again, in a series of vicious circles that repeat every time without leading to any improvement. Against that background, in my view the use of a comparative tool can help to structure the analytical process and target it more narrowly, strengthened by greater knowledge about the real effects of past experience on present-day conditions.

In-depth analysis of Paraisópolis as a case study has shown how we can learn from the informal city by directly experiencing a particular context and studying the dynamics that have taken place there one after another over a long period, leading to an awareness of the processes and relationships that have been taking shape and consolidating there over time and that suggest a realistic way of reorganising the thinking that goes into the urban project. Thus the urban project reappears as a device for change and regeneration that can be used, with different roles and modes, by public bodies, professionals, and communities, united by conscious collaboration based on clearly defined roles. Unlike a uniform vision of the city or of the agents that are active in a particular place, this multifaceted approach aims to bring out diversity and alternative views and to produce a different awareness, closely associated with action, that can help to define new perspectives for the informal city.

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Share for Care. Communication Technologies and Social Inclusion for Empowerment in Guayaquil, Ecuador

Veronica Vasilescu, Francesca Vigotti and Andrea Cominola

Abstract This paper presents the main deliverable of Improving Access to Resources at Reduced Risk for Urban Areas with Strong Informal Settlements (IMPARAR), a project belonging to the realm of social innovation and development. IMPARAR aims at promoting social development and inclusion in the deprived neighborhoods of Guayaquil (Ecuador) by increasing citizen accessibility to public resources and services. Living conditions in informal settlements present several challenges, such as the lack of community management strategies, especially regarding access to services and risk prevention. Key determinants for such challenges are the poor communication between local communities and public administration, and the lack of territorial data in informal contexts. To address these challenges as output of IMPARAR, we designed Share for Care, a two-way communication-intervention system, which is a composed solution characterized by a Digital Tool System and a Community-Based Organization. Share for Care is designed to support the communitarian and collaborative work of the population, by means of Information and Communication Technologies (ICTs). In the paper, the features of the system as well as the participatory approach adopted along the whole IMPARAR project are described. By combining communication technologies with policies of inclusion and social mobilization, Share for Care is designed to provide benefits to both public administrations and local communities.

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1 The Informal Settlements in Guayaquil

Rapid increase of population that occurred during the second half of the XX century in developing countries had a central role in the formation of new, highly urbanized, and unplanned settlements growing on the formal city peripheries (UN-Habitat 2003). This trend is not going to slow down: it is argued that informal settlements will reach almost 890 millions of inhabitants by 2020 (UN-Habitat 2014). Citizens belonging to the lowest income social stratum will represent the largest part of the new population in urban growth of developing countries (Martine 2008). This phenomenon is mainly due to the fact that people who gain a low daily income are more attracted by rural–urban immigration, as this has been historically seen as an opportunity to enhance living conditions. In the Global South megacities, the informal dwellers face several issues: challenges related to land use, risk of disasters, and natural hazard. Indeed, informal settlements, also called *slums*,¹ are frequently built on high-risk and marginal land, usually prone to hazards (Architecture Sans Frontières International 2012). Moreover, poor structural quality of housing, overcrowding, low awareness about the living environment and exposure to possible risks worsen the already difficult situation. The “illegal” or “extra-legal” nature of informal settlements leads generally to an exclusion from government provision of basic infrastructure and services, increasing the vulnerability regarding hazards and dangerous conditions. Such background led inhabitants of informal settlements to develop particular *coping capacities* (Jabeen et al. 2010; UNISDR 2009) in order to prevent or minimize the impact of possible disasters.

With the goal of conceiving solution proposals to the above challenges, this paper focuses on risk prevention and management strategies pivoted around the direct involvement of local communities, the collaboration between them and public institutions, and the use of local resources and technologies, as fundamental means for the improvement of dangerous living contexts and, consequently, of the general quality of the inhabitants’ life. In particular, we present the results of the Improving Access to Resources at Reduced Risk for Urban Areas with Strong Informal Settlements (IMPARAR) research project, whose main objective is the study of possible systems for the improvement of access to resources in the barrios of Guayaquil, the largest city and the economic capital of Ecuador, assuming that acting in this direction would encourage human promotion and social development within the informal settlements. Over 50% of the three million people living in the city are settled in informal *barrios*,² as determined by migrations from rural areas

¹Although the complexity of these settlements is such as to make a single definition incomplete, a *slum* is commonly known as defined by UN-HABITAT: “(...) A group of individuals living under the same roof in an urban area who lack one or more of the following: durable housing, sufficient living area, access to improved water, access to sanitation and secure tenure.”

²*Barrios* is the Spanish name for those marginal areas of the city, that are gathering together population coming from internal and external migration, characterized by the lack of infrastructures and urban planning.

(Mera Giler 2009). These are marginal urban areas in which problems such as lack of urban planning and basic services and housing deterioration are constantly rising,³ worsened by lack of awareness. The main objective can be declined in more specific objectives, i.e., the increase of local consciousness and the improvement of inhabitants' technical competences, all aimed at the creation of an awareness model that would promote citizen participation in the management of community problems in their living context, simultaneously working closely with the Municipality.

The paper points out how the sustainable and careful use of technological systems (already widespread and commonly used by the community of the El Fortin barrio, chosen as a case study), and integrated local and institutional development strategies, could become a solution to face problems in informal settlements. According to the main objective of IMPARAR, the system we propose in this paper—Share for Care—deals with addressing the heterogeneous problems that afflict the barrio by directly involving the population in the process of designing counteractions to issues. Indeed, we adopted forms of participatory design along the whole IMPARAR project, to co-design solutions with high acceptability through public participation and social innovation. In the first part of the paper, we present the context of Guayaquil and its problems and clarify the project objectives and its methodology in detail. After that, we depict and formalize Share for Care, developed in response to the identified problems. Finally, we discuss the main criticalities of the system proposed and conclude with some final remarks on possible developments and research opportunities.

2 The IMPARAR Project: Context, Methodology, Objectives

As mentioned in the introduction, the access to public resources is not ensured in the informal settlements in Guayaquil, and living conditions may be dangerous either for the inhabitants or for the environment itself. Keeping into account that one of the key reasons for this situation is the poor communication between the local community and the municipal institutions, the main objective of IMPARAR—a multidisciplinary academic project carried out in 2011–2012 by a supervised team of students of the Alta Scuola Politecnica⁴—is to promote a social and environmental development for the local community through a system that could facilitate the relation among Municipality and population, thus increasing the access to resources and preventing dangerous and risky situations. Since many heterogeneous

³Moreover, Guayaquil is affected by widespread environmental vulnerability: problems of flooding (caused by the geographical contest, the heavy rains seasons, and the rise of Guayas river water level) occur very frequently, as well as earthquakes, so that the city is classified as a highly vulnerable area (Cannon 2000).

⁴www.asp-poli.it. At the time when the IMPARAR project was carried out, the authors of this paper were M.Sc. students attending the Alta Scuola Politecnica.

problems afflict the informal settlements (Mera Giler 2009), the IMPARAR project considers the following three different topics, which are urgent and different, while sharing common aspects: (i) housing policies, (ii) resources management and natural hazard, and (iii) living conditions and open source information.⁵ As a direct consequence, the proposals developed with this project must be considered as strictly connected parts of a system of policies. Among the mentioned topics addressed by the IMPARAR project, this paper mainly focuses on the general living conditions in the settlement of El Fortin and, more deeply, on the use and diffusion of open source information in that context.⁶ This choice was not decided a priori by the authors, but it is the outcome of several preliminary analyses and two in situ missions carried out in Guayaquil between 2011 and 2012: a process of involvement of the population during these field trips revealed fundamental, to highlight the relevance of the chosen topics and to rank the existing problems by urgency and importance. The participation of the local stakeholders—especially the inhabitants of El Fortin—occurred mainly in two distinct moments. At first, some focus groups were organized, so as to get in touch with the already interested and active part of the population, namely the one closer to the educational and religious center of “La Consolata.” This phase allowed the identification of the most important problems as the local community perceives them. Moreover, these focus groups were exploited to collect useful information about use and diffusion of information technologies, smartphones, and Internet connection: their spreading is constantly increasing through the community in El Fortin. The youngest segment of the population uses regularly social networks. Relying on the results of the first phase, we performed a second step, to continue the involvement process: a knowledge campaign developed upon relevant themes for the inhabitants of El Fortin. More in detail, we structured the campaign using slogans printed on daily-use and recreational objects and was mainly addressed to the students of the primary and secondary school in “La Consolata,” together with their parents. The success of this phase was promising for the rest of the project. After completing the on-field analysis, we could better define in detail both problems and objectives to address in IMPARAR. We then formalized and sorted them according to the hierarchical structure defined by the standard of the problem and objective trees, detailed in the guidelines of the Project Cycle Management (PCM) by the European Commission (European Commission 2004), as showed in Fig. 1. The development and implementation of IMPARAR rely within the objectives presented, which represent, at different levels of detail, the desired situation for the future of El Fortin. The general objective is the improvement of the knowledge and management of environmental and social conditions in El Fortin, to be pursued by increasing local population’s awareness and acting on three sides:

⁵More information about the IMPARAR project from: <http://www.asp-poli.it/wp-content/uploads/VIIICycle.pdf>.

⁶More information can be retrieved from “IMPARAR—TEAM C *Living Condition and Open Source Resources*”: http://www.labcoopint.polimi.it/wp-content/uploads/CORSO_ASP_Imparar_Final-Report_Team-C.pdf.

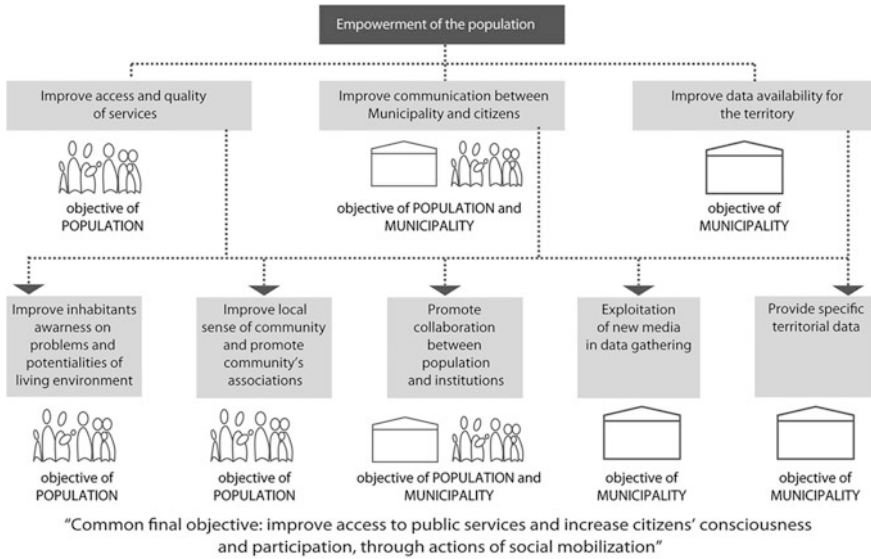


Fig. 1 Hierarchical objectives tree of the IMPARAR project

- increasing the access and quality of services;
- increasing the communication between local community and institutions;
- increasing the availability of territorial data.

That being so, the use and diffusion of technologies can have a high impact over these objectives, since technologies have a fundamental role especially in communication connections and in techniques for diffused data gathering.

The declared project objectives represent the future optimal vision, while the strategies represent the tools for realizing it. In the IMPARAR project, the shared strategy we adopted consists of a bottom-up approach: its aim is to directly involve the population and increase its responsibility toward the formulation and design of possible solutions to the identified problems. This methodology is considered suitable as a response to the problem of scarce communication between institutions and population, especially when joint to the extensive and innovative use of ICTs, to comply with the poor availability of territorial data. Reacting to the problem of low access and quality of services, some projects developed globally show how small local organizations, the so-called Community-Based Organizations (Chechetto-Salles and Geyer 2006), potentially improve the quality of services and their access for the population. Among these, literature reports about voluntary-based organizations, e.g., the one described in Moctezuma (2001) and developed in San Miguel Teotongo, which is now working constantly since more than twenty years. "Time Banking" cooperatives, which are working both in

European contexts (e.g., *Coordinamento banche del tempo—Milano e provincia*⁷) and in the context of Latin America (e.g., *Banco de Tiempo*⁸), were also considered in the IMPARAR project. The strategy here proposed, which is the basis for the investigated solutions described in the next section of this paper, is therefore based on the integration between involvement activities and digital technologies, in order to overcome the spatial and social communication bounds which make the interaction between local citizens and municipal institution hard. This integration can be only possible through the activation of local, active, associations.

3 “Share for Care”

According to the specific problems presented and to the consequently defined objectives and strategies, the main research outcome of IMPARAR, as delivered in late 2012 at the end of the project, consists of the design of a two-way communication-intervention system between the local community and public institutions, as well as a set of recommendations for its implementation. The solution we propose—Share for Care—is based on the promotion of local resources, the involvement of the local population, and the innovative use of diffuse technologies. In particular, Share for Care is composed of two integrated elements, as shown in Fig. 2:

- a Digital Tool System, whose aim is to foster communication between local population and Municipality, along with a better and more efficient collection of territorial data on sensible issues in informal settlements as El Fortin, to promote useful development policies and activities through the use of ICTs;
- a Community-Based Organization (CBO), whose objective is to enhance local consciousness and representativeness. Acting on a local level, the aim of the CBO is promoting the development of communitarian and subsidiary activities among the population of the barrio, in order to empower the population and enable it as active part in the growth of the barrio. Among these activities, Share for Care includes a Time Banking system: through the exchange of personal skills and competences, it tries to compensate the lack of formal services in the neighborhood by creating complementary organized services.

The two components of the system are designed and combined to achieve the common goal of empowering local population, through complementary fields of intervention, with the final scope of improving the current living conditions. Even though the design of a unique solution for all the considered problems was not possible given their heterogeneity and variety of actors involved, we tried to

⁷Coordinamento Banche del Tempo—Milano e Provincia: <http://www.banchetempo.milano.it/newsite/>.

⁸Banco del tiempo: <http://bancodeltiempo.blogspot.it/>.

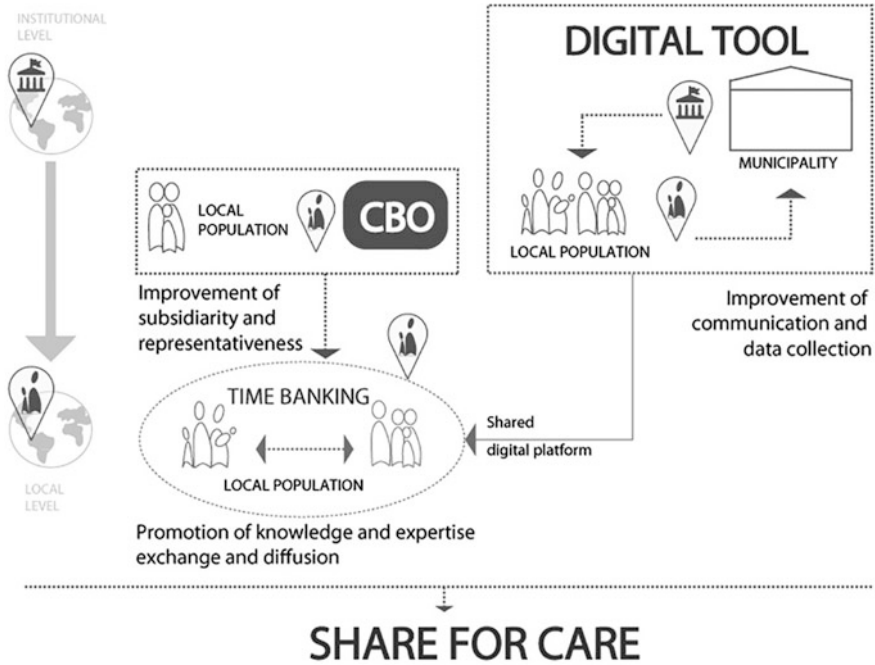


Fig. 2 Share for Care system diagram

propose harmonious solutions that may well integrate with and complement each other. By acting on specific problems, this research proposes improvements to the general problem, i.e., a better awareness and management of environmental and social conditions in the informal settlement of El Fortin. This could lead to the creation of a specific background that would allow in the future the conception and design of development strategies aimed at risk reduction by identifying potential risks, vulnerabilities, human capacities, and local resources. It is important also to underline how the composed structure of Share for Care faces different development levels of the problems, from the local communitarian one to the Municipal one, and tries to manage the relations between these two.

4 Share for Care Components: Digital Tool System

The provision of specific data on informal settlements to the Municipality, the improvement of communication between Municipality and population, as well as the promotion of the awareness of the population about the condition of their own barrio are essential to provide successful development policies and to improve the quality of life. For these reasons, the research behind Share for Care resulted in the

design of a Digital Tool System, which would support communitarian and collaborative work of the population by means of digital technologies, improving the collection of data and the availability of information to both the population and Municipality. The aim of the digital application is to involve citizens to increase interaction between each other and local institutions. The use of ICTs can help in this sense, especially using tools that are already spread among the population and that are commonly used in everyday life (e.g., social network platforms as Facebook, Twitter, etc.). Moreover, their use could help in preventing possible dangerous situations, improving local population acknowledgment, managing particular services. The design of the Digital Tool of Share for Care relies on the concept of Human Sensor Web,⁹ a methodology that collects data to monitor specific services provided, or the environmental situation of a specific context directly from the population and its feedback (Fraternali 2011). The application of human sensors aims also to engage citizens to act as sensors that collect geo-referred information, providing the so-called volunteered geographic information (VGI) (Cox et al. 2010). Thanks to the spreading possibility to access to Internet connection, the availability of GPS systems at affordable prices or embedded in mobile devices, the improvement of social networks as platforms for geo-referred data sharing, and the development of more participative interaction on the Web, the population has the possibility to create and share geographic information useful for a variety of applications (Castelletti et al. 2012). By applying the above-mentioned technologies and methodologies, we designed as part of Share for Care a system that easily spreads information using multiple digital channels: Web, smartphone apps, SMS system, social networks as Facebook and Twitter. The combination of these tools leads to the two main functions of the Digital Tool System, displayed in Fig. 3.

The first one can be defined as an inbound activity: from the community to key stakeholders. It consists primarily of digital mapping activities using citizens as sensors to collect data on sensible issues through a system of geo-referred warnings. The second one is an outbound activity: from key stakeholders to population, meaning that public administration could use innovative and interactive ways of communication, to inform citizens about new strategic programs of development, new services offered, intervention plans, etc.

Focusing on the digital mapping functions, Share for Care would enable the inhabitants to access a map of the barrio and locate and report geo-referred warnings such as risky situations, natural disasters, inefficiencies of key infrastructures, waste accumulation points in their neighborhood.¹⁰ The system is designed to be compatible with social networks as Facebook and Twitter. This allows the exploitation of their potential: faster localization of geographic position,

⁹Human Sensor Web Methodology http://www.itc.nl/Pub/News/in2010/Sep2010/Human_Sensor_Web.html.

¹⁰As examples of systems based on geo-referred information and alerts: *Twitcident—Helping Emergencies Service*: <http://twitcident.com/>; *Ushahidi*: <http://www.ushahidi.com/>.

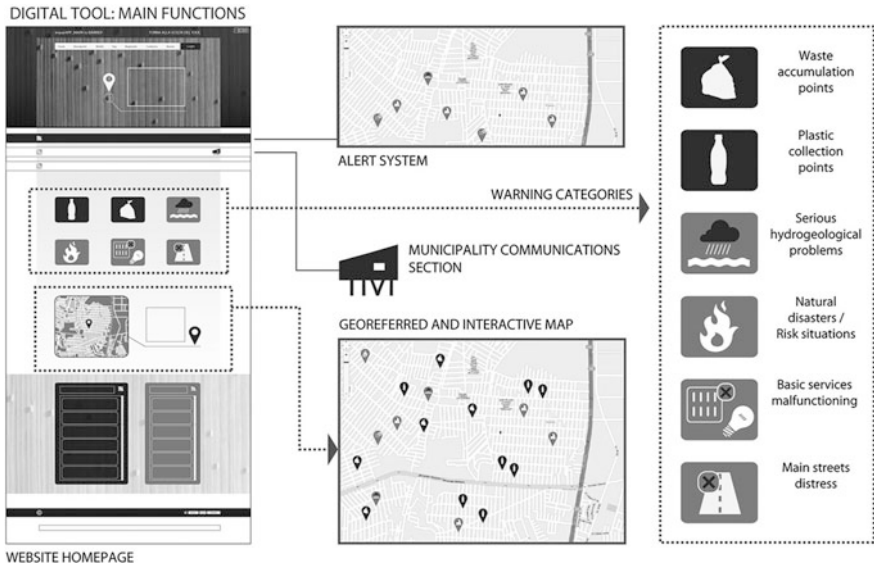


Fig. 3 Digital Tool System: main functions and visualization design

more visibility to particular events, possibility to divide them into different categories by using tags, possibility to publish warnings in real time. A specific function of the mapping structure is the “Alert System.” In case of dangerous events reported, as fires, floods, serious traffic accidents, etc., the Alert System would be activated, sending notifications to the users. The alerts would contain precise information on the reported dangers, i.e., the exact location visualized in the barrio map and the time when the event occurs. Notifications could be also sent via Facebook and Twitter to those who use the application through social networks. To include a wider portion of population and maximize reachability, those who do not have the possibility of continuous access to Internet could be alerted via the activation of an “SMS alert system” designed for mobile phones. Furthermore, it would be useful to communicate tips and give recommendations and suggest preventive behaviors, to help the population understanding how they should act in case of disastrous events. The collection and elaboration of warnings would allow the development of different tools aimed at the management and prevention of risk situations and the implementation of development strategies. Giving an example, by using the collected data, the Municipality may have a better understanding of the actual conditions of the barrio, may be aware about the living conditions of areas that are often still unreachable, and may create constantly updated databases useful for the definition of “risk maps” for sensible areas or specific intervention plans and sensitization campaigns. The system can be also useful for the providers of main services, as electricity utilities, sewage systems managers, etc.: alerts about serious malfunctioning or maintenance activities might allow them to provide higher quality services and respond immediately to users’ needs.

On the user side, moreover, the proposed system aims at providing direct and updated information to the local population too. The creation of interactive and constantly updated maps and databases, visible to everyone, together with warnings systems, can increase the awareness of the inhabitants about the real situation of their own barrio: by understanding the primary needs and potentialities and leading to the creation of internal and local plans of development and intervention. The main goal of the system, if implemented, would be the development of an innovative use of diffuse technologies (in particular ICTs) and the involvement of local communities, acting on the issues of disaster reduction and management.

In practice, the workflow we adopted to design Share for Care along with the IMPARAR project concerned different aspects, including the study of the technical aspects needed for the possible and feasible implementation of the tool, as the digital platform supporting it (consisting of a Web application aimed at managing a community database created through the collection of data. These data would be reached by explicit provision of information of the users and by data extraction from social networks), or the design of the Web site and phone apps. To make the proposed project feasible, despite its academic nature, it has been necessary to develop the design of all its aspect.

Along with designing the technical aspects of Share for Care, we carried out feasibility studies about the management, financial, and organizational aspects of a real implementation of the system.¹¹ a preliminary business model and system structural organization analysis show that the composed structure would be developed and managed by different actors involved, such as representatives from Municipality departments, experts from the main universities of the city (e.g., ESPOL—Escuela Politecnica del Litoral, Universidad Catolica de Guayaquil) that are already involved in research projects regarding this field of action, and local communities. The specific feasibility of the proposed solution was analyzed too, considering also the economic resources needed for its development, the possible investors, and the regular investments needed for the management of the structure (according to the range of prices of the year of the project development). Finally, considering the general feasibility of the entire project, it was relevant to deepen aspects regarding the effectiveness of the working phase of these solutions, through the study of key performance and effectiveness indicators, e.g., number of site visits, number and quality of warnings, response time in case of dangerous situation, number of territorial data received. These indicators, although still only theoretical, can help the development of the preliminary design, and the eventual implementation phase, enabling the monitoring of the system.

Also, the potential benefits for the main actors involved were considered, to understand the usefulness of the proposed solution and the potential willingness of stakeholders to participate actively. The involvement of the population was the most important aspect among those considered, essential and inevitable requirement

¹¹IMPARAR—TEAM C Living Condition and Open Source Resources, op. cit.

for the feasibility of the project. In this acceptance, the involvement of population was essential to understand the real willingness of the main actors to participate and to sensitize the population on critical issues.

5 Share for Care Components: Community-Based Organization

The second component of the proposed system is the CBO. Problematic contexts, such as El Fortin, form the representative background in which these organizations are usually developed. Due to their peculiar character of co-participation and bottom-up approach, CBOs involve people who for the best part are residents of the districts in which the organizations are set. Hence, employees who respond to this characteristic enhance the quality of the service offered to the community, thanks to their knowledge and awareness about critical problems that afflict the neighborhood. Furthermore, this kind of involvement could lead to another level of participation by including the social networks of people who are already members of a CBO: thus, the system of relationships of the individual could be overdrawn. Although the CBO is originally organized to face specific issues, it could enlarge its scale of use, embracing new challenges by using the same methodology applied to the original matters: this approach will promote the activation of communitarian associations, the empowerment of “subsidiarity” (an important concept, usually hard to achieve in complex social contest such as El Fortin) and the promotion of representativeness among the local inhabitants. The principal role of the CBO in the system would be the management of the problems at the local level, improving the activity that will be held by the Digital Tool. In fact, it could play a decisive role in the creation of local policies regarding risk management: the rise of awareness of the community, the promotion of exchange and integration of local resources and knowledge, the identification of needs, and priorities promoted by the local governance are at the base of effective adaptation and response strategies (Jabeen et al. 2010). To effectively improve the living context of the neighborhood is not only useful to strengthen public infrastructures and buildings, but it is also fundamental to create “resilient communities” (ASF International 2012) able to face and adapt to difficult situations, and also capable to interact with public institutions in order to create specific development strategies. Furthermore, the CBO could represent a trigger for the activities related to the prevention of risk management, by helping the management of the Digital System, involving and coordinating people in mapping activities leading to a better and more efficient use of the reporting system, becoming the physical and central reference point for the creation of sensitization campaigns about sensible issues causing dangerous situation and for the sponsorship of the alert system to the local community, creating supporting networks during the catastrophic events. Furthermore, it is fundamental to underline the advantages that would interest the technological and social aspects: on the one

hand, the system will improve by receiving feedbacks from the users, that may enlighten possible technical problems or upgrading; on the other hand, the community will receive a service that will be helpful not only regarding the alerting system of possible hazards but also to create a new community awareness.

6 Discussion

This paper presented the main components and purposes of the “Share for Care” system, a two-way communication-intervention system designed as part of the IMPARAR project to promote social development and inclusion in the deprived neighborhoods of Guayaquil (Ecuador) by increasing citizen accessibility to public resources and services. We devoted a focus on the description of its two components, a Digital Tool and a CBO and how they are coupled in the whole system. Starting from the proposed design of Share for Care, and recommendations for its actual implementation, possible outcomes deriving from its implementation, which would involve both the population and the public administrations, may improve awareness about the actual and updated socio-environmental condition of the barrio, leading to the creation of specific prevention, development, and intervention plans focused on the real existing risks, needs, and potentialities.

Thanks to the widespread presence of low-cost communication technologies among citizens, the increasing accessibility to smartphones, and the continuous implementation of new tools for main social networks, the potentialities of such project as the one here presented have increased exponentially in the last years. A specific strength of the presented research consists in the use of local resources and simple ICTs spread among local population to create a powerful but simple means of communication and intervention. This is supported by the literature regarding the number of experiences in Latin America where e-participation of the population in the government of its own city has been applied, leading to a sensible change in life conditions of the inhabitants.

The implementation of these structures could bring important benefits to all the stakeholders involved. On the one hand, the system could support the Municipality by providing important information (with considerable saving of resources and time) for the management of informal settlements and the creation of maps and databases useful for development plans and giving an innovative tool of communication with the barrios population. On the other hand, it will be useful also for the population: alerts reported by inhabitants could help in improving the services, in preventing dangerous situation, and in providing immediate interventions for risk situations. Local communities can benefit from an efficient and simple way of communication with public institutions that will allow them to express their own real needs.

Yet, we acknowledge that an actual implementation of the system would provide context-specific outcomes and the whole implementation process could be affected, or even threatened, by local conditions determined by the number and typology of

potentially conflicting stakeholders involved, available financial resources, social needs, condition, and attitudes. Among these latter we can list, for instance, several factors that could affect the results of a possible implementation of the presented system: the individual motivations to participate in the activities of the community; citizens' awareness about their living environment; the not frequent direct involvement of the local population in territorial data gathering activities, and in risk prevention and management strategies; their attitude to communicate with public administrations. Despite these possible threats, we think that Share for Care can supposedly be effective in supporting the development of informal settlements and complex environments, especially keeping into account the promising outcomes of similar experiences worldwide and the participatory approach adopted along the whole project workflow, which allowed co-designing the proposed solution with the local community, in the attempt to increase acceptability and suitability with respect to local needs.

Finally, the system implies a "learning-by-doing" approach, where local governments can use efficiently the indigenous knowledge of the local inhabitants for the management and creation of development strategies, an innovative approach for a context was usually the Municipality acts through top-down strategies.

In the end, the proposed strategies are intended only as the first step of a wider and more complex process of development of informal settlements, where in the future the local population, in collaboration with the public institutions, will have a leading role in the empowerment and improvement of their living conditions. It is evident that each context is unique and solutions should be adapted to respond appropriately to the specific needs and possibilities, but the aim of the project was to create a sort of "guideline," a "resilient system" that could be adaptable to different environments, helping the management and development of vulnerable contexts, from the environmental and social point of view.

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Enhancing Participation Through ICTs: How Modern Information Technologies Can Improve Participatory Approaches Fostering Sustainable Development

Domenico Vito

Abstract The involvement of the communities in decision-making is a key strategy to enable compliant policies. This is particularly true to foster a sustainable development. ICT systems can allow information to flow down from the government to the citizen: they create the possibility of flows upwards of information, as a citizen of government creating “feedback-loops” between “communities,” “decision-makers” and “environment” catalyzing participation empowerment and the perception of local knowledge. Even if they bring a great potential, the use ICT for development actions is not free of controversies and side effects. In particular, they regard the effectiveness of participation mediated by informative systems, the problems related to data quality, and data security. The work will offer a critical excursus of different participatory mapping approaches mediated by ICT, like public participatory GIS (PPGIS), participatory sensing and crowdmapping and how they influence the relationship between communities and lands in a vision of sustainable development.

1 Introduction

Promoting participation through community development projects and local decentralization has become a central tenet of development policy toward the sustainable development goals (Van Heck 2003). Although the participatory approach has certainly not a narrow focus, it surely concerns the involvement of the population in the planning and implementation of projects. Such “holistic” forms of people’s participation are certainly required for area-based operations which affect citizens, like environmental protection, soil, and water conservation.

Participation has a strict link with the sustainable development. The necessity of public participation for successful environmental policy has been recognized for

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some years at both the international and the national level. As implemented by Agenda 21, one of the most important focus for get environmental policies more centered on communities is the participatory approach and public participation, including participation by specific sections of the population, e.g., women, children, indigenous peoples, and farmers (Eden 1996).

Considering the capillarity and the community contribution to environmental problem solving, the diffuse involvement of society within environmental issues could represent a key factor for the success of those actions. To be successful, environmental policy has therefore to be linked to the notion of “concerned citizens” that couples individual activism to institutional action (Kingston et al. 2000). The concept of “concerned citizen” is strictly related to the way how the information about the specific topic comes from the top to the bottom, and how the mechanism of involvement about the specific problem reaches both policy maker and the stakeholders. Such mechanism nowadays could be strongly mediated by information system, and in particular by the use of Web that represent a bidirectional way to realize participation, in the sense that they allow to gain information’s, notices, ideas from the citizenship as they permit policies to better adhere to the context they are proposed. ICT, especially the Internet, can be used by both institutional political actors, by civil societal actors, and even by single individuals enhancing bidirectional dialogue between these entities. This work analyzes the role of ICT technologies in enhancing participation toward a sustainable development.

2 Basic Theoretical Concepts

2.1 *The Sustainable Development*

In 1987, the World commission on development and environment—commonly known as Brundtland commission announced the strategy that will both guarantee development, eradication of poverty, and that will stop in the same time the path to environmental degradation. This strategy has been called sustainable development as the development that meets the needs of the present without compromising the ability of future generations to meet their own needs. Basically, development can be defined as the process by which individuals and communities are able to increase their capacity to use the resources and improve the quality of life for all (Hart 1992). To be successful, the concept of sustainable development needs to include the promotion of people’s involvement in environmental management at the local level.

People indeed can know better what are the environmental priorities and the problems of their community even if many problems cannot be addressed by the local community.

Community involvement is strictly and is important to address that any action isn’t fully sustainable without taking into account the local knowledge (Hart 1997).

A sustainable development then derives from a good interrelationship between the satisfaction of primary needs and the maintenance of sustainable lifestyles.

But it is possible and fostered only if the empowerment of people and communities is considered. This approach has contributed to the visualization of the sustainable development as the intersections among economic, social, and environmental sectors.

These are commonly known as “dimensions of sustainable development” as shown in Fig. 1a. This visualization implies that some parts of the economics system are independent to the social system, as if it were possible to imagine economic relations that don’t need the social substrate. Similarly, the representation assumes the existence of social structures without a natural system which supplies natural resource. It is important to not see these concepts only in a linear cause–effect relationship between each other, but as inter-dependence in a circular point of view.

In order to have an exhaustive vision of sustainable development; Alisa (2007) proposes a concentric framework where a fourth dimension is added: the participative democracy (Fig. 1b).

Participative democracy is contained within the social dimension, and it is intersected with the economic dimension since some decisions as an active participation of people to the strategies planning deal with economy, for some productive and consumer choice, and with public institution non-directly linked to the economic system but concerning policy issues (Alisa 2007).

2.2 *Participation and Empowerment*

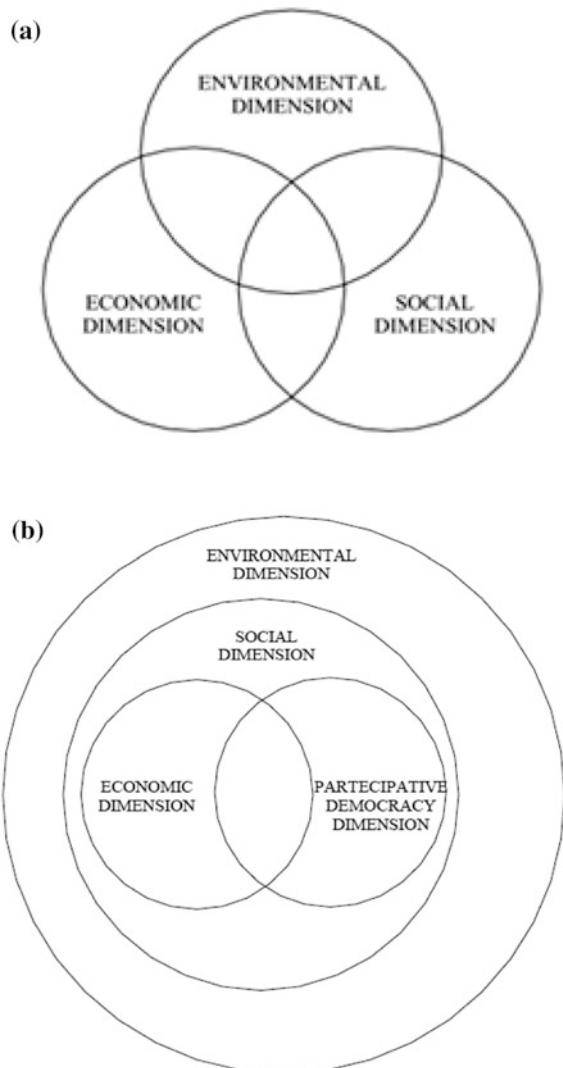
More than 2000 years ago, the Greek philosopher Aristotle defined citizens as the ones who share in the civic life, the attitude to rule and being ruled in turn, and considered as good citizens who bring the knowledge and the skills both to rule and to be ruled (Mansbridge 1994).

But sometimes the chance to express full citizenship is limited by several factors. When it happens action to enhance the empowerment of the population is needed. Empowerment can therefore be considered as consisting of three other concepts: participation, transparency, and accountability (Bailur and Gigler 2014). The relationship between these three concepts is represented in Fig. 2.

First of all, in order to achieve empowerment, the citizens need to participate to set up the main issues regard them. There is a wide range of definitions and interpretations of participation. In more general, descriptive terms it stands for; “the involvement of a significant number of persons in the decision-making process which regards their development” (Hart 1992).

Participation therefore is about people. Transparency instead regards information and processes and can be defined as “any attempt (by the States or citizens) to make information or processes that previously were opaque in the public domain, accessible and usable by citizens groups, suppliers and policy makers” (Joshi 2013).

Fig. 1 Dimensions of sustainable development inclusive of the participatory dimension **a** classical view versus **b** concentric dimensions of sustainable development



As instance, the use and implementation of open data is an application of transparency. The final concept in this quadrangular equation is accountability.

Schedler (1999) defines accountability as the relationship between the power holder (account provider) and delegator (account demander). Accountability depends on several factors such as the degree of political will, the existence of a free press, and the receiving capacity of civil society but basically can be divided into “responsiveness” seen as the ability of the institutions to inform and explain their activities to the public, and “ruling capacity” of the bodies and civil society, as the power to give sanctions in this case of violation of its mandate.

Fig. 2 Relationship between empowerment, transparency, accountability, and participation (reproduced from Bailur and Gigler 2014)

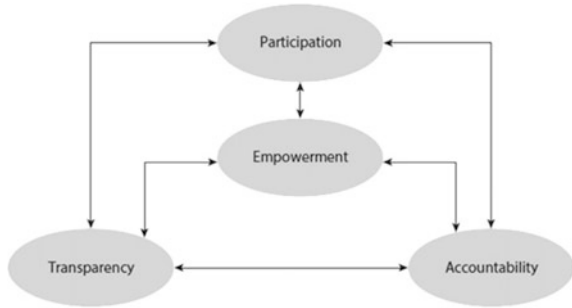
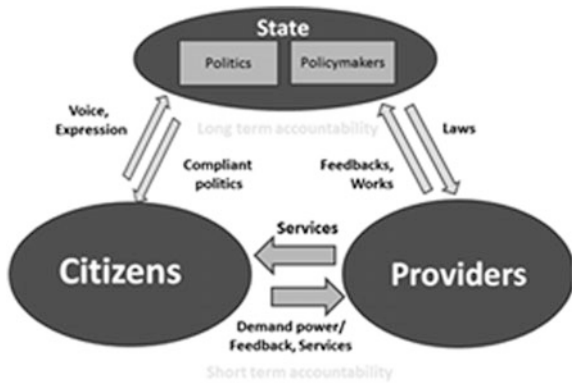


Fig. 3 Relationship between empowerment, transparency, accountability, and participation



3 Methods and Techniques for the Participative Use of ICT Technologies

3.1 ICT Systems for Participation and Empowerment

ICT systems can allow information to flow down from the government to the citizen.

They indeed create the possibility of flows upwards of information, as from citizen to government. This type of communication is essential to inform the decision-making process allowing information flows horizontally, flattening hierarchies (Fig. 3).

Central to this process is the question of how to close the “feedback-loop” between citizens and governments. The information technologies can fill the “credibility gap” between the supply side of government (government reforms) and the demand side of the citizens (Gigler and Savita 2014).

The strategy is to “put citizens in the circuit” (Fraternali et al. 2012) of the decision-making process.

3.2 ICT to Improve Local Knowledge Involvement

One way by which sustainable development can be implemented is to support local populations with modern technology in their own environment.

These combined with their local knowledge may make it possible for indigenous communities to develop the right strategies to face social and environmental problems, such as example to adaptation strategies against natural hazards.

Local knowledge has indeed interesting characteristics in terms of informative system (Minang and McCall 2006).

Regarding local knowledge in fact:

- it is a system of spatial information that is developed by the close relationship between the local population, its land, and its natural resources
- members of the community have a pool of experiential data of different categories according to their age, and social status
- it is an original knowledge of the local community
- the system is a “pseudo” in the sense that consists in the classification of facilities and employs certain methodologies (e.g., oral transmission)
- it is a holistic system in that it uses for decision different areas of knowledge.

For this reasons, local knowledge can be considered as a source of information for local sustainable action and projects. However, as informative system, local knowledge has obviously some drawbacks as it has no facilities prediction, it has some gaps in transmission, and finally, it has little quantization. The combination of local knowledge and information technologies—such as GIS and remote sensing—may be a solution for spatial data on a spatial and temporal scale.

3.3 Public Participatory GIS

Participatory mapping is used in participatory research as well as in planning and management initiatives for development activities on a local level. In its broadest sense, participatory mapping means the creation of maps by local communities often with the involvement of supporting organizations including governments, NGOs, or other actors engaged in development or land-related planning (Lienert 2009).

Participatory Mapping is a well-known practice that can contribute to building community cohesion, help to engage participants to be involved in resource and land-related decision-making, raising awareness about pressing land-related issues and ultimately contribute to empowering local communities and their members (IFAD 2009).

Participatory approaches in spatial analysis are rooted in the implementation of participatory rural appraisal (PRA) methods during the 1980s. Their success shows the fast growth of people’s participation (Oakley et al. 1991). During the 1990s,

participatory rural appraisal (PRA) and geographical information systems (GIS) came together for delivering public participatory geographical information systems (PGIS).

The term public participatory GIS (PPGIS) originated during two meetings of the National Center for Geographic Information and Analysis (NCGIA) (NCGIA 1996a, b) is aimed at defining the use of GIS technologies to expand public involvement in the policy to promote the objectives of local communities and grassroots organizations (Sieber 2006).

In a GIS, geographic information is described explicitly in terms of geographic coordinates (latitude and longitude or some national grid coordinates) or implicitly in terms of a street address, postal code, or forest stand identifier. A geographic information system contains the ability to translate implicit geographic data into an explicit map location, as geospatial and time-series data. Geographical data and community maps may support the participatory approach during the data integration process realizing the participatory approach.

The participatory approach becomes effective only on certain conditions.

Basically, maps represent an intermediary output of the long-term process and need to be integrated into the networking and communication initiatives.

The maps produced and the spatial analyzes represent important steps in the process.

A good PPGIS practice is embedded into long-lasting spatial decision-making processes, is flexible, adapts to different socio-cultural and biophysical environments.

The participatory PPGIS is frequently used as a tool to share the knowledge of the community and to promote learning to the development (Minang and McCall 2006).

3.4 Human Computation and Participatory Sensing

Participatory sensing (PS) can be defined as the use of mobile devices to form sensor networks that enable interaction and participation of public and private users to collect, analyze, and share local knowledge (Burke et al. 2006).

Mobile devices, in fact, are increasingly capable of capturing, classifying and transmitting image, acoustic, location and other data, interactively, or autonomously. Given the right architecture, they could act as sensor nodes and location-aware data collection instruments.

Including consumer devices as a fundamental building block of the sensing system PS implies that the human owners of these devices play an important role in the resulting system architecture.

The application of participatory sensing realizes the implementation of the paradigm of “human computation,” (Fraternali et al. 2012; Law and von Ah 2009) by which the interaction among users is harnessed to help in the cooperative solution of tasks. Human computation (HC) is usually applied in business, entertainment, and science, but can be also useful in the management of environmental

resources, which are by definition shared and distributed and demand new approaches to their management, based on an increased consciousness of mankind's collective responsibilities. (Fraternali et al. 2012). This approach connects with the concept of "concerned citizen," representing a way to open the informative stream between institutions and civic engagement. Human computation can open up opportunities for a continuous involvement of stakeholders, in all phases of a project implementation: from the definition of the objectives and of the performance indicators within the project life cycle.

Human computation can be implemented in a variety of forms, according to the scale at which humans are engaged, the tasks they are called to solve and the incentive mechanisms that are designed to foster participation (Quinn and Bederson 2011).

Crowdsourcing and crowdmapping can be considered cases of HC. As the citizen feedback as it bolsters the ability of citizens and non-governmental actors to hold the state accountable, the interesting feature of the human computation stands in the potential to somehow diminish the accountability gap described in Sect. 2.2.

In such a way, human computation opens the way to a more open and collaborative governance and environmental management.

3.5 Participative Use of ICT: The Crowdmapping Example of OpenStreetMap

Nowadays with the advent of social media and distributed technologies and with the spread of smartphones and mobile devices, the concept of participatory GIS is virtually extended to the global level giving rise to such phenomena as crowdmapping.

Some examples of this new application of PPGIS based on crowdmapping are OpenStreetMap and Ushaidi. OpenStreetMap (OSM) is a collaborative project to create a free editable map of the world. Created by Steve Coast in the UK in 2004, it was inspired by the success of Wikipedia and the preponderance of proprietary map data in the UK and elsewhere.

Since then, it has grown to over 2 million registered users, who can collect data using manual survey, GPS devices, aerial photography, and other free sources.

OSM is considered nowadays a prominent example of volunteered geographic information and application of participatory GIS combined with human computation and participatory sensing. The maps of OSM are open worldwide and even used by UN agency: this has been the case of the Haiti earthquake.

4 Case Studies

4.1 Participatory GIS for Water Management in Kologulu

The case of Kologulu, Ghana is an example of use of public participatory GIS technologies for water management at community level. In this experience, community members have been selected to map the spatial extent of the water reservoirs and the presence of gardens and farms in the surrounding area (Aabeyir and Kabo-bah 2012).

The data have been used to study the dynamics evapotranspiration of the basins.

Particular emphasis has been given to involve the participants in understanding how to use the PPGIS to monitor sources and know their territory.

The mapped points were then superimposed on satellite images in order to estimate the temporal variation of water levels. The community Kologulu is located in the northwestern part of the Lawra District of the Western Region of Ghana Superior. It is about 28 miles from the capital Accra. The population of Kologulu is about 903 people, consisting of 50.2% males and 49.8% females. The village suffers rains between April and October with average annual rainfall between 1000 and 1200 mm rainfall peak in August and September (Danuor 2012). The water supply is mainly through wells dug in the sand. There is an additional basin, the Kologulu Reservoir. The main business of living in this country is agriculture. This makes the reserve particularly important, because it supports the activities of cultivation and fish farming during the dry season. In general, the life of the community puts pressure on the tank especially in the dry season when it becomes necessary to use water in reserve.

However, because of climate change, the water actually is going onto strong phenomena of evaporation. By using ArcMap 10.0 and ERDAS Imagine 9.2, the different types of land cover were classified as shown in Fig. 4. During the field survey was figured out that some of the farms owned by the people of the village were in the proximity of the eastern side of the dam. The crops next to the dam caused the silting of the reservoir that consequently was no more able to support the activities of cultivation during the dry season.

Fig. 4 La Cuidadora Project Web site reproduced from <http://cuidadora.ourproject.org>



Chemical fertilizers were used too, contributing to pollute water. The purpose of the participatory mapping experience was particularly important to inform the community and researchers on the strategies to be adopted to ensure the reserves was not exposed to a severe evapotranspiration during the dry months. This process brings to a discussion among the community members about the management of water basin. The discussion finally leads to the definition of municipality ordinances to regulate the activities around the reserve and to sanction some harmful practices within the buffer basin. Furthermore, the involvement of rural communities through the PPGIS allowed the professionals involved to transmit to people new water conservative agricultural methods such as mulching, the use of the manure, and rotation. Basically, the use of PPGIS created a space integrated learning of the territory that was useful both to indigenous communities and professionals on site.

4.2 *La Cuidadora*

The project, called “The Cuidadora,” by Jonathan Rupire, provides network-shared information to help indigenous communities to better protect themselves from the dangers of contaminated water, social–environmental conflicts, and corruption.

It combines citizen journalism, activism, and geographic information into a single source of information available online (the Cuidadora project 2014). Using a distribution Ushahidi (translated into indigenous Shipibo) with GNU-LGPL3 and free geographic data and OpenStreetMap), the information provided by affected communities are reported, georeferenced, and then distributed to national organizations and media, as well as the communities themselves.

The Section “recibe alertas” organizes a periodic digest of all the report displayed through the title, the description, time, and photograph within the specific category.

To make this work, the Cuidadora is based on its relationship with local NGOs as Defensa Indigena and the Coordinadora Nacional de Derechos Humanos (Rupire 2010).

The Web site is hosted on a server collective Ourproject.org.

It consists of a main page that displays a georeferenced map in the foreground.

The Cuidadora represents an example of crowdmapping through the “Participatory sensing”: Standing to this paradigm, different users are involved in the signaling circuit through remote devices (Fraternali et al 2012). The central hub is a Web platform which collects and visualizes all the information. The “Cuidadora” system is also provided by a Twitter account where the alert “tweets” is reported by specific signaling hashtags.

This structure made up a community information system (CIS) (Fraternali et al 2012).

A CIS represents an infrastructure that is able to spread fast response and equally fast propagations over all the places where it insists. These two features are essential for an alert system and became more effective as the number of user increases.

5 Discussion

The use of ICT and new media in the recent years has raised great attention in the international community. A great debate has been opened on public participation and civic engagement through new technologies. Furthermore, the development of social media and the switch from Web 1.0 to Web 2.0 brought new possibilities in the field of political communication. The analyzed case studies helped to figure out some of the potentials in the use of information technologies to enhance participation. In particular, in the case study of Koligulu, we faced how the use of satellite images and public participatory mapping increases the awareness about an environmental problem leading to a communitarian discussion on the strategies to solve the problem.

La Cuidadora indeed represents an example of “community information system”-based alert system. Respect to the traditional systems, it has a faster response, but less accuracy due to the non-professional nature of the alarms gathered. It is noticeable that the capabilities of the system rise with the number of users.

The proliferation of initiatives related on ICTs has led to high expectations of technology as “empowering” in terms of participation, transparency, and accountability as shown in Fig. 2. But caution is needed in order to not fall in the paradoxical vision of the “liberation-technology”. The discourse on participation, and furthermore on ICT applied to obtain participation doesn’t lack controversies, criticisms, and doubts.

Firstly, even if ICTs have the potential to empower, how does this happen in practice? And how accurate is it to say that a participatory initiative will lead to sustainability?

For instance, referring to the Fig. 2, the relationship between empowerment and participation could not always be completely causal. Its persistence implies the willingness of those who are empowered to empower others or the ability or agency of those who are not empowered to gain power in some way, even without the support of those empowered (Gigler and Savita 2014). In other words, even if by the mediation of information systems, participation traduces in empowerment if the information shared in the involvement process are traduced in concrete actions. In order to grant sustainability on long-term, it is important that the participatory process “implicates the population and instills in them the sense of responsibility.” This is the processes happened in the case study of Koligulu community, where the participatory process leads to a public discussion and to the definition of rules. Another challenge for participation is that even if a community does want to participate in a development project, they may simply lack the skills, resources, or time (Brett 2003; Moser 1993 cited in Michener 1998). This observation helps to

focus on the importance of bidirectional communication that could become essential for an ICT-based informative system.

The bidirectional communication enables the exchange of knowledge: it can be pursued between expert and grassroots stakeholder, or between experts, and decision-makers.

The exchange of knowledge creates a common basis of information and values that is crucial for the success of a participatory action. Probably the future of ICT participatory project stands in the definition of mechanism of mediation of the inputs in order to provide non-dispersive and chaotic outputs. Another critical issue of the participatory use of ICT through remote devices stands in the fact that the collection of data in a pervasive way inevitably lead to the production of a huge amount of data.

These data are most of the time affected by some bias and acquisition problems. There are almost two kind of concerns (Cuff, Hansen and Kang 2008):

- bad data processing, mainly caused by the fact that when amateurs collect data through cheap, unverified, uncalibrated sensors,
- the observer effect, related to the fact that observation generally specifically alters human behavior and thus the process of measure.

These problems are particularly significant dealing with approaches related to crowdmapping, crowdsourcing, and alerting systems where a lot of untrained users contribute to signaling. Even if this kind of self-regulatory strategies can be adopted, various other forms of distributed accountability can make data collection more reliable: for example, a simple one stands in the implementation of basic entries for the verification on the devices, in order to repeat missing or faulty measurements in real-time, before the environment changes (Burke et al. 2006).

Another great issue related to the use of crowdmapping and participatory sensing is the security of data gathered. Most of the times, in fact, the information about the sensing bring up also sensible data related to the device and to the user itself.

Furthermore, it is possible that the application installed on remote devices to perform the participatory sensing, should send other data without the user consciousness.

This kind of sensing could be defined as opportunistic (Lane et al 2008) and could be coupled to the participatory one very easily and without particular technical humbles.

Considering that the transmitted data are available to a great number of users several data security problems should be considered ICT-based participatory solutions. These problems should be considered “a priori” in order to avoid to make lot of users vulnerable in their sensible data.

6 Conclusions

The involvement of local community about their development can be considered a key point to grant sustainable action within a specific environment. Participation, empowerment, and sustainability have a strict relationship of inter-dependency.

This relationship has not linear fashion, but stands in a circular shape.

If we consider any action or project within a space in a specific time, it can be argued that the circularity is expressed as “feedback-loops” between the main actors involved in the process that are communities, decision-makers, and environment.

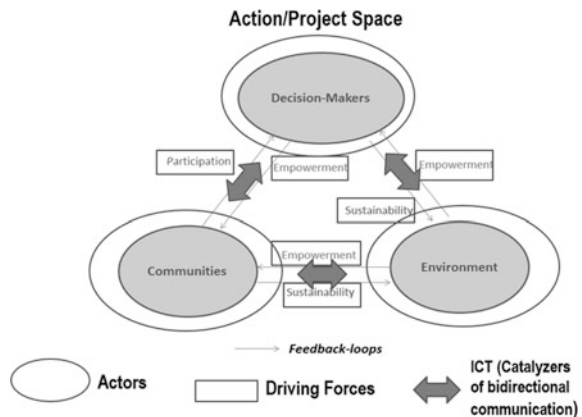
Participation, empowerment, and sustainability lie within the feedback-loops as driving forces of the relationships (Fig. 5).

As discussed in this work, “feedback-loops” could be strongly mediated by information system. This is true for the different techniques and case studies analyzed, where the mediation by ICTs acted on different feedback-loops. In the case of “Kologulu,” public participatory GIS mapping helped to create awareness about the feedback-loop between the community and environment. The case of “La Cuidadora,” shows how the crowdmapping approach helped to fasten the whole complex of feedback-loops in order to create a reactive signaling system. The way by which the ICTs and all its declination acts on feedback-loops is related to the capability of information systems to catalyze bidirectional communications.

Bidirectional communication contributes to strength the information-decision mechanism and the action-reaction mechanism of a community within its environment.

Thus, if we consider any project or activity as the action of the community on the environment in response to a problem, it’s possible to argue that the use of ICT technologies enhances sustainability because it helps to find the best-fitted solution to a specific problem, considering the boundary conditions related to environment and community needs. Through ICTs, the boundary conditions are better known due to the strengthening of the information-decision mechanism. Thus, sustainability dimensions and consequently sustainable development should be reached.

Fig. 5 Actors, feedback-loops, and driving forces within a community action



This is true if communities are involved where involvement stands in participation in decision-making, but also consideration of the local knowledge of a community about a specific environment. Going to a deeper analysis regarding the action-reaction mechanism described above, considerations about resilience could be also advanced. The reinforcement of the action-reaction mechanism and the catalyzation of the feedback-loops between environment-communities-decision-makers could reflect on faster and better responses of communities to environmental changes. In other words, this means an improvement in resilience. So it's under the proper conditions, it should be said that in addition to sustainable development, the use ICT also helps to foster the resilience of communities. Even if the undoubted advantages, ICT should not be considered as a "liberation-technology" and their use can't solve the kinds of problems. The widespread use of cell phones, SMS, and social media combined with crowdsourcing approaches could be a key enabler for social change, but several controversial questions regarding the effectiveness of ICT-based participation and related to the quality, the privacy, and the management of the huge amount of data produced by the use of ICT technologies are still on open discussion.

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Part II
Design Strategies and Building Techniques
for Development in Marginal and Rural
Areas

Architectural Design in the Cities of the Global South

Camillo Magni

Abstract In recent years, architecture for international cooperation has been the focus of lively discussion, occupying larger spaces inside the disciplinary debate, while new and recurring “natural catastrophes” punctuate the agendas of international policy and threaten global economies. This paper will describe certain problematic contexts and settings that pertain to architectural design in contexts of poverty and alienation, in the conviction that these observations can reveal questions which on a wider scale have to do with the architectural discipline. For this reason, the thinking is not limited within geographical boundaries (Global South as opposed to a hypothetical North of greater development), but instead maintains a problematic perspective capable of observing crossover phenomena through the ways in which they manifest themselves.

1 Introduction

In recent years, architecture for international cooperation has been the focus of lively discussion, occupying larger spaces inside the disciplinary debate, while new and recurring “natural catastrophes” punctuate the agendas of international policy and threaten global economies.

The ethical and civic impact of such an approach, and the admiration owed to those who operate in problematic conditions, in impoverished areas, with an often crippling lack of resources, are clear. Nevertheless, the great interest generated by such initiatives cannot depend only on considerations of an ethical nature. What emerges from careful observation seems to involve the very core of the architectural discipline, its methodology, a deeper sense of the profession. Building in these

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contexts means using architecture as a “means,” not as an “end,” and it becomes an opportunity to contribute to the development of the poorest areas. The purpose, in other words, is not the construction of a building, but the promotion of development, in the conviction that architecture can be a tool—not the only one, not the foremost—to improve the living conditions of people. What takes form is the passage from architecture seen in a productive sense, which aims at optimization of the constructed artifact for its sale, and a process-based architecture interested in social, environmental, and economic ecosystems, with which it sets out to interact and interfere.

This short paper will describe certain problematic contexts and settings that pertain to architectural design in contexts of poverty and alienation, in the conviction that these observations can reveal questions which on a wider scale have to do with the architectural discipline. For this reason, the thinking is not limited within geographical boundaries (Global South as opposed to a hypothetical North of greater development), but instead maintains a problematic perspective capable of observing crossover phenomena through the ways in which they manifest themselves.

2 The Cities of the Global South

In the countries of the Global South, the theme of movement to the cities has taken on unique characteristics of scope and quality. Never before have cities grown so rapidly. Large portions of the population leave rural regions and pour into metropolitan areas, attracted by hopes of employment that are nearly always dashed. The challenges for the design disciplines are concentrated in these new metropolitan areas, which dramatically reveal all the limitations—and opportunities—of uncontrolled urban expansion. But we need to pay closer attention to the ways in which the new cities take form. While on the one hand the spontaneity of processes relies on endogenous actions on the part of the population, undertaken in total autonomy, on the other in many cases we can observe phenomena that can be traced back to more or less ramified planning processes. Different modes of construction of urban fabric are thus superimposed inside a profoundly chaotic situation. The city presents itself as a multiform archipelago of separate enclaves, as opposed to a few consolidated city portions inside the enormous fabric of the informal city (if this definition can still apply) that is only apparently equal to itself, since it is the expression of multiple processes and economies the exert pressure from the bottom-up.

Nevertheless, the aspect of greatest impact is the speed of growth of cities. Over the last few decades, there has been an explosion of metropolitan areas in the countries of the Global South, and current forecasts indicate no immediate slow-down. Cities like Lagos, Mexico City, Cairo, Jakarta, Mumbai, just to name a few,

have reached growth rates that are unique on a planetary scale. If we look at the African continent, for example, in 1910 the urban population amounted to just one million inhabitants, while by 2007 that figure had risen to 370 million, with the hypothesis of reaching 770 million by 2030. The most important reasons behind this explosion are demographic in nature; since the 1960s, there has been a radical acceleration of population growth in the countries of the Global South. Africa is the continent with the highest growth rates. Though forecasts are difficult to make, the experts predict that the phenomenon will slow down only after 2040 and will tend to stabilize toward 2060 when the worldwide population will have surpassed the level of 10 billion inhabitants.

Alongside demographic growth, there is a second aspect that has to do with the places of concentration of new populations. There has been a general intensification of phenomena of migration from the countryside to the city, with radically different characteristics than in the past, both due to the size of the process (London grew seven fold in the 19th century, while in just 40 years, after 1950, the population of Lagos became 40 times larger) and to the type of motivations that prompt people to move (in European historical cities offered better work opportunities, while today in many cases we are seeing major mobilization of portions of the population without the presence of employment opportunities in the cities). In other words, migratory flows are taking place that originate in the desperation of zones of departure, rather than in the appeal of zones of destination. This observation cannot be applied to all the contexts of the Global South, but urban growth in the absence of economic growth is the most evident characteristic of most of the metropolitan areas of the Global South (Mike Davis).

The combination of these two phenomena—demographic growth and increased migration from the countryside to the city—is the main cause of the proliferation of enormous man-made areas that would be hard to classify as cities, at least according to the most established parameters, yet can nevertheless be associated with the principles of urban existence. While it might seem like a contradiction, these settlements are a problem, but at the same time they represent an extraordinary opportunity. The high concentration of population in a specific place is in itself an opportunity for those who work in the disciplines of space, and the first form of ecology can be the management of habitat density through optimization of resources, transports and local economies, introducing new forms of territorial governance.

3 An Ecosystem of Populations and Identities

Processes of urbanization combined with the more general phenomenon of globalization are gradually modifying the economies and social structures of many of the nations of the Global South. Most economic resources and political interests are

being progressively focused on cities, introducing new forms of capitalism partially produced by the countries themselves and partially the result of new forms of colonial exploitation. In this sense, the metropolitan areas, besides attracting new population, are also drawing in unprecedented economic powers and the persons they represent. In particular, we should emphasize the rise of a new middle class that until a few decades ago contained only a narrow slice of the population, but instead now represents one of the segments of greatest interest and major growth. The burgeoning ranks of these citizens are found precisely in the cities, so it is justifiable to talk about a “metropolitan middle class.” The needs and aspirations expressed by these inhabitants are gradually constructing a new habitat imaginary suspended between diversified and contrasting identities. On the one hand, remnants of local residential culture remain, a culture that reveals all its limitations in the shift from a rural to an urban context; on the other, infinite references appear in a pervasive form to a modernist culture of a western character, which when shifted into a new context also reveals grave limitations and distortions. The outcome of these two pressures is an eclectic and confused melting pot of overlapping identities in which we can glimpse interesting potential, the expression of extraordinary creativity, but at the same time the repetition of mechanisms of speculation whose expressive forms have determined the character of the history of western cities. The spread of new gated communities and of monofunctional service industry and shopping districts are the most obvious symbols of a more radical change.

A second aspect to emphasize has to do with the average age of the population. While the countries of the Global South stand out for high nativity rates, the urban areas are set apart by the concentration of the youngest segments of the population inside already young nations. This produces great dynamism and entrepreneurial spirit of the society, with high growth rates, constituting a resource in terms of demand for employment that can attract a supply side, also from foreign investors. At the same time, unemployment can pressure young inhabitants—no longer aided by the family and social networks found in rural contexts—to get involved in criminal organizations, with a resulting spread of illegal practices. Potential and risk are two sides of the same coin.

From a social standpoint, the urban population stands out for two other aspects. The first has to do with the redefinition of balances inside family nuclei, through the weakening of the patriarchal structure: on the one hand, women take on a different role, increasingly emancipated from housework and gaining ground in the world of work. On the other, the men—having abandoned agricultural activities—are increasingly forced to work far from their families, which in a context where mobility is still very inefficient leads to partial abandonment of married life in the home. A second aspect regards the structures of belonging to specific ethnic groups and forms of aggregation that formed the basis in past centuries for the organization of rural contexts. In the new metropolitan condition, these structures are weakened, but they do not disappear. Strong factors of ethnic recognition remain, joined by

unprecedented hybrids that are manifested in spatial terms in the construction of new ghettos and socially identified districts, at times in terms of social subdivisions, at times in relation to income.

The metropolitan areas of the Global South represent a recent phenomenon, especially in terms of their size and their most distinctive characteristics. As a result, their inhabitants and social processes reflect the novelty of the context, opening the way for countless assessments in which the opportunities must be balanced with concerns about what is still a very uncertain future.

4 Architectural Design as an Open Process

It is clear that the cities are the place where the wager of the future of the nations of the Global South will be played out. In this context, it becomes necessary, for the disciplines connected with organization of space, to consider what role architectural design can play, and in what way it can contribute to the development of these territories. It is necessary to ask ourselves with which forms, which tools and objectives we can operate, in a condition so different from that of the past. At the same time, this phenomenon cannot be shut off inside the fading boundaries of faraway nations. Major migratory flows mobilize identities and cultures as well as people and problems that once seemed foreign to us and are now suddenly close and timely. For these reasons, it becomes crucial to expand the field of observation and to come to grips with the most evident problems, in order for the responses to those problems to also become evident. The need to approach complex, inter-scalar and trans-national processes is symptomatic of the contemporary condition, and of the rethinking that is taking place regarding the design disciplines.

Without any attempt at completeness, we can set forth several considerations stemming from observation of the experiences of those who operate in the contexts of the Global South. Designers like Caravatti, Tam Associati, Tyin architects, Giancarlo Mazzanti, Diébédo Francis Kéré, Anna Heringer, Urbana, Rural Studio, Architects without Frontiers and many others bear witness to an unmistakable attitude of thinking of the project as an open process. The morphological aspects do not depend on arbitrary or random choice, or on the consequences of other factors, but are connected on a par with a complex system of problematic. Building means solving problems related to disciplinary, operative, and contextual aspects. The synthesis of the architectural design lies in the interaction of these ambits. The serious distress of these contexts makes the conditions in which to operate much more extreme. Perhaps this is precisely the factor that makes it possible to strip the project of useless superstructures, to recognize the deeper reasons behind our craft. This position involves the capacity to contribute to the development of local

communities and to help the people who live in them through architecture. To observe the use of materials and construction systems makes it possible to exemplify this approach: if on the one hand construction technologies are the expression of disciplinary reflections on morphological and structural choices in the project, on the other they have to do with the vision of development we want to pursue and transmit to the local community through the enhancement of resources, the promotion of sustainability and the use of appropriate materials. The project thus becomes a field of experimentation in which to make decisions that have an impact on both formal and cultural aspects, through support of inclusive, sustainable economic development.

Another factor is related to the extraordinary creativity that emerges in these projects. Though with great difficulties, a phase of coexistence of multiple cultures is taking form, suggesting the tendency on the part of designers to draw on extremely heterogeneous formal repertoires. The category of the *genius loci* of Christian Norberg-Schulz is no longer sufficient to express the crucible of contaminations emanating in the project, starting with the specificity of places. Also in rather grotesque forms, we are seeing projects that represent places, practices of use, aspirations, and desires typical of countries in a phase of extensive transformation in which cultural sedimentation has begun to form only its initial strata.

A third aspect is that of the authorship of the project. In contexts with advanced economies, the path of the project has been systematically organized in a process of separable parts that has undermined the authorship of its protagonist. On the other hand, in the countries of the Global South we can observe an opposite process: the author expands his field of action and inserts a series of players in the process itself, who gradually become co-protagonists of the project. For this reason, in the most successful examples architecture becomes a terrain of interaction (and not conflict) between the many persons involved. This does not mean that the architect is exempted from performing his professional tasks; in a more complex form, we are seeing an expansion of his responsibilities and expertise and the coexistence of multiple subjects that contribute to the final result.

Observing these experiences, one final aspect becomes clear, regarding the disciplinary characteristics of our job: it seems as if architecture, in these places, “is at its best” (P.L. Nicolini). We can discover measured, harmonious projects, appropriate for their socio-environmental context, with surprising hybrids between faraway and nearby cultures, between tradition and innovation. The obligation to abandon the reassuring methods and established practices of our actions paradoxically facilitates the project. The attention focuses anew on the place (paradoxically often unknown), the materials and the construction techniques. The relationship between structure and form becomes evident, and therefore appropriate. The culture of places is expressed in the architecture through careful typological interpretations, a material reading of the construction, a tendency to involve local communities, the use of innovation that is never banal, never an end in itself. The use of “appropriate

and appropriable technologies” (H. Massuh) brings out the intention to stimulate local communities to apply productive systems from the bottom-up.

It would be a mistake to consider the projects for the Global South a return to the past. These projects fully represent the contemporary spirit, addressing complexity and choosing the minimum terms with which to do it, demonstrating an ability to come to grips with the themes of globalization, and rediscovering the (epistemological) principles of the architect’s action in the “faraway local.”

Bioclimatic Design for Informal Settlements

Gian Luca Brunetti

If you find that you're spending almost all your time on theory, start turning some attention to practical things; it will improve your theories. If you find that you're spending almost all your time on practice, start turning some attention to theoretical things; it will improve your practice.

(Donald Knuth, computer scientist.) [In: Gonzalez-Gutierrez A (2007) p 99.]

Abstract In this paper, a review of the reasons hindering the use of bioclimatic design principles in informal settlements is attempted and the perspective of bioclimatic design in those contexts is discussed. Among the main candidate reasons is the habit of mind induced by the belief that informal settlements grow organically, so as to invariably end up being optimized for their functional tasks. Another reason lies in the very nature of bioclimatic design, which is based on integration, that can be perceived as too a “weak” guarantee of perspective features, not very suitable for competing with clear-cut and powerful strategies like active climatic control. A third reason is constituted by the technical challenges which are presently still posed by the environmental simulation of open and intermediate spaces, especially in hot climatic conditions. In this context, some promising research lines related to climatic control and passive cooling are identified in this text. Those approaches are likely to benefit from an integrated blend of practice and theory and may contribute to increase the attractiveness of bioclimatic principles for the rehabilitation of informal settlements.

1 Bioclimatism for Informal Settlements

At first sight, informal settlements may look like places in which bioclimatic principles cannot be very important. This impression is fostered by the fact that often informal settlements are considered places in which the main daily problems are little above the level of survival, and where environmental comfort (thermal, lighting, acoustic) looks like a luxury, an inessential thing.

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An inessential luxury, however, which in traditional times men were invariably willing to obtain (Oliver 1997; Olgyay 1962). How can it be?

The first candidate reason for this is that comfortable dwellings have never been much more expensive, or difficult to build (all other things being equal) than uncomfortable ones. Usually, what makes a difference in the quality of dwellings is indeed the intelligence embodied in the design choices.

The second candidate reason is that living in an informal settlement does not usually mean living just above the level of survival: as well known, people live full lives in informal settlements, longing for improvement, but also developing affection for the places (Mangin and Turner 1969).

A further obstacle for the application of bioclimatic design principles to informal settlements derives from an extremization of the belief that architecture without architects (Rudofsky 1964) can invariably take care of its own growth, because it evolves by natural selection, which, by definition, cannot produce unfit outcomes.

This line of thought has probably touched its zenith with the mind-blowing work *The Timeless Way of Building* by Alexander (1979).

2 Views About the Role of Spontaneity

Alexander's thesis sprang from—and reinforced the line of thought based on—the fact that traditional vernacular types have grown in the past very much like organisms under the pressure of techno-cultural selection. It is not very relevant here if there is a difference between biological and techno-cultural selection, linked to the fact that memes, differently from genes, can revive and can multiply themselves in parallel lines (Steadman 1979). The most important thing would be to know if, in the dynamics of the techno-cultural evolution, besides a Lamarckian component derived from learning (Valiant 2013), a pressure exists resembling what is called sexual selection in Darwin's theory (Darwin 1871): the selection of the seemingly fittest “solution” above the purely fittest ones (which also may explain the role of fashions and trends).

The “spontaneistic” line of thought of which Alexander is an interpreter is tempered by the awareness created by studies like the milestone *House, Form and Culture* by Rapoport (1969), which brought into the foreground the fact that often in architecture there is just a weak correspondence between what is in theory a functional optimum and the actual solution, due to the fact that it is not rare that the techno-cultural drivers prevail over the techno-functional ones.¹ Which is perfectly

¹The most notorious example among many is that of the “conquest” of the cold north-east of the Japanese islands made by the traditional house type suited to the humid south-west.

in line with the conclusion brought forth by contemporary lines of studies on the evolution of technology (Basalla 1989).²

The line of interpretation opened by Rapoport tempers the thesis that natural selection has been at play on a functional basis in the formation of vernacular types, and does this by casting doubts about the fact that the evolutionary drive always “aims” towards the most functionally advantageous solution available (in optimization terms, the global optimum). This impression is reinforced by experience, which shows that whilst traditional vernacular is invariably fit for the environment it responds to, whatever its evolutionary path, modern informal often is not, or, at least, it is at a much lesser degree.

In informal settlements around the world, discrepancies between modern vernacular and traditional vernacular are very common. This is not a bad thing per se, because it is unlikely—contrarily to a romantically idealized viewpoint—that the solutions optimised for past constraints remain optimal for the present ones; but often, the alterity between the past solutions and the new ones is extreme, which is a sign that a loss of some useful heritage of knowledge may have taken place. To this, the fact has to be added that the studies about the environmental behaviour of traditional vernacular today are, overall, more numerous and frequent than those regarding the behaviour of modern, informal vernacular: traditional vernacular is getting the research attention it deserves (Cook 1996; Zhai and Previtali 2010; Weber and Yannas 2013), but the extreme form of modern vernacular present in informal settlements does not.

Of course, there are solid reasons for this, like: informal vernacular, on the average, is not working well; nobody is proud of it; it is unrecognized; it is a moving target because it evolves incessantly; and, under some aspects, maybe it is not even a vernacular, because it is often so internationalized to resemble a sort of international style of the poor.

The scarcity of studies regarding the bioclimatism of informal settlements is relieved by the fact that the design actions targeting those contexts can profit from a wealth of researches related to housing (Pearlmutter and Meir 1995; Santamouris et al. 2007; Bardhan and Debnath 2016). Lines of research striving to put traditional vernacular and modern solutions in comparison and/or perspective are indeed flourishing (some examples: Labaki and Kowaltowski 1998; Dili et al. 2011, Nguyen et al. 2011). However, it should be recognized that there are still some aspects specific to informal settlements—ultralight density, ultra-low cost, ultra-small sizes—that are being not very much addressed by bioclimatic studies. The suspect is that the belief that informal settlements cannot be improved in situ is here at play; the belief that a dwelling in a slum is something that cannot be built

²The adoption of logograms on part of the Chinese Han dynasty (Boltz 1994) as well as the QWERTY layout of the typewriter keyboard (Norman 1998) is notorious example of that kind of dynamics.

upon is counterbalanced by approaches which today are, unfortunately, still minoritarian (Huchzermeyer 2009).³

There is much else in Christopher Alexander's analyses besides the importance of natural selection in the evolution of solutions.⁴ But the clearest component of this "spontaneistic" line of thought is the belief that informal solutions will tend to an optimal—or, at least, adequate—equilibrium for the very reason that they are spontaneous. However, that this optimality is not what is being reached is evident both in informal settlements (UN-Habitat 2003) and a great deal of the "high-tier" architecture created by professionals (Stohr and Sinclair 2006; Aquilino 2011). The sensation is that bioclimatism today is often a great absent at the table of competences, far more than at the times in which knowledge was less mature, but more integrally applied (Fry and Drew 1964).

The reason of this is that since the industrial revolution, as well known, the viable technological solutions have become more and more numerous and have begun to require more and more scientific, abstract knowledge; which has progressively reduced the importance of the oral, informal transmission of design knowledge and the cumulative value of experience as a collective good. This knowledge accretion in the past was favoured by the fact that the selective action of evolution was exerted on a small number of techniques and technologies over a long time, during which the rejection of unsuccessful solutions and the adoption of successful ones could bring effects which lasted in the memory of generations of men. But this dynamic is on the way to be discarded at an increasing pace more or less everywhere; to the point that in the affluent countries houses are presently being built with criteria which are very different than those which were mainstream only thirty years ago.

On the other hand, some recent improvements in housing design have been made possible by the fact that bioclimatic knowledge can be embodied in architectural solutions in manner which would have taken ages to evolve to an informal process. This is made evident by the fact that several of those solutions do not even really require advances in the components that are being used, but only in the knowledge which is input into the design. At technological level, they were indeed already perfectly feasible in traditional times—if only there were an idea that they made sense. Examples of this kind of innovation regard the advanced exploitation of aerodynamics in solar chimney (Zamora and Kaiser 2010), the improved efficiency of draught evaporative cooling (Ford et al. 2010) or sound absorption in natural ventilation (Egan 1988).

³Bioclimatic studies on shacks (Mathews et al. 1995, 1999), emergency shelters and low-cost prototypes (Crawford et al. 2005; Krüger and Laroca 2010) seem to be meeting more incentives: the former ones thanks to the low entry barriers related to the construction of the physical prototypes; and the latter ones due to their non-informal (professionally designed, and, in certain cases, professionally produced) nature.

⁴Like, for example, the thesis that an architect should only be assigned small groups of dwellings, "small" architectural decision, so as to be given the possibility of reaching a deeper and fuller understanding.

The cited limitations of the capacity of exploring the space of design options (design space) rapidly by natural selection are due to the fact that this ability requires the capacity of jumping from a certain solution to a better solution via a transitional, less promising one, in a situation in which the most promising one can be “seen” and reached only from the intermediate one, but not from the starting point. That process in the branch of artificial intelligence devoted to studying evolutionary algorithms is called “moat traversing” (Winston 1992) and in nature may require long times to take place.

In the design of houses and settlements, an example of evolutionary action requiring “moat traversing” is that for the passage from an isolated house configuration to a courtyard configuration under the pressure of functional constraints in cultural milieus where the courtyard configurations are historically absent.

An increase of the degree of advantage of the courtyard configuration over the other candidate schemes may take place, for example, when a certain people begin to live in a condition much more densely populated than the condition to which they were previously accustomed. The advantage of the courtyard in the new condition derives from its capacity of simultaneously assuring privacy, climatic control, and relations with the environment through the sky and the view paths and air paths traversing the rooms on the streets.

But it is difficult that a courtyard configuration emerges by pure natural selection in an informal settlement in which it is culturally absent, because for this to happen, that configuration should be chosen in advance at the time in which the settlement is not yet densely inhabited but the plot size is already small. In a cultural area foreign to the concept of courtyard, it is much more likely that the courtyard configuration emerges from an act of conscious exploration planned by design. Indeed, the cases of self-help housing adopting a courtyard today mostly imply a planned evolvability and take place in cultural contexts in which the courtyard scheme was already present (see e.g. Bredenoord and van Lindert 2010).

The likelihood of the courtyard outcome in a cultural environment foreign to it is furtherly reduced by situations of hyper-high densities, and/or hyper-small size, and/or hyper-low costs which are typical of informal settlements. I personally had a keen sensation of this happening during the workshop to which I participated with a group of colleagues of the Course Coopera(c)tion and a group of international colleagues focusing on housing solutions in Kya Sands, Johannesburg, in 2015 (see Part VI of this book). The average plots of the settlement were small (about 5×5 m), and the dwellings were single story. As a result, the overcrowding was remarkable and extending the houses was technically difficult. The solution I proposed in the context of the activities the group in which I worked can be taken as an example of configuration which would unlikely appear in a spontaneous growth process. The solution was conceived for a plot size of 12.5×5 m (obtained by prolonging one street every two) and based on a courtyard configuration having the purpose to assure to the inhabitants a suitable degree of privacy, ventilation, and relation to the environment through the sky. The reason for which it would be unlikely that a solution like that grew spontaneously is, more precisely, that this would require that the buildings at the ground floor were kept less dense and more

“concave”, more space-containing, than they seemed to have to at the beginning of the enterprise. Making room for the extra spaces needed for the subsequent growth would indeed require the apparently irrational intermediate step of closing the ground space on itself when the building is one story high and there are no stairs in the courtyard: which can be done if the hypothesis of building a second (and maybe a third) story is embraced in advance.⁵

The design search processes simulated via genetic algorithms show that a quick exploration of the design options can only be obtained by setting the mutation rate of the genes to high values, which makes the architectural configurations fairly unstable; but such a lack of cultural stability is uncommon in the growth of dwellings in informal settlements. Expecting fast mutation rates in informal settlements would be as expecting that the designer—builders assumed the frame of mind of inventors or scientists. It is true that necessity fosters invention, but in such settings the sort of pressure fuelling innovation is likely to be counterbalanced by powerful cultural and technical forces deriving from the longing for a reassuring, culturally recognized identity (d’Alpoim Guedes 1971) (Fig. 1).

On the other hand, informal settlements are contexts which are more apt than others to incubate solutions which are dormant and on the wait, following a path which is typical of nature, where mutations are likely to emerge abruptly after having been cumulated inactively for long times (Koonin 2016)—which is the recent, most convincing explanation of why evolution happens by “leaps” and not as a continuous process (Gould 1972). A design leap waiting to happen may be incubating, for example, in the high-density unofficial settlements which are typical of many Indian cities, where narrow back-to-back row houses are raised for three or more stories on plots of the size of about 4×8 metres. I have become aware of this family of configurations by being introduced to it by Marco Ferrario, co-author of an interesting book by Micro Home Solutions about the improvement of informal settlements in New Delhi (van Noppen et al. 2011).⁶

In the book by MHS, the robust solution of exploiting fan-driven ventilation shafts on the back of the row houses is taken into account. For assessing the feasibility of natural, non-fan-driven ventilation through the shafts, I explored, via thermal simulations, the viability of the hypothesis of making them larger, so as to move the air by a combination of stack effect and solar chimney effect (Fig. 2). And the data that I gathered showed that the problem is not a monotonic one in which the outcome can be more or less advantageous depending on the efficiency of the ventilation through the shaft; it resembles a binary problem, because the ventilation obtained can be advantageous or disadvantageous depending on how the chimney

⁵In the proposed solution, the stairs to the second story are not placed above the stairs to the first one, and the façade on the street at the second story is not continuous. The result is that the enclosure constituted by the buildings around the courtyard becomes more and more opened to the outside (street and sky) with the height.

⁶That of the ventilation through shafts is a solution that has also been investigated in other high-density contexts (e.g. Prajongsan and Sharples 2012), which is a clue of a growing awareness of a need.

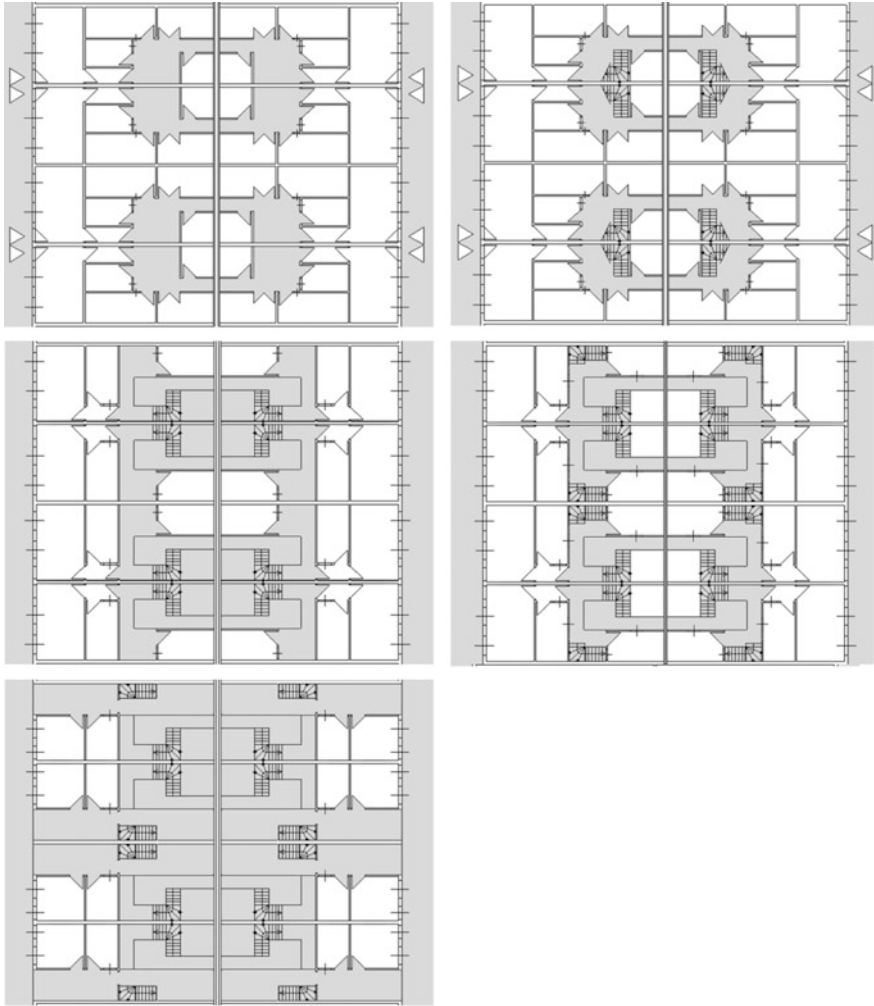
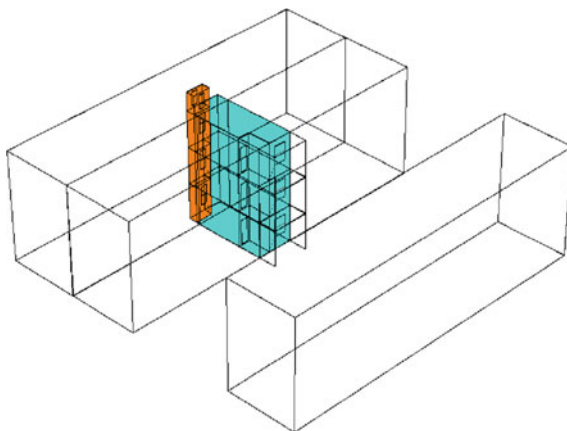


Fig. 1 Scheme of evolutionary houses for extending the Kya Sands settlement, Johannesburg. The open space is coloured in grey. Top row: ground floor of four units, without (left) and with (right) stairs to the first story. Middle row: first floor, without (left) and with (right) stairs to the second story. Bottom row: second floor.

is designed. The most disadvantageous situation turned out to be when the system, instead of producing an ascending ventilation through the shaft, produced a descending ventilation from the stories above to the stories below, which would make the inhabitants of the lower stories inhale the air used by the inhabitants of the higher ones—which is unacceptable for sanitary reasons.

The assertion which I am here aiming to draw is that it would not have been possible to arrive to the described conclusion without the foresight allowed by thermal simulations. This is because the architectural situation in question, like

Fig. 2 View of the thermal zoning for studying the solution aimed to the natural ventilation of a house through solar shafts in a high-density settlement of New Delhi. In cyan, a back-to-back row house. In orange, the solar shaft



many others, was not typical, and therefore could not have been addressed by the means of preliminary design methods; which, on the other hand, are very common in informal design settings, where incentives for designers are very low to absent.

3 The Role of Environmental Simulation

The above example reveals a trend which produces strong consequences for bioclimatic design: that the historical phase in which the simplified approaches were deemed sufficient for reasoning about low-cost solutions is coming to an end, because simplified methods do not build a conceptual base firm enough for the risky ground of the new, untested solutions. This is due to the accumulation of errors which each superimposed step of simplified analysis produces (Scudo and Brunetti 2007). This is particularly evident in bioclimatic design that requires a very integrative approach (Citherlet et al. 2001) in which the effect of many synergistic causes and components becomes embodied into one cumulative response.

The consequence of this situation is that today the influence of bioclimatic principles on the design habits of the Global South, unfortunately, is rather limited. This does not mean that the bioclimatic principles cannot be of help for signalling the opportunity of punctual innovations in the conception of construction solutions: which is, on the contrary, the commonest virtuous case, combining advances in the availability of components with advances in knowledge and design habits. I'd like to bring here the example of a project of a school in Dioubeba, Kayes Region, Republic of Mali, designed by caravatti_caravatti architetti, which is being built in this very moment. Its roof features the adoption of a highly ventilated and reflective light-frame roof separated from the rooms by a hanged ceiling. The project embodies technical considerations based on the results of thermal simulations (Fig. 3—I used ESP-r as a simulation tool—Clarke 2001), which showed (Fig. 4) that by adding a layer of thermal mass above the ceiling, plus a radiant barrier

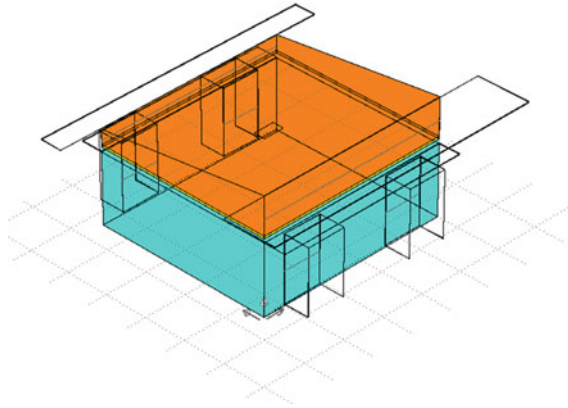


Fig. 3 View of the thermal zoning of a segment of a school in Dioubeba, Keyes Region, Republic of Mali, designed by caravatti_caravatti architetti. Cyan: the room; orange: the ventilated roof cavity

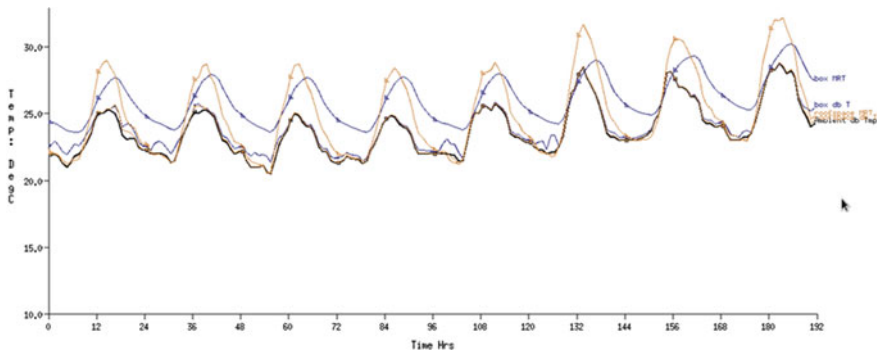


Fig. 4 Dry bulb air and mean radiant temperatures in the rooms (blue) and in the roof cavity (ochre) obtained from the simulation model above for a week of May. (In black: ambient temperatures.)

constituted by a profiled metal sheet on top of it, separated by a cavity, the radiant temperature of the ceiling could be lowered, and the comfort conditions of the room could be improved.

Again, the foresight would have never been possible without dynamic thermal simulations.

The importance of environmental simulation lies in the fact that a designer, for embracing the untested, has to rely on hard facts. The sad news is that the kind of environmental simulations which are usually needed for exploring an informal dwelling in a hot climate are currently among the most difficult that one can stumble upon. This is due to the fact that the problems to be investigated typically involve open and semi-open spaces, space between, mediation spaces and

transition spaces;⁷ the simulation of which is complicated by the fact that defining separate thermal zones in the open respecting the principle of conservation of energy is difficult, because the boundaries between the contexts to be considered are blurred (Kong et al. 2017). As a result, despite the progresses which have been made (Clarke 2015), the simulation of open and intermediate spaces is still in its infancy (Reinhart and Davila 2016), which slows down the pace of the studies regarding design for hot climates.

The existing foundational literature about passive cooling exerts a huge influence on the state of the art of design for hot climates, but, due to the fact that a great part of it predates the appearance of the most novel functionalities of simulation programs, it does not tie many links with thermal simulation. It is not by chance that the architectural design solutions that have been explored less thoroughly up to now are the ones about which the simulation approach was less certain.

A great deal of the challenges left open in this field regards natural ventilation. The most important ones lie in the areas of interaction of the indoor domain with the outdoor domain and of buoyancy-driven ventilation with wind-driven ventilation.⁸ Among the other important open challenges, there are: the effect of the external solar reflections on obstructions outside the thermal zones⁹; the multifaceted aspects of the radiant exchange of the infrared radiation between buildings, the open space and the sky (especially when some enclosures are absent or are transparent to infrareds); the infrared radiant modelling of the effect of solar obstructions; the 3D thermal flows through the ground; the modelling of evaporative phenomena involving absorption from surfaces combined with natural ventilation; and the simulation of courtyard spaces, into which all these issues converge (Safarzadeh and Bahadori 2005; Sadafia et al. 2011). These common tasks can easily put the skills of a thermal simulation expert at trial. It is not that modelling those problems usually requires many thermal zones. It is that it demands firm and balanced opinions about how to circumvent the limitations of the simulation tools.

Of course, the uncertain present of bioclimatic design is far from being entirely due to the vicissitudes of the evolution of thermal simulation tools. So the fact that it may be due to its very principles themselves must be taken into account. Indeed, one may ask: if bioclimatic design is so great, why it is not winning?

⁷Indeed, a passively cooled building is very often “served” by many kind of intermediate spaces (shaded, and/or ventilated, and/or wet, and/or in contact with the ground, and/or in view of the sky, etc.), often so much that even its indoor space may be considered an intermediate context between “outsides”.

⁸This objective seems to be addressed at the moment by the only ESP-r tool (Beausoleil-Morrison 2002).

⁹This objective is addressed by a minority of the main tools in use.

To try to answer this question, we may turn our attention to why solar building design has not won the scene in temperate climates after the peak of interest at the end of the 1970s. The main reason for this is likely to be the already cited fact that at the core of bioclimatic design there is the concept of integration of systems and decision.¹⁰ Now, integration is a rather “soft”, undetermined concept. And cultural habits, in general, need strong drivers to be modified. For temperate climates, that modifier, in the last years, has turned out to be, unexpectedly, not passive solar gain, but conservation of heat by superinsulation (side consideration: coupled to a recourse to mechanical systems!): a concept which originated in the Seventies, when it did not seem more promising than others (Booth et al. 1983).

Until superinsulation entered the scene, low-energy design failed to win the markets in temperate climates. Now, many clues suggest that, similarly, the promise of improving the thermal behaviour of buildings in hot contexts—informal dwellings included—by integrated design alone is too weak a strategy to have a remarkable influence on the course of the main design trends. More powerful perspectives are likely to be needed for making passive cooling more attractive for everybody.

In this framework, the fact that, as said, there are currently rather high entry barriers for the simulation of passive cooling is, in reality, good news, implying that there are still many untapped solutions, which, once integrated in a coherent whole, may be suited to make passive cooling finally too advantageous to ignore, even for low-cost and ultra-low-cost dwellings in the diffuse urban fabric of the Souths of the world.

A short list of the opportunities of which I am aware of, besides the already cited ones of the evolutionary schemes for high-density courtyard houses and of natural ventilation in ultra-high-density back-to-back row houses, is, in no particular order: the integration of wind-driven ventilation (involving indoor and outdoor aerodynamics), stack effect and chimney effect for climatic control (Khedari et al. 2000); the conductive, convective or radiative exploitation of indirect evaporative cooling deriving by the wetting of surfaces (Kant and Mullick 2003; He and Hoyano 2010); the exploitation of selective surfaces and enclosures for shading, or for shading and daylighting (Silvestrini 1980); the coupling of natural ventilation and thermal exchange with the ground (Kumar et al. 2007); the enhancement of low-cost techniques for the exploitation of downdraft cooling (von Zabeltitz and Baudoin 2005); the practical improvement of roof ponds (Spanakia et al. 2011; Pearlmutter and Berliner 2017); the use of redundant and low-cost radiant barriers in ventilated configurations (Miranville et al. 2012; Brunetti 2014); the creation of indoor cool pools thermally exchanging with the ground for the hybrid integration of natural ventilation with air conditioning (Aynsley 1997).

¹⁰Integration is even more important for passive cooling than for passive heating, because in its case more strategies are usually into play.

4 Conclusive Remarks

Accepting that the bioclimatic approach is a powerful tool supporting design requires a leap of faith (not unfamiliar to architects) regarding the fact that reasoning, sketching, calculating and reasoning, again and again, do matters and can really make a difference in the quality of a solution. But this leap is also deeply related to the faith one has to have in the power of abstract knowledge.

With respect to this, I wish to point to the attention of the reader to the following, beautiful quote by Michael Oakeshott (1962):

(...) consider the example of cookery. It might be supposed that an ignorant man, some edible materials, and a cookery book compose together the necessities of a self-moved (or concrete) activity called cooking. But nothing is further from the truth. The cookery book is not an independently generated beginning from which cooking can spring; it is nothing more than an abstract of somebody's knowledge of how to cook: it is the stepchild, not the parent of the activity. The book, in its turn, may help to set a man on to dressing a dinner, but if it were his sole guide he could never, in fact, begin: the book speaks only to those who know already the kind of thing to expect from it and consequently how to interpret it.

I believe that what is more captivating about this quote is that it is at the same time so true and so untrue. The book can be the seed which ignites the “cookness” in the cook, and a great deal of the best things which have happened since the French Revolution onwards are based on the assumption that the book *can* make the cook. Handbooks, criteria, abstract models, abstract formal laws, abstract reductions, and abstract black box calculation tools (like simulation tools) are all tools which are separated from the real things. They are recipes, or about them. But they have again and again proved to work since the scientific revolution. The notorious fact that the industrial revolution has been fuelled more by doers than by thinkers (Singer 1954) may just be due to the fact that the scientific knowledge possessed by the doers back then was enough for pushing the technological frontier forward, and does not necessarily mean that theoretical knowledge was the unuseful part of innovation. If it were not so, a mason at the end of a career would be the wisest of designers, which often is not. But the opposite is also true: if practice were the unuseful part of innovation, the theoretician, after a life of abstract speculations, would be the best of designers; which often is not, either. Some studies suggest that even in societies in which the oral transmission of knowledge related to the crafts is the rule, a blend of practice and theory is today the most effective strategy for the transmission of technical knowledge (Ngowi 1997).

This has a lot to do with bioclimatic design.

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Housing in African Rural Contexts: The Nubian Vault. Opportunities for the Economic Market in the Rural Savannah Environments

Emilio Caravatti

Abstract It is well known that the level of human development of most parts of West African nations is among the weakest of the whole planet. The housing sector, which responds to a primordial necessity, constitutes one of the greatest potential for exploiting resources that are still available and unexplored. The debate on housing issues is today mainly focused on the phenomenon of urbanization, where large megalopolis are fed with uninterrupted streams of populations from the countryside. It follows that most researches on the conditions of habitat ignore the state of rural housing where valuable case studies are virtually absent. An oblivion of research that hides an area of architectural intervention in which there is still a lot to be done. The rural context is a decisive factor for a challenge to which the debate on architecture is also called to respond.

1 Rural Housing in West Africa: General Conditions

The theme of housing in the rural contexts of West Africa is not too often investigated in the academic and architectural discipline. Over 50 years have passed since *Architecture without architects*,¹ where for the first time the “*unfamiliar world of the non-pedigreed architecture*” was introduced. Defining an architecture as *non-formal or non-classified* cannot mean relegating such contexts outside of a debate. Hiding the reason of the absence of such architecture by locking oneself in the simple axiom of spontaneism risks to hide a sort of indifference to these territories; the enormous capability of which should be, rather, revealed by a conscious research effort.

It is well known that the level of human development of most parts of West African nations is among the weakest of the whole planet. An in-depth overview of

¹Bernard Rudofsky, *Architecture without Architects*. Museum of Modern Art, New York, 1964.

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the phenomena and causes of this situation can provide important insights into different, possible policies, not only regarding housing, but also aimed to a more penetrating reflection on the factors that manage and produce the current global scenario.

The challenge for a decisive turning point in the development of an entire continent can also start from here.

The prevalence of design techniques imported by European schools since the colonial period to today have for sure concealed and compressed the evolution of local knowledge and set the basis for the proliferation of a widespread Western hegemony in the construction of the cultural process regarding architecture. Likewise, the debate on housing issues is today mainly focused on the phenomenon of urbanization, where large megalopolis are fed with uninterrupted streams of populations from the countryside. The city as a magnet absorbs and concentrates its attentions. It follows that most researches on the conditions of habitat ignore the state of rural housing. Valuable guidelines or case studies applicable in such contexts are virtually absent.

On the contrary, the rural context is a decisive factor for a challenge that is still possible. The oblivion of research on the theme of habitat hides an area of architectural intervention in which there is still a lot to be done. This has been until now mainly a territory of individual architectural episodes and design exercises, rather than structured experiences about long-term prospects or well-rooted actions within communities.

The causes of the deep situations of crisis which is common to much of the continent are many and well known. The backwardness of farming methods, the strong demographic growth, the evident consequences of climate change, the lack of basic infrastructures, as well as the fluctuation of local product prices on the international market are linked to a logic of dependence on external markets. To succeed in activating culturally aware development processes in these territories, managing to develop some sectors by diversifying productive activities is necessary, as well as—above all—focusing on activities involving the participation of particularly vulnerable population groups.

The housing sector, which responds to a primordial necessity, constitutes one of the greatest potential for exploiting resources that are still available and unexplored. The cases of the Republic of Mali or Burkina Faso, where, as a design group, we have been pursuing architectural experiences for over last fifteen years, sampled in this article, are a partial, but clear testimony of that.

A reflection on several issues related to living is here necessary, especially with regards to issues like the promotion of local building materials, the development of affordable techniques, the professionalization of the informal house market, the collection and coordination of the indispensable potential of the rural context. This is a challenge to which the debate on architecture is also called to respond.

2 Rural Housing: The Rural Construction Market in Mali and Burkina Faso

Strong economic dependence Some data to define a concrete scenario. The rate of growth of these nations fluctuates between 2.5 and 3%, and by 2030 the current 30 million inhabitants are expected to have grown of about 45%, reaching over 45 million inhabitants. Considering that currently a middle-sized household uses materials such as cement for masonry or metal for roofing, the degree of dependence that importing such materials will produce for these nations in the years to come is incalculable.

Many open issues. How to provide houses for all these people? How to respond to the need to build adequate infrastructure and schools and services suitable for the population growth? Will these countries be able to face those needs with imports of materials as massive as the ones with which today they aim to satisfy the demand?

Absence of policies and processes The scenario of housing in rural contexts is related to factors which are far from the logic of large-scale programming or induced by exogenous processes. There, the construction activity is characterized by aspects consolidated over time, based on respect for traditional practices and authorities. Building experiences are mainly carried out through self-construction, using methods well adapted to the sociocultural, climatic and safety needs of each population during the centuries. More than 60% of rural dwellings are built with precarious, provisional material. This on the one hand induces the populations to maintain the social traditions of care and responsibility toward the artifacts, but, on the other hand, raises the problem of the often indiscriminate use of the few available resources. (The use of wood for building and cooking is one of the reasons of deforestation in these areas.)

Status and comfort Overcoming the housing precariousness and improving building comfort are objectives suitable to encourage the development of unexplored techniques and markets today.

The cost of materials and the social status related to them are today major obstacles for the creation of more efficient and stable houses. If at our latitudes an earth building is synonymous of living comfort and only imaginable for a culturally advanced type of inhabitant, in developing contexts, earth as a building material is instead considered a mark of poverty. Which opens the way to a reflection about the viability of the use of local materials, and about the competitive relationship between quality and price; but also, about the suitability of social status as an indicator for the choice and type of use of materials.

Organization In traditional Western African societies, seasonal cycles rhythm the activities of the communities. A traditional society responds to the two basic needs of nutrition and inhabiting following the natural cycles. The precariousness of the rural context is closely related to the climatic variables. The wet season is dedicated to agriculture, and the dry season is predominantly dedicated to construction

activities. The social organization, assembled around the authority of the village, uses community tools for the realization of community works and for the maintenance of the main infrastructures. Even in works aimed to individual families, the intervention of the community is decisive with respects to several scales and needs—in agricultural works as well as in the production of bricks.

Characters A reflection on the potential of a rural construction market has to be based on elements which are often not found in other contexts.

The absence of professionals in architectural design, for example, leaves the construction of a building under the direct responsibility of the builder. In that situation, the mason sums up the role of entrepreneur and architect, who also has the power of choice over the general plan of a building. Often the supply of materials is the responsibility of the customer. As a result, finding the repetition of models very similar one with another is common, and often those models are adopted after having been previously used in other occasions by the builder or the customer. It follows that the influence of professionals on the local market is often confined to an even smaller scale than the single village. The diffusion of professionalism in the construction field is made difficult. On the other hand, it is likely that triggering market processes within these contexts would result in the development of interesting economies of scale.

Potential Many positive aspects exist which may turn out to be capable of triggering processes of culturally aware development. The social fabric of the village communities is structured according to secular traditions of social organization. Their implementation processes are shaped for respecting the community rules and are set on mutual solidarity. The close relationship between social organization and the construction world makes these processes, for example, very economical, because they are linked to the context in which they are realized.

On the one hand, the city is now devoid of the ability to absorb work; but in rural areas, on the contrary, labor is still an important value, linked to the inherited knowledge of places and the potential of agriculture. There are unexplored capabilities in these territories. Examples of this potential lay in the increase of crop production and the use of natural resources. These facts could bring decisive benefits for contrasting the dependence on the laws of the international markets. The promotion of the local product, its proper positioning on the market, its diffusion, may be decisive factors for relieving the dependence from international markets.

Dominating in the background, there is the fact that the objectives and main themes of the economy should be the struggle against poverty through creation of jobs, the enhancement of natural resources, and the creation of balanced local markets targeting the specific needs of these contexts. In this sense, the house market, its structure, the struggle for the precariousness of living are effective levers that can be pursued by strengthening the professional skills and by improving the production and construction techniques which are being adopted.

3 Materials and Appropriate Techniques

In the last fifty years, colonization, urbanization, and the monetization of relations have changed the construction sector even in rural areas, where full autarchy and the use of local materials are today often replaced by methods and materials coming from the global market. It should be noted that in the sub-Saharan region the use of concrete as a construction material for residential buildings takes place for about 80% in urban areas, while in rural areas the so-called “*en dur*” dwellings do not currently account for 3% of the total. There is a huge but substantial disparity in how much “global” materials are used, despite the great diffusion of metal sheet roofs. There is a lot of opportunities for improvement in the organization and management of the informal markets in rural areas.

From local materials to affordable materials Local material is a concept that appeared during the 1950s within the current vocabulary. Depending on the interlocutor (a professional, a builder, an association), the term has taken different shades. Whether it is a locally available material, or produced from resources within the country, or it contributes to a positive impact on the economic balance, the term has been obsoleted by the definition of appropriate material that better suits the different situations it was called to define (rural self-construction or conventional urban context). Instead, it is more effective the term “affordable” as an evolution of the term “appropriate,” for the cases where it is possible to use materials that are compatible with the context, suitable for on-site technologies, and which are readily affordable and developable. The distinction may appear sterile, but it is decisive for revealing the presence of commonplace in the cases where a construction material or technique is considered unsuitable for being “universal,” for the only fact of being linked to a specific context.

Affordable materials and techniques are terms that do not require a rigid endogenous logic. However, their strong or broad compatibility with the context makes them elements that can be developed by local populations, that can make them open to wider horizons, and free them from a dimension of autarchy which is incompatible with the rule of the markets, which is imposed on other scales. With the term “affordable,” the ground of debate opens up to greater capacities for contacts and relationships with the surrounding contexts, as has always been the case in human history, due to the human nature. They are materials and techniques that fit their characteristics to conditions and perspectives which are similar to that of the contexts of origin without necessarily being self-contained, in a perspective of true sustainable development.

The roof as an architectural decisive element Particularly crucial is the theme of the roof, which is where most of the main technical problems are concentrated and where a great part of the symbolic value of a house resides. The first strategy for improving the condition of roofs for housing is the replacement of traditional roofing components with more modern solutions, while integrating in the choice considerations regarding the durability of materials, their availability, and their quality (e.g., by taking into account the issue of deforestation).

In rural areas, the house considered a simple shelter for the night, useless during the day, not worthy of climatic considerations. These considerations in many cases drive the builder toward the use of metal sheet roofs, raising no consideration of the negative effects of this choice. A foreign origin, so often synonymous of a very low thermal and acoustic comfort, requires the capacity of purchasing within formal markets and financial liquidity; while the rural population, predominantly composed of farmers, revolves around an economy based on the exchange of products in the weekly market and operates in situations in which it is difficult to turn labor into money. The expenses for these materials fall within a larger-scale macroeconomic system without creating an added value of the kind of an increase of the employment rate or the development of a local economy.

This is a real problem for development at the national scale.

In spite of the awareness of the disadvantages and the very high costs of profiled metal sheets, the choice of the builders most of the times goes in that direction, probably due to a lack of a real alternatives for meeting the requirements of constructive durability and social status.

It should also be noted that even architecture as a discipline has never contributed much for investigating on this subject and has not yet developed viable alternatives. In rural areas, there still currently are no replicable standard solutions; and technological innovation often does not consider the use of local materials as a priority, with that ignoring the option of focusing on affordable techniques using low-cost materials and locally available professionalism and profiting from experiences in homogeneous contexts (Fig. 1).



Fig. 1 N'golofalà_Republic of Mali Nubian Vault private house. *Photo credits:* All pictures are made by caravatti_caravatti architetti

4 Rural Housing: A Possible Solution, Process NV

Appropriate rural solutions exist and are being developed far away from architectural debates, opted for at the local scale, with the objectives of professionalizing and adding value to the constructive processes and of linking deep existing knowledges to the contexts of their applicability.

In the following section, we are going to analyze the case study of the technique of the Nubian Vault (NV), which adopts principles and criteria that can specifically be integrated into the way of life and learning habits of western rural populations of sub-Saharan Africa.

Using earth as the only building material, the NV offers concrete responses to the market of importation materials and to deforestation; and, above all, it forms the basis for a logic of self-development relying on the value of emulation and on the principles of self-construction, which are deeply rooted in such contexts.

The system is based mainly on the training of personnel and on on-site experience. A training program exists that tends to the autonomy of the trained professionals, so as to favor the capacity of self-advertising of the technique. It is a program that aims to disseminate knowledge and professionalism as an alternative to the simple "*promotion of local materials.*" It is a process mostly linked to the development of labor and adapted to the requirements of the local economy.

The experiences illustrated below show the principles and processes of the Nubian Vault Association (AVN) founded in Boromò, Burkina Faso, at the beginning of the 2000s by Thomas Granier and Séri Youlou.

AVN's mission is to improve housing conditions by the means of an appropriate architecture. In sub-Saharan Africa, the struggle to obtain decent housing plunges millions of families into a vicious circle of poverty. AVN organizes the training and support of local Nubian Vault (NV) builders and entrepreneurs to promote the NV solution on a large scale, with the aim to developing a self-sustaining market sustained by the NV construction technique.

The idea is that a result of the application of this construction strategy, families can acquire affordable, sustainable, and decent housing, at the same time improving their economic conditions, their quality of life, and their environment.

AVN offers a solution to this problem on the basis of three integrated concepts: A ROOF, A SKILL, A MARKET.

Here below, the highlights on which the process is structured are transcribed, by courtesy of the Nubian Vault Association.

Appendix: The Nubian Vault. Criteria—By the Nubian Vault Association²

A Roof: The Nubian Vault Technique

The Nubian Vault technique is based on an age-old method of timberless vault construction, originating in Upper Egypt a region at the same latitude as the western African territories on which this article is focused.

The Nubian Vault construction method is:

Ecologically sustainable	using neither corrugated iron roofing sheets, which are expensive and difficult to recycle, nor timber beams, rafters, or supports.
Carbon neutral	none of the building materials need to be manufactured or transported long distances, nor do any trees need to be cut down.
Economically viable	locally available raw materials (earth, rocks, and water) are used, thus favoring local economic circuits and self-sufficiency.
Comfortable	due to the excellent thermal and acoustic insulation properties of earth construction.
Durable	NV buildings have a far longer lifetime than those with corrugated iron and timber roofs, and maintenance is simple.
Modular	it can be used for a wide range of buildings (houses and public infrastructures) which are easily extendable.
Appropriate	AVN's simplified and standardized version of the technique has been adapted to the climatic conditions and traditional know-how of the Sahel region, making it easy to learn on-the-job.

A Skill: NV Masons

The majority of trained NV masons collaborate with AVN, exchanging ideas and information about the market, clients' needs, and potential apprentices, both informally, and at formal congresses arranged by AVN each year. Some of them go further, getting involved as extension agents promoting the VN technique, for which AVN then provides compensation. Apprentices are chosen from the local population: The selection is made by the local community in collaboration with

²Source courteously by <http://www.lavoutenubienne.org/>.

experienced NV masons. Apprentices progress from laboring work, to making bricks for the vault, to observing and assisting experienced masons in the skilled work of vault construction. Depending on the level of commitment and the starting point of each apprentice, it can take one or two construction seasons of on-site apprenticeship before an apprentice began able to build a vault.

There are five, progressive, classes of NV apprentices and masons, all of whom are trained on actual NV building sites:

- C1 apprentice
- C2 advanced apprentice
- C3 mason, able to build a vault
- C4 foreman, able to supervise a construction site
- C5 builder-entrepreneur, able to negotiate with clients and supervise several sites

The rate of recruitment and training of apprentices is one of the main factors affecting the growth of the Program. At the end of their apprenticeship, and with the support of AVN, newly trained masons are encouraged to start engaging with clients, and to market their skills to new clients in the locality. Masons who have reached the level of site foreman (C4) or entrepreneur (C5) are entirely responsible for their construction projects and for the salaries of their masons and apprentices.

By the end of 2016, through the Earth roofs for the Sahel program:

- 600 builders, entrepreneurs, and masons had been trained;
- 300 apprentices were working alongside them;
- 830 villages with at least one Nubian building.

The trained and experienced NV masons have no difficulty in finding clients and marketing their skills, as the demand for new NV constructions is currently outstripping the supply of skilled builders. And quite a few of the more ambitious NV builders and entrepreneurs are working on AVN pilot projects outside the Sahel (Zambia, Madagascar, Rwanda, etc.).

A Market: NV Housing

AVN's mission is to promote the Nubian Vault, for as many beneficiaries as possible. To do this, the Association first trains and guides extension agents to "pump-prime" local markets, starting from a base of pilot villages, evolving into pilot zones, and then into entire regions. The pump-priming process starts with the identification of local "champion" and supporters and the running of promotional meetings at village level.

Objective over the next years is to promote national self-sustaining markets in NV housing by multiplying local, regional, and national initiatives through creating regional centers and setting up franchise partnerships with other NGO's and development organizations.

Fig. 2 Mud bricks. *Photo credits: All pictures are made by caravatti_caravatti architetti*



The majority of AV's resources ($\sim 80\%$) target our main priority groups of "bottom of the pyramid" families surviving in an informal economy in rural and semi-rural sectors.

By 2016, with an average annual growth rate of 32% since the start of the Program in 2000:

- 2000 construction sites;
- 79,000 sqm realized;
- 25,000 people now use or live in a NV house or building;
- 2,500,000 € generated on the local market (Figs. 2 and 3).

Technical Overview

During the last fifteen years, AVN has successfully introduced a simplified, standardized version of this ancient technique. This standardized NV technique is:



Fig. 3 Mud bricks production. *Photo credits:* All pictures are made by caravatti_caravatti architetti

- roofs are exclusively vaulted (no domes) and can incorporate a traditional flat roof terrace;
- vaults are a standard width (3.25 m), made from mud bricks of a standard size;
- a guide cable is used to define the curvature of the vault;
- walls are a standard thickness, and openings for doors and windows a standard size;
- plastic sheeting is incorporated in the roof to reduce water penetration and erosion.

The major cost element in using the VN method is labor, often provided by family members and neighbors on an exchange /barter /self-build basis, thus keeping cash in the local economy; the raw materials (earth, rocks, water) are locally available and ecologically sound; construction with mud bricks and mortar is traditional in the Sahel region—the innovation of vault construction can easily be incorporated into existing practice.

Building a Nubian Vault house Learning to build a vault, however, is a skill that can only be acquired through experience on a NV building site. Timing is crucial: Construction can only occur during the dry season (September–May in the Sahel) and must be completed before the seasonal rains start. Fortunately, the dry season is also the time when there is little agricultural work to do in the village fields, and men are available to help as unskilled labor or to train as apprentices.

Obtaining building materials Advance scheduling of the sourcing of building materials (earth, water, rocks) and the making of the mud earth bricks is essential: Ideally, when the team of NV masons arrives to start work, the rocks for the foundations, the water and earth for the mortar, and the bricks for the walls should all be ready and on-site. Any delays here will not only cause problems between mason and client, but also run the risk of being unable to complete the house before the start of the next rainy season.

The foundations Depending on the properties of the ground and the site of the building, foundations can vary from 40 to 80 cm deep; they need to be 70 cm wide for load-bearing walls and around 50 cm wide for the gable walls. They are filled with rocks, bound with an ordinary earth mortar. In sites where there may be strong flows of surface water during the rainy season, the foundations should be raised 10–15 cm above ground level.

Load-bearing walls Load-bearing walls which carry the vault are 60 cm thick and are made up of rows of super-imposed mud bricks. Each course is made up of a row of bricks laid lengthwise alongside a row laid width wise, using an earth mortar. The orientation of the bricks alternates with each course.

Recesses and openings are built into the thickness of the walls (doors, windows, cupboards, alcoves, and shelving). These are headed with arched lintels (built over oil drums as a temporary support); their use can be modified according to the needs of the owner. These are built before construction of the main vaults starts.

Gable walls “Gable walls are built in courses of bricks laid lengthwise and are around 40 cm thick. They are raised so as to lean slightly inwards (by around 1.5 cm for each meter of height).

Construction of the vault Flat bricks (24 cm × 12 cm × 4 cm) for the vaults are made in advance from good quality earth, such as that traditionally used for building granaries.

No formwork or shuttering is used to support the vault during construction. The mason, using a mortar made from the same earth as the bricks, starts the vault by laying the first courses against one of the gable walls. A cable is stretched between the two gable walls, at the height of the base of the vault. This defines the central axis of the vault, and a cord fixed to a sliding ring on the cable acts as a guide to ensure that the mason maintains a constant radius for the vault. Toward the top of the vault, the mason adds a couple of fingers width to each joint to develop an ogival (catenary) shape.

Buttresses are formed on the completed vaults by raising the side walls by 8–10 courses of large bricks, and by filling the gap so created with plain earth. The height of the buttresses depends on the client’s needs—many prefer to raise them high enough to make a flat roof terrace over the vault (and the flatter the roof, the more resistant it is to erosion during the rainy season).

Finally, the roof is waterproofed, using plastic sheeting (locally manufactured, costing around 0.60 €/sqm), over a smooth coat of mud mortar. The sheeting is then covered with a rendering of enriched mud mortar (using traditional adjuvants),

Fig. 4 Nubian Vault construction site. *Photo credits: All pictures are made by caravatti_caravatti architetti*



which both protects the plastic from damage by the sun, and provides additional protection against heavy rains.

External walls are composed on earth brick walls, to use a thin cement rendering (very common in the Sahel regions), or a mix of tar/sand/earth/lime, which gives a very attractive finishing coat.

Regular maintenance and re-rendering with enriched earth mortars is in fact sufficient to guarantee the durability of the buildings.

Interior finishes Depending on the resources and the tastes of the owner, various options are possible. Colored or plain lime washes are inexpensive to apply to the interior walls and help to reduce insect infestation. Installation of an electrical supply during construction is straightforward as well as interior showers, tiling interior or partition walls (20 cm thick) can be fitted.

The roof Clients wishing to reduce regular maintenance to a minimum can, as an alternative to enriched earth, use a final rendering coat of thin fibro-cement mortar over an earth base. It is advisable to wait one year after construction before doing this, to allow for any settlement to occur (Figs. 4, 5, and 6).

Fig. 5 Bolmò_Republic of Mali Nubian Vault interior.
Photo credits: All pictures are made by caravatti_caravatti architetti



Fig. 6 Ngolofalà_Republic of Mali Nubian Vault. *Photo credits: All pictures are made by caravatti_caravatti architetti*



National Public Primary Schools Strategic Planning: A Key Factor to Ensure Quality Education Enrollment in Developing Countries

Luca Bonifacio

Abstract The lack of proper, adequate, and accessible school facilities represents one of the main reasons of student dropout in most developing countries (UNICEF and MDG-F 2011). Indeed, if a school is easily accessible and is able to provide an inclusive, safe, healthy, and stimulating environment, students will more easily attend and learn. If not, sooner, or later, they will give up. This is true especially in rural areas, where today still more than 30% of the children do not attend primary school, mostly because they would have to walk for hours to reach a remote, overcrowded, inadequate, or unhealthy learning environment. Because of the utmost importance of this issue, humanitarian organizations (HOs) normally invest vast parts of their resources to tackle this problem. HOs aim at expanding and reinforcing education infrastructure networks either directly or jointly with local governments. UNICEF alone invested more than three hundred million dollars per year in school construction only (UNICEF 2016). Nevertheless, school construction is usually among the most unsuccessful and controversial sectors, with very low impact on the enrollment rates and high costs for involved agencies and NGOs. This is caused mainly, as it will be explained in following paragraphs, by the overall lack of adequate policies able to tackle the issue from a strategic point of view. In other words, national school construction programs are still very much focused on the stand-alone outcome, the school itself. To this date, national plans do not appear to tackle the processes and tools necessary to ensure that the school network as a whole is properly designed and functional. This article will explore the issue of lack of strategic planning, starting from the current state of the art to analyze current common practices along with their limitations. Finally, this contribution will attempt to highlight some of the core matters that, in the author's opinion and experience, should be the key steps in a new, more strategic, and efficient approach for primary education infrastructure development.

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1 The Issue at Stake

Existing policies are most of the time not present, or, when they exist, they are inadequate. At the core of the issue, there is a chronic scarce interest by national governments in education.

As a data point that highlights this situation of distress, only 14% of national expenditure is devoted to education, and the trend appears to be uncertain (World Bank 2017).

Other factors also have a heavy impact:

- (a) Primary schools construction programs are complicated to manage. Having a national plan implies highly qualified, cross-sectoral managerial and technical skills that most of the times government lacks.
- (b) Governments typically focus their efforts at the central level on higher education, delegating the management of primary schools at the regional, local level.
- (c) Allocation of land plots is a highly sensitive issue, causing conflicts of interest and speculative interference.
- (d) The construction industry is among the ones with the highest exposure to corruption schemes.
- (e) Normally, there is more interest in new construction rather than maintenance and renovation. It is considered easier to build a new school than to repair an existing one.
- (f) Political agendas can strongly entwine with school construction programs. Furthermore, the construction of schools might be used as a propagandistic tool, which clearly undermines the core ethical value of the efforts.

As a result, without accurate and thoughtful planning, the few resources which are indeed invested are simply invested unwisely. A clear indication of this issue can be seen in the distribution of schools over a country's territory: Some areas show a strong overlapping of schools, while others are just left uncovered, forming vast gaps in the national school networks.

2 State of the Art

The established policy tool currently used to tackle the issue is commonly known as a “norms and standards” (N&S) document.

While N&S represents a widely adopted practice in many countries, the nature and content of these documents vary strongly from case to case. Some merely approach the matter from a juridical–legal point of view, while others are much more technically-oriented.

Legal-oriented N&S usually provide a guideline for a specific regulation. These documents, at a fundamental level, list all the necessary requirements for a school to be recognized as such. They might go as far as defining the number, type, and size

of rooms which are to be built, students to classroom ratio, or other similar basic requirements, but they do not go deeper into the problem. Most developing countries implement this solution, with examples of such systems found in Brazil, South Africa, India, and more.

More technically-oriented N&S might instead become fully fledged “manuals” that go beyond mere legal requirements. Indications might be given with respect to the best way a school could and should be designed and built, providing examples, specifications, and technical details. The case of Peru, Indonesia, and Kosovo, among others, are good examples of this more thorough approach to norms and standards. As a global reference, it is also worth to mention the Guidance Note for Safer schools, written by the INEE and the World Bank (INEE and World Bank 2009). The cases of Mali (Ministere de l’Education Nationale du Mali 1990) and Bhutan (Spiegeleer 1986), instead can be taken as edge cases, having their norms and standard document transformed in an architect’s remarkable hand-sketching exercise on the topic.

Finally, there are some cases in which such tool becomes nothing else and nothing more than a collection of “blueprint” designs to be slavishly and blindly applied. Such a trend is clearly seen, among many cases, in the Angolan standards version 1994–2010 and Myanmar standards currently in use. In both cases, the author was involved in their repeal and replacement. These types of documents, in the author’s opinion, are perhaps the most insidious. Indeed, they dangerously prevent the necessary and fundamental exercise to plan and design with attention to the specific geographical, climatic, and cultural context. They represent, by any definition, a total breach of the most basic deontological code that an architect should follow.

Regardless of their orientation, N&S usually are extremely weak with respect to the strategic planning. Indications about how many and where schools should be built are few and mild. On top of this, no link to economic plans nor overall aspirations and goals is provided, which makes most of the times N&S quite a theoretical exercise. They might go as far as to identify basic parameters necessary for territorial planning, such as a number of schools per family and maximum distance that a student should travel each day (competency radius) but, again, they rarely go further than this. These exercises are often abstract, generic guidelines which get simply disregarded in practice. Analyzing further the idea behind the competency radius, for instance, reveals how the tool quickly becomes useless if not applied to the specific context. As an example, a badly connected mountainous area has dramatically different traversal times than a city, or even a developed countryside.

This plurality of contents and approaches defines the current state of the art. The common ground among them, however, is that these documents are detached from reality, referring to an ideal “network” of schools made by new interventions. These, in the end, provide a perspective on how each government wishes their schools to be like and not on how, based on the real scenario, the network can be improved and expanded.

3 Innovative Approaches and Their Limitations—The Child-Friendly Schools (CFS) Experience

UNICEF launched in 2006 the Child-Friendly School (CFS) program (UNICEF 2009). The program sets as a goal to stress some key innovative factors, among which the quality of spaces that was mentioned above.

The CFS philosophy is based on six key principles. According to the CFS, schools should be:

1. Based on child rights
2. Safe and protective
3. Sensitive to gender (and disability, as added in the Angolan version of the N&S document)
4. Providing quality education
5. Encouraging community participation
6. Healthy and hygienic

Since 2006, these initiatives have been implemented in many countries by UNICEF in partnership with local governments, promoting awareness, and establishing pilot experiences.

However, only in few specific cases UNICEF was able to be involved directly in the writing of the National N&S. Where this has been done, the CFS principles could be incorporated into the final documents, establishing relevant backgrounds and innovations. Rwanda, Angola, and partially Laos are examples of such kind of collaboration, with Myanmar also following the same trail.

Key contributions of the CFS program include some reflections:

- Schools are considered *de facto* as a pedagogical tool. The way spaces are conceived influences and supports directly the teaching.
- A school is not a stand-alone building but represents an enclosed safe environment formed by an interconnected sequence of outdoor and indoor spaces. Therefore, classrooms in a strict sense, as well as courtyards, toilets, and multi-functional spaces are all treated as equally important and vital for the proper functioning of the school.
- A school without adequate toilets and water supply cannot be classified as a school. This follows the main international guidelines in a matter of basic sanitation. This not only ensures a baseline health and hygienic standard, but is also considered a key component of the pedagogical program. Students are taught how to use toilets, how to take care of their personal hygiene, how to win stigmatization, and issues of gender and disability.
- Schools are focal points for the communities. They constitute a social aggregation center: open, neutral, safe. People belonging to the local community can gather there and organize educational activities beyond the official opening hours. Most importantly, however, schools have to be able to fulfill their role of community “safe spots.” This is true not only in developing countries but

throughout the world: in case of natural calamities or social unrest, school buildings represent the space where the community can gather and find shelter.

In order for these reflections to become reality, however, the local community should be involved throughout the lifetime of a school, from its design to its construction, and finally its upkeep. Schools must be viewed as more than a mere governmental facility.

As a milestone, Rwanda was the first country to adopt norms and standards based on the CFS approach (Rwanda Ministry of Education 2009), with the document ultimately approved in 2009 after being iterated through the local administrative procedure.

Key contributions of this document include:

- Full adoption of all six CFS principles.
- Focus on sustainability. Schools are built with the goal of being simple, organic buildings, keeping a close eye on the construction process itself, with the goal to optimize it as much as possible.
- The document also foresees a series of tools to assess and monitor based on a bottom-up approach.

However, in this case, as well, the planning component is lacking specific, clear indications.

Despite this limitation, the document was extremely successful with a positive impact on the network, measurable on a radical increase in the quality of education and enrollment rates especially in rural areas, and today is globally considered as a reference.

As another example, in the case of Angola (UNICEF Angola 2011), the national N&S was developed starting from a census of existing buildings carried out by UNICEF itself in 2008. This simple but fundamental approach helped to shape a more accurate strategy. Furthermore, it provided all the necessary operational tools to establish the network and its management, including the necessary protocols.

This document was also structured on the six key CFS principles, including technical matters as well as planning issues, emphasizing not only construction but also restoration. Unfortunately, this project could not be developed further, as the local Ministry of Education failed to push the document for the final approval.

4 A Proposed Solution

Despite best efforts made to comply with the CFS guidelines, many aspects still need to be addressed about the development of clear and effective policies. Some key points on current policy implementations provide some reflections that show how policy could be better developed. Current policy has the following shortcomings:

It focuses too much on the what (building schools as an artifact) rather than on the how and its relevance. How does a school work? How does it interact and network with other schools in the national and local territory? These questions are still largely unexplored.

- It does not provide clear indication of the management structure that should be put into place to ensure a correct and functional administration of schools (i.e., operation and maintenance manuals).
- It does not provide a formally structured assessment of existing buildings and their functionality level.
- It does not give a detailed evaluation at a local and regional level of key indicators such as population density, critical areas, and other specific requirements.
- It does not explore key cross-sectorial retro-feed implications (i.e., budgetary allocations, education goals).
- It does not evaluate the financial implications of a national upgrade and expansion plan for schools.
- Gives little to no consideration for the fundamental issue of maintenance, monitoring, and follow-up.

Because of these limitations, a radically new approach should be adopted.

As a reference, the following key points should be addressed:

1. Develop a simple ranking or rating system to evaluate existing schools as part of a national inventory.
2. Carry out a comprehensive, detailed mapping and assessment of the existing school system(s) giving a ranking to the level of conformity of each site. Such exercise is today extremely viable due to the digital tools available. The experience undertaken in North-west Myanmar in 2016 following Cyclone *Nargis* (2008) can be taken as a reference.
3. Establish an independent management system with its own policies and procedures and allocate necessary resources. The system should be linked or embedded in the Ministry of Education.
4. On the basis of assessment outcomes and adopted guidelines, develop a national Master Plan (MP) able to clearly envision and strategize the primary school network as a whole. Such a plan needs to be developed using geographic information system (GIS) applications, integrated with comprehensive layers of geographical data (i.e. population density, levels, soil conditions, key infrastructure provision, exposure to specific natural risks, etc.).
5. The MP should include clear and specific financial evaluations and be linked to Ministerial budgetary plans.
6. The MP should not be viewed as a fixed, closed black box. Instead, it should be able to improve and gradually phase upgrade plans for existing infrastructure (i.e., establishing rating systems to be reviewed on regular basis).

7. The MP should be able to identify aspects that require “hi-tech,” national-level solutions such as the development of new infrastructure, and others that can imply “low-tech” local-level solutions such as roof maintenance.

In conclusion, HOs should shift their main focus from the mere implementation (either direct or indirect) to the policy-making level, ensuring national governments are able to establish the necessary framework and tools to evaluate, assess, and manage school infrastructure. In a way, this provides to the local population, as the adage goes, “The fishing net rather than the fish”.

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The Tourism as Local Development Leverage: The Restaurant/Guest house of Olga's and the Professional School YCTC in Livingstone, Zambia

Lidia Diappi

Abstract The paper illustrates a project which is much smaller in scale compared to the large aid international programmes which aim to provide valuable benefits in terms of health, education and population well-being. Nevertheless, even small initiatives, like the one presented, can have significant positive impact on local development, because they can be replicated by the indigenous population and are sustainable. These projects are deeply embedded in the local context; they originate from specific contextual needs and aim to improve the well-being, using local resources and tapping on local potential. According to this logic, Olga's Italian Corner is a project that aims on one side to foster educational development and on the other side to find ways to support financially the activities of the Youth Community Training Centre (YCTC). In addition, the guest house of Olga's which is a small structure with good quality standards can become a family model of tourism facility in areas with high tourism potential like the one analysed in the present paper.

1 Introduction

What does “development cooperation” exactly mean? It is mission to transform on a long-term basis a community, transferring professional and economic competencies in the course of a fixed-term intervention.

Cooperate requires to solve the problem of creating competencies and structures which can last in the long term. This means that these initiatives should not only be self-financing when donors' support comes to an end, but they should also be flexible enough to adapt to future changes and develop further.

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This is the objective that we have set when designing and implementing this initiative. It is nevertheless clear that other components contribute to the success of a development cooperation initiative.

Another significant component concerns a specific and clear focus of the objectives and the analysis of the local context. The initiative has to be tailored to the needs and resources of the local community. It should not be assumed that the greatest contribution to the improvement of local conditions should come from external inputs. Indeed, the rediscovery of local natural resources, better known and managed, the setting of smaller and more realistic objectives, the launching of initiatives that originate from the understanding of local people and their experiences could make projects more efficient and sustainable.

Being aware of all these important conditions and objectives, we illustrate below the experience of the YCTC and Olga's Italian Corner, starting from a brief description of the spectacular geographical context of Livingstone.

2 The Project Area: Livingstone and the Victoria Falls

Livingstone is the ancient capital of Zambia at the time when the country was named North Rhodesia. It is a tourism centre on the Victoria Falls and a border town with road and rail connections to Zimbabwe on the other side of the Victoria Falls. It is an historic British colonial city with nice buildings art deco; its present population was estimated at 136,897 inhabitants at the 2010 census. It is located along the Zambezi River, which represents a natural border with the neighbouring countries and defines the margins with Namibia, Zimbabwe, Botswana, Zambia.

In addition to the falls, 40 km far from Livingstone there is the Chobe Natural Park and 70 km, the Okavango Delta, both in Botswana.

Livingstone is therefore at the crossroad of very interesting natural attractions and has a great potential in terms of tourism development. It should be noted, however, that in order for the local population to tap into this potential it is necessary to reinforce their technical skills for the creation of structures and reception facilities in line with tourists' demand.

The hotel structures in Livingstone and in Victoria Falls, the neighbouring town in Zimbabwe, are five-star hotels, generally owned by foreign capital, mainly by South Africans.

In turn, the economic impact of tourism on local community concerns mainly employment and not hotel revenues or consumer goods' sale given that they are purchased from abroad.

Technical training for the youth is therefore the overall objective of the project which has motivated the Diocese of Livingstone and the NGO CeLIM of Milano to set up in the 2000 the technical and vocational school YCTC. In order to make the YCTC financial sustainable and to allow its development, it has been necessary to add additional activities which have generated revenue and contributed to local development. They will be illustrated below.

3 A Short History

In 1999, NGO CeLIM with the Diocese of Livingstone grounds the professional school YCTC.

In 2005 Lucia, an Italian OCDE Officer, in charge for monitoring the socio-economic trends of African countries, is informed by the Zambian Authorities about YCTC, defined as an example of best practice.

She flies to Livingstone and meets the local staff and the CeLIM volunteers. Among them, she meets Giovanni, which is working actively for the take-off of the school and its production units. He informs her about the surviving difficulties of the school, given the discontinuity and uncertainty of donors' support.

Giovanni has the idea of building a restaurant with a showroom, displaying the YCTC products, in order to contribute to economic sustainability of the school and enable a greater number of youth in need to have access to training. Indeed, tourism is one of most job-creating sectors, and this area is extremely endowed by nature.

Lucia is very enthusiastic about this idea and shares this vision with her family, which happily donates the money inherited from her grandmother Olga's to help building the restaurant.

Since its inauguration in 2008, Olga's Restaurant has become one of Livingstone's landmarks, thanks to the great management of CeLIM volunteers and its local staff which have progressively gained outstanding managerial and professional skills, so much so that they are managing the restaurant by themselves (www.olgasproject.com).

Building on Olga's success, already in 2008 CeLIM volunteers understand the important opportunity of building an accommodation annexed to the restaurant (to increase the sources of income for YCTC). At the time, they set spacious and comfortable tents in the garden.

However, after some time, they turned out not to be a safe and lasting accommodation. As also the story tale of the three little pigs teaches, a structure made out of bricks was a much better solution for a guest house.

Clearly, the funds Lucia can collect from relatives and friends are not going to be sufficient, so some professors of Politecnico, being informed of the idea, in 2010 submit a funding proposal in collaboration with CeLIM, to the Cariplo Foundation, which supports development and innovative projects. Luckily, the proposers are awarded the grant.

4 About YCTC

The YCTC is a vocational and technical training school for vulnerable youth of Livingstone. YCTC offers vocational training to teenagers, a category often forgotten by cooperation projects, focused mainly on children.

The YCTC is a project oriented to a specific need: prepare for employment/entrepreneurship opportunities.

In Zambia, 30% of the population is illiterate, 1 out of 5 attends secondary school, and among them, only 5% attends vocational schools. YCTC offers an alternative to poverty to hundreds of youth, offering free training to HIV/AIDS orphans. Zambia is indeed among the countries most affected by the HIV/AIDS epidemic. The school creates competences related to tourism whether in the construction of hotel structures (e.g. plumbing, masonry, construction techniques, iron carpentry, tailoring, plumbing, power and electricity), or in terms of capacity building in touristic services: hotel managers, waiters, cooks, computer technicians, catering.

As an additional source of income, the school has set up some production units (carpentry, tailoring and metal workshop), which sell their products to the community of Livingstone and tourists.

The competent teachers, all Zambian, combine theoretical training with practical demonstrations and teach the students how to use machines and appliances available at the school.

Currently, the school has 320 students and 12 teachers. Increasingly, more pupils demand to access the school, and therefore, the construction of the guest house of Olga's has represented an important contribution to make the school financially sustainable and allow to a greater number of youth in need to access to its free courses. In addition to financing the school, Olga's provide training on the job for students. Some of the best graduates at YCTC are now employed at Olga's. The statistics of the school estimate that 80% of YCTC former students found a permanent job (Fig. 1).



Fig. 1 YCTC students during a practical lesson of electric wiring

5 Project Highlights

As stated earlier, the main aim of the project is the creation of the no-profit restaurant Olga's and a small accommodation, in order to guarantee the economic sustainability of the school YCTC, expanding the access to professional courses for free.

In addition to this fundamental objective, other intents and opportunities motivate the initiative:

Olga's Italian Corner generates *occupation*, around 30 employees with different positions and levels, which significantly contribute to the local development. But, in addition to this, many synergies are created among the restaurant, guest house and the school. Indeed, the students of catering and hoteling in YCTC unit have a concrete *training* opportunity at Olga's, staying side by side to the personnel appointed to the different functions of waiter, cook, room service and accounting (Fig. 2).

The restaurant hall devotes a large showroom to YCTC products (wood and carpentry furnishing, bags and clothing); this acts as incentive and selling vehicle for the school products and allows to disseminate information about the no-profit objective of the complex.



Fig. 2 The Olga's Restaurant at night under its thatched roof

In addition to respond to the touristic demand, another aim lies in promoting a change of the local hotel facilities. Our purpose is to fill in the blanks in terms of hoteling models, by proposing an alternative to foreign-owned hotels and promoting small local replicable structures as our guest house. Indeed, this area presents big touristic potentialities, but scanty economic means. Small structures like Olga's guest house can be easily built and sustainable and can be managed by a single family. The investment is limited, as the construction materials and techniques available locally are not expensive and of good quality. Much more important YCTC can provide the professionalism needed to run this kind of business at a suitable standard level.

The partnership between CeLIM, Politecnico di Milano and the Diocese of Livingstone contributed to enrich the project with other purposes and actions.

Politecnico di Milano is a technical university advanced in technology research and experimentation for construction and energy. The building process of the guest house has represented an important moment of professional training and allowed students to carry out an on-the-job training in various sectors of YCTC teaching: building industry, construction, plumbing, power and electricity, renewable energy resources. Moreover, given that Politecnico was the work yard supervisor, it has commissioned and oversight the production of windows, doors, curtains and furnishing to the production units of the school.

The involvement of Politecnico did not limit itself to the design and the supervision of the building works, but it concerned also a didactical activity at YCTC. In parallel with the works, some professors have held different courses. With these initiatives, the university opened up a new route of support and collaboration with YCTC finalized to knowledge transfer and to update the school's curriculum.

In particular, two courses attracted the attention and the interest not only of the students but also of the local technicians, as they concerned crucial points for the local technologies.

- *Construction for hot climates* has tackled some innovations in design and building technologies for hot climate by mean of a revised use of traditional materials (subsoil, lime, straw), which assure improvements in bioclimatic behaviour and an integration and aesthetic valorization of the local natural and anthropic heritage.
- *Solar energies at work: a solar water heater do it yourself*. In a country placed few degrees below the equator, solar energies represent a great opportunity in providing power everywhere in the country, as the lack of electricity or sudden power cuts are the rule in many African countries. The lessons provided an updated overview on the available modern technologies, while the practical applications have concerned the construction of a solar panel based on locally available materials.

The other partners are also contributing greatly. *CeLIM*, for instance, aims to enable responsible travellers to experience authentic preserved destinations in Livingstone. Its basic idea is to change the image of the place provided by travel agencies and luxury hotels, based on pictures of the gorgeous Victoria Falls or the

big five pasturing in the parks. The city indeed presents a lot of humanitarian initiatives of great interest.

The project has intended to promote responsible tourism through a sensitization campaign, travels organizations and advertising material. The responsible tourist may have here an authentic and respectful experience of a world so different from his own, getting in touch with the problems and realities of the local community, taking part to the YCTC life, or volunteering to teach computer courses, English, or playing with children attending the school. The promotion and sensitization activity is still in progress and is addressed to favour its replicability in similar contexts.

The *Livingstone Diocese* proposed the general objective to sensitize the community to the importance of tourism for local well-being and has constantly supported the project, highlighting the importance of its educational and economic impact on the whole community.

This has taken place particularly in various areas of activities of the Diocese: 12 parish, catechesis meetings, educational Diocesan structures (schools and professional centres) and organizations of socio-assistance (advisory bureau, orphanages).

In these contexts, the initiative has been presented highlighting that:

- Zambia enjoys a touristic and environmental inestimable heritage that should be preserved even with educational and formative actions addressed to different age cohorts.
- Tourism holds a great potential and should first benefit the local community; in turn, initiatives of welcome, reception and touristic facilities managed by Zambians should be encouraged.

At least 20,000 people have taken part into one or more of these formative moments.

6 The Architectural Project

The site area lies close to the main street of Livingstone, the Moshi Oa Tunja road, which links Livingstone in the west, with Victoria Falls and Namibia, and in the east, with Botswana. This is the most alive street of the city, full of shops, bar, banks and public buildings. The area belongs to the Diocese, as well as the neighbouring St. Theresa church.

The choice of the type of structure for the building was conditioned by many elements linked to this specific context. The first point concerns the type of guests, which are mainly responsible tourists. Therefore, the need of sobriety of style has influenced both buildings and oriented to choose construction techniques rooted in the local tradition as based on local materials and capabilities.

The restaurant is a brick building, articulated around a main hall, which protects the guests in the rainy season. During the hot-dry season, an external thatched roof

provides coolness and ventilation to the tables, showing the most known image of the traditional architecture.

The need of sobriety has also marked the guest house project. It has been conceived as an essential structure, a simple slab of few rooms, whose form, close to the plot boundary, has avoided knocking down the big trees of the garden. The project, however, even if simple, has introduced some relevant comfort elements such as the large size of the rooms, a thatched roof, the teak wood furnishing, the mosquito nets on the beds and on the windows and the room aeration. Given the efficient cooling and ventilation provided by the straw on the roof, conditioning is not necessary, with an evident energy saving. No television, fridge and, as said, air conditioning have been provided to the rooms.

The amount of budget (USD 100,000) and the area size have limited the project to nine rooms and twenty seven beds, which anyway are sufficient to sensibly increase the profits produced by Olga's in order to finance YCTC.

The school, on its side, with its production units, has been involved in the guest house realization by supplying different products: hollow cement blocks (Construction unit), doors, windows and beds, tables and bathrooms furnishing (wood carpentry unit) and in sewing mosquito nets, curtains and bedspreads (tailoring unit).

In order to raise the awareness of the guests about local culture, a call of ideas for paintings has been organized for the decoration of the rooms. Tens of local artists have participated, and the winners have gained a small amount of money for the realization of the paintings.

The idea behind this initiative is to make the guest house a permanent exhibition of paintings that gives visibility to the local artistic production. The works may be sold to the guests and continually renewed.

The theme chosen "Myths and legends in Zambia" has exerted great attraction of the young local artists. A jury composed by the President of the Livingstone museum, the President of the Livingstone Artists Association, two Professors of Politecnico has chosen the best works.

The award ceremony took place at the Olga's Restaurant and represented an important event for the local community, being published on all local newspapers. The winning painters have exposed the meaning of their works interacting with the audience and opening a lively debate in the presence of local authorities, YCTC teachers and students and local population.

This event has represented an effective occasion for spreading information and bringing the local population nearer to Olga's and YCTC and also to sensitize citizens about the issue of tourism.

7 Olga's Italian Corner Today

The manager's formation was a crucial issue for the sustainability of the whole project.

As said, the cooperation project must have a finite duration, beyond which donors and NGO should withdraw, having set up and enabled the structure to become self-sustainable.

After running eight years of business, the NGO CeLIM has handed over the restaurant and the guest house to the Diocese, which owns and manages the structure.

CeLIM, foreseeing to hand over to the Diocese the structure in condition to self-sustainability, has formed the staff and left written protocols for the different functions (restaurant serving, dishes preparing and cooking, stores and warehouse and room cleaning). For running the business, CeLIM has trained a young local woman, Esther, to become a General Manager, giving her more and more responsibility in relevant tasks. From 2008 to 2015, Esther has been working at Olga's under the supervision of CeLIM volunteers and now is completely autonomous.

Eight years is a quite long period, but is necessary for learning all the skills needed in order to manage the restaurant, the kitchen, the room keeping, the financial accounting, the laws and norms, the staff hiring, training and supervision and the building maintenance.

Today, the General Manager is supported by an Assistant Manager, who can substitute her in case of necessity or for administrative work.

The Olga's staff is composed now of 27 people, 18 of them are former YCTC students. Moreover, at least three YCTC students are always practicing at Olga's. All are Zambian. Both General Manager and Assistant Manager are women. Also, the staff is equally composed by women and men, with the aim to favour women empowerment.

7.1 The Diocese Supervision

A board composed by a Diocese delegate, the CeLIM Country Representative, the YCTC director and the Olga's management monitors both YCTC and Olga's.

The board meets periodically and evaluates the conduct of the activities, audits the accounts, approves the balance, takes decisions concerning staff hiring and managing, updates the prices, delegates the decision implementation to the manager. The board reports directly to the Diocese.

7.2 The Financial Contribution to YCTC

In 2008 and 2009, at the restaurant run taking off, Olga's was supporting the school with a contribution of USD 15,000. In the following two years, the contribution has been heavily penalized, with respect to the expected outcome, due to a new Zambian government law, issued in pre-electoral period, that retrospectively increased the salaries, doubling their amount.

Olga's reacted to this law maintaining in any case all the employees and reducing overhead by 10% the working hours, till reaching a threshold of sustainable costs, even with a margin reduction. This allowed to the 22 employers to keep their occupation and sustain their families.

From then on, the tourists' flow has constantly grown, both in the restaurant and guest house, also for the effective promotional activity that has been carried out. Therefore, in 2016, the goal of USD 30,000 of contribution to YCTC has been reached, covering 50% of the school costs, and brighter prospects are open for the future.

7.3 Who Are the Guests of Olga'

The clientele is mostly young, generally constituted by people involved in the cooperation world, very active in Southern Africa, and by responsible tourists. However, in the periods coinciding with the European and USA holidays (July and August), also other tourists are visiting the structure.

The nationalities mainly represented are (in decreasing order) USA, South Africa, Italy, Zambia, Germany, Canada, Holland, Australia, Zimbabwe, Great Britain, Finland, Japan, Moldova, India, Ecuador. The duration of the stay generally is short, from one to three nights. However, some tourists stay longer, in particular NGO volunteers.

From may 2013, guests have continuously increased, probably further to some articles on Victoria Falls, placing Olga's Italian Corner among the three most recommended accommodations in the area (being the other two five-star hotels).

Finally the Tripadvisor Excellence Award, gained in 2014, has ratified the good quality achieved by Olga's and its stable position among the best restaurants and lodges in Livingstone.

From January to December 2016, on average 3320 guests slept at Olga's, with an occupancy rate of 67.30%. It is worthwhile to note that the occupancy rate in the guest house is growing, with an increase of 25% only in the last year.

The positive trend is also the result of the synergy with the restaurant, also growing. In fact, in 2016, 36,900 guests have been served, equal to 3.080/month, being 33,500 in 2015.

8 Why Olga's Italian Corner Succeeded

This project is small, but complex, and owes its success to many factors taken in consideration and carried out to sustain the project.

A sustainability of a cooperation action may be defined as the capacity of a local context to reproduce and consolidate the changes introduced by a project, even once the external intervention ends. The term “sustainable” concerns different dimensions of the project, being not limited to the *economic financial* aspect, even if it had a relevant role here.

The project should hold a *sociocultural sustainability*, namely must be lined with the needs of the beneficiary population and its cultural models, without imposing too drastic and incomprehensible changes, but awakening and motivating the citizens about the novelties introduced. Here, the creation of a professional school responds completely to the local population’s expectations. Through new modern professional skills, the community will take advantage of the process of economic growth engaged by the tourism.

On the other side, the commitment of the Diocese has been essential in making the community aware of the relevance of tourism and letting accept in their territory the tourists, an alien population so different from them.

The church has also persevered in presenting a different concept of environment, no more conceived as pure mean of subsistence, but as a valuable resource to protect; this represented a new message, which has changed the perception of inhabitants of the place in which they have always lived.

The project should be rooted and accepted by the local reality; therefore, the involvement of local institutions is opportune or necessary, as they can give authoritativeness and credibility to the project and facilitate the carrying out of the program, as they know the most suitable interlocutors and the most efficient strategies. This introduces the concept of *institutional sustainability*, which is assured here by the partnership with the Diocese of Livingstone.

The realization of the project and its lastingness is facilitated if lined up with the governmental policies at local or national level. This requisite, which could be defined *political sustainability*, has been pursued through the alignment with the strategy of the Zambian government, which assumes tourism development as priority objective for the nation.

Coming to more practical issues, the different products realized by the project, buildings, furniture, handicrafts, are obtained through a technological transformation, which implies the choice of means and processes consistent with the context, its needs, its resources, its local skills and the environmental impacts produced. This criterion of *technological sustainability* has informed the choices of materials and building techniques both in the building concretely realized as in the matter presented and experimented in the courses held (delivered) at YCTC by Politecnico.

It was not a chance or a series of lucky events that made Olga’s a successful cooperation project, rather a vision on the future of this community, shared by all the promoters of the initiative, oriented to build the prosperity of Livingstone by discovering the potentialities offered by its exceptional natural landscape.

9 Conclusion

In these short notes, I tried to explain rationally and technically all the features of the project. But, actually, I have to say that the true engine of Olga's resided in the enthusiasm of all the partners in trying to change forever the life of young unfortunate people.

This is the story of a winning, a successful project made by people who have shared a dream and who, with passion, overcoming a lot of difficulties, have managed to build an example that works and which might be replicated in other contexts and hopefully contribute to Livingstone's prosperity.

This quote of Nelson Mandela, I believe, is the best sentence to describe this project:

A WINNER IS ONLY A DREAMER WHO HASN'T GIVEN UP

In fact, the key of this success resided in the many institutions, many dreamers, which worked together, each of them with its organization, motivation and skillfulness, to a common goal, without surrendering to the many obstacles arisen on the way.

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The Mantra of Modernity

Maddalena d'Alfonso and Jacopo Galli

Abstract Modern Architecture and Urbanism are the concrete results of a series of urban and design experiments that, during the first and second industrial revolution took place in Western and Eastern European countries and came to define the practices of the world of construction, prefabrication and design in the context of full industrialization. Five words could be identified that describe the methods and the processes underlying modern urban design, building a Mantra of Modern Architecture still in vogue: Technocracy, Hygienism, Formal Reduction, Cost-effectiveness and Communitarianism. This paper aims at analysing and clarifying how the Mantra of Modernism has been applied in non-European settlement and how it can constitute the conceptual base towards the construction of an alternative contemporary modernity.

(KAB)

«Aql-agh newghel di ddunit
lh'al d tameddit
nettazzal nug' a tt-neqd'aâ»

(ENG)

«I can not keep an eye on this world
and it is evening at once
as far as I rush I can't reach it»

Si Mohand ou-Mhand

The term Mantra in use since the twelfth century BC is originally from Vedic Sanskrit; it contains the root man- «to think» links to the suffix -tra, which has instrumental value: it means initially hymn or prayer, but in the later phases of religiosity in the East Asian regions (India, China, Vietnam and Japan) and from there in the areas of South and East Africa, it recovers its original mystical and meditative meaning, becoming an oral formula whose effectiveness depends on the

Maddalena d'Alfonso conceives the Mantra and states of the time frame; Jacopo Galli did the archives researches, the clarifications in the state of the art and the language simplifications.

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reiteration of the pronunciation. Far beyond its spiritual use linked to the Vedas,¹ it can be considered as a vehicle or a tool of thought.

Modern Architecture and Urbanism are the concrete results of a series of urban and design experiments that, during the first and second industrial revolution took place in Western and Eastern European countries—including Areas of the Russian Empire and the Soviet Union—and came to define the practices of the world of construction, prefabrication and design in the context of full industrialization. The construction of these projects as a whole set not a unique version of modernity but rather a series of terms coding a modern architecture thought. These same words were repeated in the circle of designers, engineers, performers, and even committees as prophetic formulas of progress, becoming the salvation Mantra of Cosmopolitan Elites. At the same time, the rationalist and functionalist thinking of modern architecture created a pure ideal, to tend to according to the rules of experimental design, often resulting in a fiduciary blind adoption of certain procedures that would lead to wealth and civilization. In this context, the brilliant slogans of modernist architects were created including Le Corbusier's Machine at Habiter, Gropius's Existenz Minimum, Mies van Der Rohe's Less is More: heroic phrases combining architecture with a formal purity derivate from building construction, also associated with certain residential qualities that would ensure well-being, constructing a modern architectural ethic strictly connected to its aesthetics.

Five words could be identified that described the methods and the processes underlying modern urban design, building a Mantra of Modern Architecture still in vogue: Technocracy, Hygienism, Formal Reduction, Cost-effectiveness and Communitarianism. In this way, contrary to purely scientific thinking, the mysticism associated with creative action both in art and architecture, which Schopenhauer and Nietzsche attributed to the salvific power of poetic inspiration, imprinted in the language of all the masters of the first modernity. This mysticism also stemmed from the certainty that the results obtained could be safely implemented and repeated everywhere, even in the most remote places on earth, improving living conditions and enhancing development in a direct relation to the backwardness of the areas.

For these reasons, in years of economical investment, without questioning the inequality inherent, the process of industrialization—used indiscriminately for the redistribution and plundering of wealth—it was possible to imagine a world in which the class of workers and the small and medium-sized bourgeoisie of administrative and traders, would have formed the majority of the world's population. This concept was related to the ideation and idealization of any type of urban project. So that architectural heroism was filled with paternalism, sometimes

¹The Veda is an ancient collection of Scythian texts from the twentieth century BC, which are a fundamental reference to Hinduism. Literally, Veda means understanding, knowledge and wisdom.

contemptuous to the history of the many oppressions of which it became a remorseful accomplice and fierce antagonist.

Although there is no unified concept of modernity in architecture, the history of architecture and the city presents a series of transnational projects that came to identify virtuous features for the management of urban growth, the infrastructural reordering of territories and the management of large-scale resources through industrialization. In our opinion, however, a crucial nucleus of current proposals and experiments has emerged in the so-called developing countries, the most interesting in the post-war period. Such experiments have in many cases defined a modernity that best suits the challenges of the present. The Mantra of Modernism, in fact, gains a clearer and more intense voice when compared with experiments promoted in non-Western environments, where historical circumstances have made the interplay between the terms more striking. The large dimensions of colonial dominions—especially British, Portuguese and French—allowed to initiate a more urgent experimental thinking, burdened on the one hand by the endemic poverty of the populations and their backwardness, but amplified on the other by the possibility of extraction of natural resources and by the unbelievable demographic growth (Riboldazzi 2009): decisive elements for the stabilization of the mass production system, a framework from which all political orders of the last century were born. The two aspects also made possible to determine a quick change, so that the Mantra of Modernism was used to declare itself completely original. The current urgency for the future can only renew the role of the architect and the design purpose of the five words that release the potential, both urban and environmental, of architectural design.

1 Technocracy

The fascination of modernist architects for technological development, which finds its epitome in Le Corbusier's machine-habiter, was rehearsed by Reyner Banham in *Theory and Design in the First Machine Age* (1960). The export of modernism to tropical areas intersects this predisposition of the first masters with a general attitude of post-war epigones, which considers science and technology as the primary tools for the development of endemic backward areas. In the first Inaugural Address of the American President after the end of WWII, Harry Truman will set a clear horizon by asserting that *we must embark on a bold new program for making the benefits of our scientific advances and industrial progress available for the improvement and growth of underdeveloped areas* (Harry Truman's Inaugural Address, January 20, 1949). The end of WWII coincides with the beginning of the end of colonialism allowing brief but significant period of progressive utopia before the onset of the Cold War. This short temporal space allowed the emergence of a technocratic perspective of modernity, where the relationship with climate became the engine of an adaptive thinking of proper use of both natural and cultural resources, materials and their derivatives, constructive systems and handcrafts,

desirable in view of the urgent social demands and new lifestyles. Modernity became the centre of a thought in which quality of space was a key element and modern architecture was adapting to regional and vernacular characters.

2 Hygienism

The text accompanying the Barcelona Expansion Plan by Ildefonso Cerdà (1859) establishes a direct contact between modernity and hygiene, but above all, it succeeds in building a direct relationship between space design and health, by laying the foundations of the XXth century hygienist movement. The almost scientific correlation between modern architectural design and health preservation is explored in the architectural grammar of the Italian avant-garde by Terragni and Gardella, as well as by British radical architects including Bertold Lubetkin, who will design a tuberculosis clinic under rigid standard rules *Spatial Diseases* and even Alvar Aalto in one of his masterpieces, the Paimio Sanatorium. The slogan of modernist Berlin *Light, Air and Sun of Großsiedlung Siemensstadt* by architects O. Bartning, F. Forbat, Wr. Gropius, H. Häring, Pl. R. Henning and H. Scharoun coincides, in the colonial experience, with the need to prevent and fight the *White Man's Grave*,² defending Europeans from the dangers of tropical climate. It is for this reason that the new colonial and modern settlements usually lie alongside historical settlements, resulting in duplication of places and cities, but also a duplicity of belonging to a nation and to its historical progress. This has in many cases also created architectural and spatial justification for both the origins of segregation, as well as the persistence of a culture of oppression based on religious, ethnic or classist prejudices. Aspects that still characterize the genesis and resilience of the slums of the world.³ It will only be with Patrick Geddes' (1854–1932) ideas on surgical project for the renovation of the historic centres that it will be possible to cure the wounds in urban space and promote modernization projects in, unhealthy and overpopulated, historic areas.⁴

²The escalation of epidemics in the West African coast has caused the terrible reputation of this continent's defined *White Man's Grave*, the term was officially used to define Sierra Leone and then extended to the whole continent.

³Writer James Baldwin (1924–1987), one of the most prominent racial equality activists at a Cambridge Union conference on 17 February 1965, said: the future of the negro in this country is precisely as bright or as dark as the future of the country, "It is entirely up to the American people and our representatives—it is entirely up to the American people whether or not they are going to face and deal with and embrace this stranger whom they relied on so long.

⁴During his teaching period in Dundee, Patrick Geddes matures his thoughts on town planning, where he considers urban planning closely related to social justice. Geddes will practice this thought in different parts of Britain and India between 1914 and 1924. G. Ferraro, *Rieducazione alla speranza: Patrick Geddes, planner in India, 1914–1924*, Jaca Book, 1998, Milan.

3 Formal Reduction, Functionalist Aesthetics

In 1910, Adolf Loos published in Vienna the short text *Ornament und Verbrechen* (Ornament and Crime) theorizing for the first time the essentiality of the shape-function of the building against any type of ornament used in the grammar of architectural styles of historic architecture. His most famous quotation “The evolution of culture marches with the elimination of ornament from useful object” was probably derived from the simpler “Form Follows Function” attributed to Luis Sullivan that Loos admired greatly. In the research of European architecture, this meant focusing on the fascination for the history of formal studies and geometries on the one hand, and on the other, marked the discovery of an interest in rural and spontaneous constructions that constituted, above all in the Mediterranean, a heterogeneous set of fascinating settlements.⁵ These researches, as they sought to restore a historical dignity to the spontaneous settlements, aimed to generate a “classic image” for modest architecture, being experimented in the garden cities and Germanic *siedlungen*.

Urban experiments were possible through the development of a new construction industry, where prefabrication and design allowed the construction of vast building in a very short time, while reducing the formal-ornamental-complexity and the adaptability to the context, geographical as well as social. Technological standardization also produced an aesthetic standard that was soon rooted in the anew of an aesthetic of formal reduction for the dissemination of the new ideological and progressive principles that lay behind. Principles that we can summarize in massification and security. While in the USA after WWII, this aesthetic was transformed into the well-known *Less is More* by Mies van Der Rohe and the technological myth of his skyscrapers in India in the same years, the aesthetic of the reduction was linked to the principles of democratization and diffusion of primary services including dwellings. This made possible the reconciliation of all experiments on housing and their industrialized infrastructure with new democratization protocols, comparing the construction of modern cities to the emancipation of Indian people from the conservative culture of British colonization. These protocols made the aesthetics of formal reduction the manifest of an ethics of redistribution of wealth and the purity of incremental mathematics adapted to architectural design. An ethic that made possible the spontaneous growth of the standard housing units. The new Indian cities thus represented the appearance of a new internationalization of modernity whose trajectories were drawn between developing countries (d’Alfonso 2014) and specific Western contexts. In Portugal, at the end of the colonization period, in the years of the Carnation Revolution, during the SAAL Plan of Nuno Portas and Alvaro Siza, the same guidelines and the same case studies were adopted to declare, with the aesthetics of formal reduction, the end of the Salazar dictatorship and the beginning of democracy.

⁵Giuseppe Pagano organized the exhibition *Architettura Rurale Italiana* in 1936 during the VI Triennale di Milano.

4 Cost-Effectiveness

The will to produce great benefits with available resources is one of the goals of any commission, but the aim and rhetoric to give rise to high monetary benefits with a small initial capital is one of the main goals in the construction world, in the adoption of the Taylorist and Fordist industrial chain. The criterion of cost attention, however, is not the only principle of cost-effectiveness⁶ that must be followed in the economic policy of urban planning, but in a broader sense, it concerns the consequences of the choices on the community, in a systemic vision. The systemic vision of a process means to evaluate it economically through all the people who work in a coordinated way to achieve a common purpose. The necessary steps to activate it are linked to each other and are carried out in an organized and progressive manner in order to reach the set goals. It is in this perspective that one passes from the attention to the aesthetics of the final product to the much more current one on the ethics of the process. It is in fact the process that is placed at the centre of the project, and participatory architecture was born from the search of experimental models that unite urban architecture to wealth redistribution and democracy building. Between 1945 and 1947, the first Indian government under the leadership of Jawaharlal Nehru entrusts Otto Koenigsberger with the organization and construction of 100 modern settlements (d'Alfonso 2016), between newly established cities and urban expansions, for more than fifteen million refugees from recently separated Pakistan. The final aim was the generation of virtuous processes that would create a system of public and private resources, with the final goal of rooting and growing the community in the near future. An economical alternative to the industrialized countries of the first and second world.⁷ It is from this experience that simple ideas such as microcredit linked to urban and architectural incrementalism developed, ideas that then migrate all over the world with the ability to adapt and involve individuals and their abilities in local communities (Aravena and Iacobelli 2012).

5 Communitarianism

Antonio Gramsci was deeply disturbed by that subtle moral illness which is indifference, to which he opposes concrete action in society. It is from this double conviction that its definition of national-popular culture originates, where not only

⁶In the classical economy, there are three main areas on which the concept is based: (1) systemic vision, (2) decision-making autonomy and (3) economic equilibrium, so it does not coincide with the principle of economic and monetary convenience.

⁷In 1955, at the Bandung Conference, economist Alfred Sauvy (1898–1990) defined the First World as the Western, Democratic and Capitalist Free Market, Second World the Economic Union of Socialist Countries associated with the Soviet Union and Third World that of the developing countries, mainly ex-colonies in search of their own socio-political identity and economic policy.

the literary or artistic works, but more generally the uses, the costumes and the spontaneous manifestations of a civilization, shows the distinctive features of national culture. In this way, their whole, but also the specificity of each one becomes representative of the whole people, contributing to the conscience of the conceptual identity between a nation and its people. The experience of architects such as Edwin Maxwell Fry and Jane Drew (Galli 2014), in the British West Africa, contributes to the study of the adaptation of modern architecture to the pre-modern conditions of Tropical Countries, and later with Le Corbusier and Pierre Jeanerret to the development of Modern Architecture and Urbanism in India thanks to the heroic narrative of Chandigarh. Their cultural theories were transformed into targeted design experiences in contact with non-European populations, promising a profound reflection on the value of communitarian relations and the need for their maintenance, in the face of a necessary evolution towards global lifestyles and economic systems adapted to the local scale. The difficult process of cultural hybridization, in an attempt to reconcile the wishes of the communities that inhabit the places and the knowledge of the professionals who build them, includes the transition from the concept of “space and time” to that of “place and occasion”. The latter finds a first figurative conclusion in the project for the Otterlo Circles by Aldo Van Eyck. A project reflecting the strict contact of the author with the Dogon culture. Joseph Ki-Zerbo’s cultural activism right in Upper Volta (today Burkina Faso) gives a completely original autonomy to this thought on the basis of a careful critical analysis of imperialism, forging the concept of endogenous development. It means, in short, the ability to achieve the right balance between openness to the outside and maintenance of local identity. When in 1980 Jakob von Uexkull set up the Right Livelihood Award, awarded to Ki-Zerbo in 1992, he asserted that the goal was: *to help the North find a wisdom to match its science and the South to find a science to match its ancient wisdom.*

From all of these considerations, it is possible to understand that activism, conjugated with architectural creation and with a care to the process (participatory) for its implementation, swings between the adoption of new technologies for quick implementation and local instruments in order to maintain local culture and traditional crafts. These are in fact expressions of the conceptual identity of the nations within which they have developed. The actuality of the Modernist Mantra and its vitality are thus explained through the reading of ongoing experiments, showing new ways of interweaving the recurring issues of modern thinking with architectural and urban design. The Mantra helps to rethink modernity every day by adapting technological innovations to social developments, in the light of an overwhelmingly ethical push, capable of imagining a progress careful of existing resources and cultural values.

Continuing to draw from the Gramscian thought, we can affirm that in order to obtain a molecular mutation of society, it is necessary to start from the knowledge of the territory, the physiognomy of the nations, to study their history, their literature, we would add their architecture. This in order to show the evidence of an alternative, but still modern, critical path, which restores in the design and constructive thought the substance of being a virtuous process for society and future

generations, even if as James A. Baldwin asserted: *the future is like heaven, everyone exalts it, but no one wants to go there now.*⁸

The non-Western world could become the complex cultural and geographic space able to accommodate and spread a new global modernity in which everyone could recognize himself. A clear symptom is the assonance between the initial phrase of the Brundtland report *Our Common Future: sustainable development is development that meets the needs of the present without compromising the ability of future generations to meet their own needs* (UN World Commission on Environment and Development 1987) and the words of a Nigerian tribal leader reported by George Kimble in *Tropical Africa, the land belongs to a large family of which many are dead, few are alive and innumerable are those still to be born* (Kimble 1960). The ideal man in non-Western society is pathologically, incurably, social and sympathetic. While one can say that underdeveloped areas backward, left at the pre-industrial stage, on the other hand they are already postmodern, post-economic, leading in the race towards a development system respectful of man and resources. The paradigm of sustainability, whose application in the West appears complex, finds fertile soil in non-Western societies. The places where it becomes possible to imagine an architecture that combines a careful analysis of climate and resources with the ability to put on central stage the man with its needs and weaknesses, but above all the community as an art of living not with the others but in others.

Recovering the five above-mentioned themes, and highlighting them, it emerges the possibility of introducing isolated examples of architecture, marginal urban reforms, peripheral experiments, which become representative of the whole process of construction of a specific identity, defining a precise path towards the development of a future sustainable modernity.

1. In the new world-order of technocracy, considering the potential of interdisciplinary or multidisciplinary applied to processes, a precise feature of a holistic architecture.
2. Hygienism becomes the minimum expression of quality of life, coupled with the desire to maximize the redistribution of the minimum space for the protection of human health, biodiversity and nature.
3. Formal reduction is both the ethical congruity of the planning and the constructive processes, and the transformation of the conditions of the greatest number of people involved in the design process.
4. Cost-effectiveness coincides with respect for the common good and for a conscious growth of monetary, cultural and experiential enrichment.
5. Communitarism means enhancing multicultural, multiracial and inter-racial, multiethnic and inter-ethnic, multi-religious, relationships based on tolerance and secularity of the process of city building.

⁸J. Baldwin, *Fly in the Buttermilk*, a short story written by James Baldwin, where he discusses the challenges faced by an African-American boy in an American school.

The Mantra of a new modernity can lead to the idea of architecture as a production of virtuous systems and virtuous processes of participation rather than as a heroic act, resulting from an isolated genius enclosed in a specific project with an autonomous language.

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Part III
Protection and Enhancement of Cultural
Heritage Amid Conservation and
Development

Research, Interventions and Training for Cultural Heritage Safeguard and Enhancement. Lesson Learned from 50 Years of Studies and Projects Implementation in Armenia

Mariacristina Giambruno and Gaianè Casnati

Abstract Since 1965, a long series of initiatives have been realized in Armenia, aimed at the study and preservation of Armenian Cultural Heritage with the Politecnico di Milano acting as a promoter or supporter, guaranteeing a scientific approach and always working in coordination with local authorities, namely the Ministry of Culture. The activities have been designed to respond to the needs that were identified adapting to the possibilities available in a context in continuous evolution (Armenia became independent in 1991 after being part of Soviet Union and is still in the process of improving the legal framework for monuments preservation). For its little dimensions, Armenia is a very interesting case study and this paper, after describing the main cooperation interventions realized, analyzes their characteristics in order to assess strengths and weaknesses of the different approaches adopted and to identify the problems to be addressed and the key factors that would entail the success of eventual future initiatives.

1 Foreword—Armenia, a Brief Outline

Armenia is a lower-middle income republic in the Caucasus region; its population is less than 3 million (with a large diaspora population of around 7 million). It is very a small (30,000 km²) if compared to its historical territory 140,000 km², actually

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included in a little part in Gharabagh, Georgia, and Iran and, for about 80%, in Turkey with which Armenia does not have diplomatic relations.¹ Christian since 301, independent since 1991, it has been a Soviet Republic for about 70 years (1920–1991).

After a substantial economic crisis followed to the independence, economic growth is now increasing (4.2%) but still exports exceed imports with an annual trade deficit of around \$ 2 billion (20% of GDP) covered by remittances from the Armenian diaspora, foreign direct investment inflows, and donor funding. The high impact of international projects on the economy and some “post-soviet” mentality affects the approach of locals to the work market. Despite the encouraging economic development of recent years, still a too high percentage (32%) of the population lives below the poverty line and the phenomenon of emigration is substantial.

Armenia is very rich in Cultural Heritage, both tangible (more than 33,000 registered monuments) and intangible. Armenian Cultural Heritage, especially religious monuments, has contributed throughout history to affirming and maintaining the national identity and cultural tradition that allowed the Armenian people to survive the most difficult times of their history. At present, Armenia’s artistic and architectural heritage is recognized as a key player in its potential capacity to attract tourism and international attention with positive effects on the economic development of the country. In fact, the largest components of GDP (51%) are travel and tourism that, with a focus on cultural tourism, is considered as a key source of economic and employment growth.

The artistic heritage of Armenia presents considerable conservation issues linked to environmental factors (a continental climate with severe winters and hot summers, high seismicity, etc.) and lack of maintenance, which are often accompanied by difficult logistics, scarce funds, and lack of skills appropriate to the high specialization required. Sometimes, the presence of strong private interests in the territory may prevail over the public interest due to a not always adequate regulatory framework thus endangering the correct preservation of historic buildings²; for those reasons, the Ministry of Culture of Armenia is seeking technical assistance.

2 The Discovery of Armenian Heritage: 1965–1988

In the Sixties, Armenia and its monuments were nearly unknown in Europe. The encounter between a professor from the Politecnico di Milano interested in Byzantine architecture³ and some Armenian families residing in Italy, together with the return in Armenia of Armen Zarian, an architect educated in Italy that helped in the organization of the logistics on place, were the conditions for the opening of a

¹A genocide perpetrated in 1915 caused around 1,500,000 victims and nearly cancelled the presence of Armenian population in Turkey.

²As an example, we can mention the old Kolkoz market on Mashtotz street (transformed into a supermarket) and the Zvartnots airport which is likely to be demolished.

³Adriano Alpago Novello, professor of Architectural History.

fruitful season of studies and the consequent creation of the association *Centro Studi e Documentazione della Cultura Armena* (CSDCA) in the ambit of the Politecnico di Milano. Although its resources were limited, the CSDCA promoted the organization of several study missions in Armenia, often adventurous, that allowed the disclosure of Armenian art and architecture to the Occidental world. It realized publications (a series of 23 monographies *DOCUMENTI DI ARCHITETTURA ARMENA*, and another, more technical, in 26 volumes: *RICERCA SULL'ARCHITETTURA ARMENA*), conferences and courses at a University level, an exhibit that travelled four of the five continents and organized five international Symposia on Armenian Art.

In those years, the main objective was to study, to document, and to promote a heritage that was unknown in the western world. Nevertheless, the approach of the Italian scholars was particularly attentive to the human aspects and a close collaboration with local experts has been promoted since the beginnings unless it was often very difficult due to the different backgrounds and mentality.

All the publications did foresee both the contribution of Italian and local authors and the Symposia allowed to invite in Italy dozens of Armenian experts for whom they were an extraordinary occasion to cross locked borders and to confront themselves with the western world. After 50 years, some of them still remember the impact those activities had in Armenia both on their personal lives and on their studies (Fig. 1).

3 The Interventions for the Safeguard of Armenian Heritage: 1988/91-2009

After the strong earthquake that struck Armenia at the end of 1988, the Government of Armenia officially asked support to the Italian Government for the structural repair of some of the monuments most endangered by the seism.

The CSDCA was the first to answer to this request, with great enthusiasm and no funds. The Politecnico di Milano came in help providing the expertise, the laboratories, and the workforce to allow the realization of the project for the preservation of the church of Saint Stepanòs in Marmashen. Due to difficulties in finding the needed economic resources, it took many years to succeed but finally, in 2001, the restored church was reopened to the cult with an official ceremony celebrated by the Catholicos of all the Armenians.

In the meanwhile, the CSDCA and the Politecnico di Milano started to collaborate in the implementation of the Pilot Project: support to local Institutions for the safeguard of Armenian Cultural Heritage. A project started by prof. Macchiarella of Ca' Foscari University in 1999 and carried on by the CSDCA until 2009 with the co-financing of the Italian Ministry of Foreign Affairs (Sector for Culture), consisting in supporting the activities of the Ministry of Culture of the Armenian Republic in the burden of monuments preservation through financing little restorative interventions, projects or training. Both the gradual decrease of the funds available and the increase



Fig. 1 The jeep used in 1980 by prof. Alpagò Novello and arch. Alberto Pensa for their travel in Armenia. On the left, a view on mount Ararat, in Turkey

of the costs for the interventions in Armenia caused the progressive shift from the realization of preservation works to the provision of training.

The aim was to train the trainers making the intervention from outside gradually more and more superfluous. In fact, training has been so well welcomed to be object of a demand for further collaboration posed by the Armenian Government to the Italian Ministry of Foreign Affairs. Nevertheless, the fact that the support from outside has been considered crucial because it involved also the funding of some activities that could not be funded otherwise, somehow affected the commitment of the locals in the object of the training.

4 The Focus on Training

4.1 The Project Restoration Training and Support to Local Institutions for the Preservation and Conservation of Armenian Heritage: 2011–2014

To respond to the demand of support, the Italian Ministry of Foreign Affairs financed a cooperation project aimed at the improvement of the capacities of

Armenian experts and institutions in the field of Cultural Heritage Preservation. The Politecnico di Milano decided to accept the challenge and to co-finance the 30% of the initiative. The project⁴ has been designed on the above-mentioned long tradition of bilateral relations and collaboration and based on shared values and common problems in the field of CH management.

Although it made the work more difficult, it has been decided to diversify the activities in order to magnify their impact, considering the awareness raising on the preservation issues as important as the training of local experts in itself. The project, based on a Technical Agreement ratified between the Italian Ministry of Foreign Affairs and the Armenian Ministry of Culture in 2011, was concluded in 2014.

The universities played a very important role, first of all the Politecnico di Milano in quality of implementing agency and co-funder (30%) of the project, the Yerevan State University of Architecture and Construction (YSUAC, now NUACA⁵) that offered the offices for the project implementation unit and where 4 Specializing Masters⁶ (2 biennial and 2 annual) have been organized, and the Institute of Archaeology and Ethnography at the Yerevan State University that participated in the organization of the courses for archaeologists.

The open dialogue with the local institutions has been considered a key factor to guarantee the sustainability of the project output, for this reason, a set of specialized conservation training and capacity building activities were organized on selected sites and in some museums with active laboratories (Aruch, Kobayr, Shengavit, Erebuni Archaeological Museum Reserve, National Gallery, National Museum of History) for a total of 14 hands-on courses to which more than 150 students participated free of charge. 7 Armenian experts and 23 Armenian students were invited in Italy for 2 weeks with different purposes (stage, workshop, study tour). 51 Italian experts went in Armenia to work on the project and a further dozen participated in the laboratory activities connected to the project implementation in Italy.

In collaboration with the Ministry of Culture, two outstanding monuments were investigated and partially conserved: the cathedral and archaeological site of Aruch and the monastic complex of Kobayr.

The attitude to teamwork, typical for Italian architects, was proposed and encouraged during all the courses forcing the students to experiment new ways of thinking, working, and interacting that resulted in a stimulating environment. The programs of the courses themselves were studied to promote the understanding of the complexity of the knowledge process needed prior to design a restorative intervention and of the need to involve different expertise both in the preliminary studies and in the interventions.

⁴Directed by Gaiane Casnati with the scientific coordination of professor Maurizio Boriani.

⁵National University of Architecture and Construction of Armenia.

⁶Professionalising specialization courses of the duration of 1,500 h per year, known with the term "Master" in Italian but not corresponding to the Master degree, directed by professor Francesco Augelli (Politecnico di Milano, DASTU).



Fig. 2 The course for Ancient Masonry Restoration organized during the Preservation Training Project in Armenia was the occasion to preserve the roof of the *gitz madur* of Kobayr monastic complex (Lori region, Armenia), 2014

Diagnostics investigations were implemented with the utilization of the best available technologies and all the students had the chance to join and personally experiment the different methodologies, discovering all the points of view from which a monument could and should be “read.” Selected tools, equipment, computers, and materials for restoration have been donated after the project to allow the continuation of those activities.

The hands-on courses and the Master courses included training on the site and promoted the collaboration between different experts (from archaeologists to restorers, from laborers to scholars, from architects to engineers, from craftsmen to public officials, etc) (Fig. 2).

The project has been concluded with the organization of an international conference to which took part experts from 14 different countries thus showing the interest of the international community in Armenia’s heritage and raising awareness about the importance of preserving it for present and future generations. The presence of representatives from Georgia, Turkey, Iran, and Syria⁷ also showed that Culture and Heritage can play a major role in the peace-building process.

⁷About 30% of the students participating to the Master courses were from Iran and 1 from Syria.

A set of publications was realized to allow the continuation of the training activities⁸ and highlighted the high difficulty of transferring into Armenian language the jargon of preservation; for this reason, the translation of the ICOMOS glossary of stone deterioration was promoted and enriched with examples of stone deterioration found in Armenia.

4.2 *The Training Project. Follow-up*

In 2015, the Preservation Training Project received the prestigious Europa Nostra award; the Jury recognized the effectiveness of the partnership between Italy and Armenia, “not immediate neighbors but sharing a philosophy in relation to their pasts” and observed that “the involvement of the Politecnico di Milano ensured that the approach was rigorously scientific and objective.”

For the occasion, the Minister of Culture of Armenia expressed her desire to see a continuation of the cooperation activities in the field.

4.3 *The Erasmus Plus Program. A Chance to Continue “Education”*

Born in 2013, the Erasmus Plus “EU program for education, training, youth and sport 2014–2020” manages the diverse funding mechanisms fostered by the European Union until 2013 in the field of training, education, and volunteering exchange experiences abroad.

In the framework of the general strategy devoted to internationalization promoted by the university, Politecnico di Milano has activated—among the others—an exchange program dedicated to students and professors in partnership with Yerevan National University of Architecture and Construction.

The exchange program foresees six-months scholarships for six students from each university to allow the attending of courses and to pass the exams in the two partner universities. Furthermore, it gives the possibility to three professors to attend didactic programs and to confront knowledge and experience regarding teaching aspects. The program will conclude in July 2017, but it has already been asked its renewal.

⁸A web site, 4 video CDs illustrating very specialized working methodologies for archaeological excavation, frescoes and stone restoration, restoration of metallic objects, a set of 9 lecture notes for university students and 2 big format volumes, one for the presentation of the project (*The Politecnico Di Milano in Armenia: An Italian Ministry of Foreign Affairs Project for Restoration Training and Support to Local Institution for the Preservation and Conservation of Armenian Heritage*, ISBN: 9788885822429, Oemme Edizioni, 2014) and the other for the conference proceedings.

As a first closing balance a few months before the end of the program, it is possible to affirm that the results have been satisfactory and the exchanges fruitful. The mobility of Armenian and Italian professors has been completed with general content from both the parts. For what concern the exchange of Italian students to Armenia, the mobility might be object of a specific communication about the offer of Armenian University, its program, the opportunities of study, research, and work also, so as to enhance the number of outgoing mobility to the School of Yerevan.

The latest initiatives conducted in the framework and using funding of the program were exchanges of didactic mobility between the teachers of the two universities, which took place in March and May 2017. The exchange allowed professors to conclude study reports and set shared objectives regarding conservation of Cultural Heritage.

Particularly, a recent workshop conducted in Yerevan involved four Armenian and Italian teachers and fifteen Armenian students, as well as an Italian student in mobility at the Yerevan University. The objective of the workshop, open to students of the bachelor and master's degree programs and the PhD program, was to develop a common methodology on the theme of conservation of widespread Cultural Heritage and historical centers. Such themes are only partially dealt in the university course by Armenian students, in contrast to the fact that there is a great need for higher education in this regard.

If, in fact, the theme of conservation of architectural heritage has had an increment in recent years—thanks also to the project supported by the Italian Ministry of Foreign Affairs between 2011 and 2014, which allowed some former students to teach what they learned in University courses—the theme of widespread heritage is still an under practiced subject. Thus, the effect is a still poor awareness of the role that historical centers and cultural landscape have in preserving the identity of a country (Fig. 3).

The workshop, organized around theoretical lessons and practical laboratory activities, has investigated the historic center of Ashtarak, located a few kilometers from Yerevan.

Students, guided by the lectures through theoretical lessons, had to develop a project of conservation and valorization of the widespread heritage of the place, which is of great interest but now almost abandoned and unknown to the inhabitants themselves.

The enthusiasm with which the students have dealt with the work, despite the short time available and the results obtained, has confirmed the validity and importance of the exchange program, together with the request of further training in this direction.



Fig. 3 The “historical centre” of Ashtarak

5 Working for the World Bank for the Safeguard of Armenian Heritage. The Master Plans for the Monasteries of Haghpat, Sanahin and Geghard

5.1 Context and Objectives

A consulting assignment by the World Bank aimed at the drafting of a master plan for the three monasteries of Haghpat, Sanahin, and Geghard constituted an interesting opportunity for setting up the studies, knowledge, and cooperation activities conducted so far.⁹

The purpose of the work, targeted on two of the three Armenian sites listed in the UNESCO World Heritage List, was the improvement of the cultural tourism offer with the aim of increasing the numbers and the permanence of visitors in the area, thus giving a new impetus to the local economy.

⁹Armenia, Local Economy and Infrastructure Development Project (P150327); *Master plans for the World Heritage Sites: (1) Monasteries of Haghpat and Sanahin, and (2) Monastery of Geghard and the Upper Azat Valley, in Armenia*; World Bank, Project manager Guido Licciardi-Urban specialist, World Bank.

Advice was therefore required to define, in agreement with the Ministry of Culture of the Republic of Armenia, the priorities for action in the drafting of a master plan, including “(1) infrastructure improvement; (2) design principles at site level; (3) integrated approach in each site including tourism infrastructure blended with site conservation and management; (4) opportunities for increased visitor spending through improved and expanded cultural experience offers; and (5) community inclusion.” The objectives had to be met with the focus being on the proper preservation of the three monastic complexes, in accordance with internationally recognized theoretical prescriptions (avoiding style reconstructions and suggesting techniques for investigation and intervention respectful of the historical matter).

The work had to be performed in a very short time span as there was an urgent need to define the guidelines for the allocation of the resources needed to preserve and enhance the sites, within a broader project including infrastructure improvement, urban centers rehabilitation, Cultural Heritage preservation, and touristic circuits development that should have kicked off thanks to a World Bank loan to the Armenian Government.

5.2 *Working Methodology and Project Proposals*

The starting point of the work has been the development of a working methodology established scientifically, based on in depth knowledge acquired through research and surveys conducted by a multidisciplinary team¹⁰ and on the listening to the priorities and needs expressed by local stakeholders (the Ministry of Culture first, the local administrators, and the resident population), according to a proven participatory model that should have supported the project’s real achievability.

The fundamental assumption was that the three monastic complexes, while properly preserved, could become the fulcrum of a virtuous circle allowing tourists to fully enjoy the visit thanks to the availability of the necessary facilities and, at the same time, allowing the inhabitants to improve their living conditions by directly entering in the tourist market and enjoying the opportunities that a well-structured and international touristic circuit can offer (Fig. 4).

The output of the work was twofold: the definition of the master plans for the three monastic complexes, including both their preservation and their tourism enhancement; the identification of the cultural assets that the neighboring territory may offer in order to lay the foundations for the creation of a network that would favor the development of sustainable and responsible cultural tourism on the Yerevan—Tbilisi route.

¹⁰The working team was composed by Mariacristina Giambruno; Maurizio Boriani; Gaiane Casnati with: Lorenza Petrini, Vassilis Mpampatsikos, Raffaella Simonelli; Sonia Pistidda; Roberta Mastropirro; Rosamaria Rombola; Lucio Specca; Rossana Gabaglio, Francesca Vigotti; Nanar Kalantaryan; Lilit Vardanyan; Artur Petrosyan; Siuneh Arakelyan; Gohar Hovakimyan; Kristina Hakobyan.



Fig. 4 View of Geghard monastery

The first part of the work has started from an accurate survey not only of the buildings of the three monasteries but also of the villages in their immediate vicinity, deeming that the “monument” is not an isolated object but part of a context that contributes to its significance.

The monasteries have been evaluated, albeit qualitatively, degradation and structural instabilities through visual observation, trying to interpret their causes and supporting the hypotheses with non-destructive tests performed in situ and with appropriate sampling and laboratory analysis. This was reported on drawings in scale 1:200 where the overall situation of the complexes was illustrated and the relationships between the different phenomena was identified to favor a correct interpretation of the degradation mechanisms. The current structures supporting tourism (entrances, visit paths, sales spaces, etc.) have also been identified (Fig. 5).

As concerns the villages, the spatial and viability characteristics have been surveyed: the presence of the widespread architectural heritage, consisting of a good number of traditional historical houses and modern quality architectures; any existing tourism infrastructure, such as restaurants, hospitality, small museums, etc., verifying their potential and problems. Some critical elements have been identified, such as the presence of materials hazardous to health (i.e. the asbestos on the roof of many buildings), the absence or poor efficiency of water systems, sewage, and public lighting; the absence of paving and the quality of open spaces. Elements, these, which are of fundamental importance to the inhabitants but also to the tourists



Fig. 5 A traditional building in the village of Sanahin

while the goal is to increase their stay in the place to activate a process of improvement of local microeconomics (Fig. 6).

The cognitive framework, built also through a good number of interviews conducted with the villages inhabitants and through an exchange of views with the municipal administrations that suggested their priorities, guided the setting of project guidelines organized in three parts. The first to define the correct procedures for designing and setting up implementable projects for monastic complexes preservation; the second and the third to outline the valorization strategies and the interventions necessary for the improvement of the inhabited environment.

The *Guidelines for conservation project*, carried out for the three monastic complexes, provide guidance on the analytical procedures indispensable for the drafting of the implementable projects and suggest, at the preliminary draft level, what would be the best intervention techniques to be applied for the solution to the detected problems of degradation and instability. To support the realization of correct implementable projects, some examples of survey of the material and structures deterioration phenomena have been provided.

The *Guidelines for urban development, Improvement of the potentialities, and Design of new elements*, set for the villages of Haghpat, Sanahin, and Goght¹¹,

¹¹Located in the immediate vicinity of the Ghegard Monastery.



Fig. 6 View of the monastery of Haghpat

provide guidance for the enhancement of the existing cultural assets, the resolution of the critical issues (the removal of asbestos roofs, the creation of public lighting, the realization of new parking lots to free the squares in front of the monasteries, the possibility of promoting accommodation in traditional houses, once verified the availability of the owners, etc).

The *Guidelines for the enhancement of the visiting experience* include guidance for the creation of new tourist services, such as spaces for selling local products, parking areas, seats, interpretation facilities. These guidelines are corroborated by providing references to projects successfully implemented in other sites, selected on the basis of their consistency with the local context.

The second part of the work is aimed to establish a cultural tourism route on the axis Yerevan–Tbilisi for ensuring a sustainable tourism development in northern Armenia, in the belief that the positive impacts that tourism development may bring to the economic conditions of the population should be organized in a network that involves the territory as a whole. For these reasons, the Cultural Heritage has been identified at a large scale and systematized, the viable itineraries have been defined, identifying criticalities and potential, reporting the tourist infrastructures present and those in need to be implemented.

5.3 *Some Final Considerations*

The work carried out has been complex, mainly due to the tightness of the execution times and to the difficulty of finding and analyzing the studies already carried out in the past on the areas under investigation, nevertheless, the evaluation of this experience two years later is undoubtedly positive.

First of all, the implementation of this assignment gave the occasion to verify some of the results of the training activity realized during the Restoration Training project realized in the previous years. The workgroup has been set up involving some of the architects that participated in the Specializing courses organized from 2011 to 2014¹² who demonstrated to have well-learned how to use on the field the knowledge acquired from the lessons.

Secondly, the continuous confrontation with the Armenian Ministry of Culture has allowed to better clarify theoretical assumptions and priorities in the preservation of Cultural Heritage, providing the basis for a more fruitful dialogue that will certainly help in the realization of eventual future projects.

Last, but of great importance, this work has allowed to broaden the horizon of interest to include the widespread heritage, too often neglected for focusing the attention only on “monumental” episodes as the great examples of religious architecture for which Armenia is well-known. Sharing with the local authorities the need for an increased attention to even the minutest testimonies of the past poses the premises for the promotion of the conservation of the territory as a whole and of the sustainable development of cultural tourism that, more and more, can lead to the improvement of the living conditions of the population and to a greater awareness of their own important past.

6 Learning by Doing

6.1 *Lesson Learned*

After about 50 years of different research and projects implementation in Armenia it is time to identify which have been the main problems and the most important achievements as a tool to drive eventual further action. In the table below, we provide a very synthetic SWOT analysis of what has been done so far with the involvement of experts from the Politecnico di Milano.

¹²Biennial First and Second grade Master in Monuments Restoration organized in Yerevan by Politecnico di Milano and YSUAC University.

Project	Skills	Weaknesses	Opportunities	Threats
Symposia on Armenian Art 1975–1985	An occasion for experts of different nationalities to meet and exchange ideas and knowledge, extraordinary at the times of Soviet Union	The complexity of Armenian Language and the different methodology of work made it difficult the sharing of information	The disclosure to Europe of the knowledge on a few known chapter of architectural history. Access to information on Armenian heritage outside the borders for Soviet Armenia scholars	Too expensive for being sustainable. The organization became impossible after the Armenian Government ceased to contribute to their financing
Ricerca sull'Architettura Armenia 1970–2004 Documenti di Architettura Armenia 1968–1998	Disclosure to the western world of a nearly unknown architecture through high quality images and texts well documented and accessible also to non-experts. These series are still known and appreciated	Sometimes difficult to coordinate the work of different experts with different languages and backgrounds	Raising awareness on Armenian architecture both to international scholars and Armenian diaspora; building contacts and relationships between experts of different nationalities	The cost of the publication and the difficulty to access the book market made the publications too expensive
Courses on Armenian Culture Provided in a few universities in Italy 1970–1990	Opened to scholars and interested people, they contributed to raising interest for the study of Armenian culture	The audience was limited by the fact that at that moment the press was not interested in publishing news regarding Armenia	Some dedicated PhD and a number of scholars starting to devote their time to the study of Armenian Culture, some of them permanently	It is crucial to have good teachers able to transmit interest and enthusiasm. The themes should comply with the requirement of the education system
Pilot Project in the Republic of Armenia. Support to local Institutions for the Preservation of Cultural Heritage 1999–2009	A series of little projects, all interlaced and designed to respond to the needs highlighted by the Ministry of Culture of Armenia. An occasion to bring in Armenia experts from different fields (architects, engineers, archaeologists, frescoes	The financing from the Italian Ministry of Foreign Affairs decreased gradually and the small scale of the projects did not allow the design and implementation of capital interventions but only small actions	Each intervention organized as an occasion for training local experts both in the design and in the implementation of the interventions. The continuity year by year of the presence of international experts contributed to the success of the project	In Armenia the work market in the field of monuments preservation is too little and nearly inaccessible to young professionals so they have not the chance to build their experience. The training provided was too short to

(continued)

(continued)

Project	Skills	Weaknesses	Opportunities	Threats
Restoration Training in Armenia 2011–2014	restorers, etc.) and to provide technical solutions to some problematic issues Holistic approach that entails the involvement of experts from different disciplines from archaeology to frescoes restoration and with different approaches, from theory to specific techniques. Promotion of multi and pluri-disciplinary	Due to an initial skepticism and difficulty in the identification of the stakeholders and to the short time of the project duration, the collaboration with local experts could not be as effective as desired.	The number of courses provided (4 Masters and 14 hands-on courses) allowed to train more than 200 students and the communication activities reached a wide audience contributing to the increase of the attention to the issues of monuments conservation	allow their capacities to increase enough The work market in the field of monuments preservation did not open to young professionals: a good % of the students found work in private organization but no one was employed in the public administration nor could work as a free lance
Erasmus +	Gives to students and professors the possibility of improving their knowledge, provides the opportunity of prolonging the training started with other projects thus magnifying their results	The need is felt to improve collaboration at University level and identify common themes of research, eventually promoting PhDs devoted to Armenian themes	The EU funding may allow the multiplication and magnification of such programs	Armenia is still not known as an interesting destination for students. The risk is the lack of students willing to study there for a while
World Bank project 2015	Setting up of studies, knowledge, and cooperation activities realized so far and focusing the attention on Widespread Cultural Heritage and the needs for its preservation	The guidelines provided should be at the basis of a successive detailed design. The language gaps may make it difficult the sharing of the project results with local experts	To raise the attention to less known aspects of Cultural Heritage promoting the differentiation of the tourist offer. Focusing the attention on the need of improving the living conditions of local population	Possible incoherence between the international standards adopted for the project guidelines and the local legal framework may complicate the endorsement of the project proposals

The analysis of the achievements and of the criticalities highlights the fact that the human factor is crucial. In fact, the key of success of the past initiatives resided in the involvement of local experts, students, and institutions, and in the continuous effort of finding the best way of working together. In the same field, we can also identify the main difficulties, increased by the language gap, by the budget constraints, and by the distance that makes too onerous a permanent presence.

7 New Perspectives of the International Cooperation for Armenian Heritage

The Politecnico di Milano and its professors are ready to find new ways for the realization of further research and training in collaboration with the Armenian experts and institutions.

To guarantee sustainability to eventual further action and to increase its significance, the investments on monuments preservation and enhancement should be considered also as drivers for improving the quality of life for the people living in the vicinities of the monuments through the promotion of peace building and the creation of incentives to local business activities.

A pilot site has been selected by CSDCA to experiment new forms of intervention, in collaboration with Europa Nostra and the EIB, for the promotion of a



Fig. 7 Encounter of the international experts with the Mayor of Anipemza and the school children in the Municipality

new vision of sustainable tourism development as a tool for improving heritage management and poverty reduction.¹³

On the other side, the proposal for the creation of a Regional Office for Cultural Heritage Preservation is under evaluation by the Italian Agency of Development Cooperation (AICS) with the aim of enhancing the capacities of local experts for the design of proper interventions on monuments (Fig. 7).

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¹³Ererouyk basilica and archaeological site and Anipemza village in Shirak region. See <https://www.europanostra.org/europes-7-endangered-heritage-sites-2016-announced/>, https://ec.europa.eu/programmes/creative-europe/node/280_it, <http://m.europanostra.org/news/806>.

Landscape Quality and Multifunctional Agriculture: The Potential of the Historic Agricultural Landscape in the Context of the Development of the Contemporary City

Maurizio Boriani

Abstract If we examine the costs and benefits of agricultural activity in terms of its productivity, it is clear that the fate of the historic agricultural landscapes has been sealed for sometime. It is, however, necessary to reflect on the traditional role held by agricultural activity: it does not solely involve the production of consumer goods but also continuous and careful maintenance of the territory. But this second job is not directly compensated. The abandonment of marginal lands and the traditional forms of agriculture, the destruction and degradation of traditional irrigation systems, the removal of the walls, hedgerows and tree lines that marked borders, the neglect of roadsides and terracing, the abandonment of low-yield or unmarketable crop varieties can lead to the alteration of historic ecosystems, the interruption of natural food chains, and a significant reduction in biodiversity. Desertion of the mountains and the forests has initiated processes of hydrogeological instability or put large swathes of land at risk of fire, while expected construction in peri-urban areas has discouraged any land maintenance or improvement work. Today, the costs of these phenomena are only partly at the expense of the agricultural producer, but they have certainly not disappeared, being in charge of the community. We need to promote a new way in agricultural activities and find new forms of economic support for them. It will be to seek the involvement of farmers in other, socially necessary, activity, such as hydrogeological analysis of the soil, landscape maintenance, protection of biodiversity, environmental management of the territory, cultural and environmental tourism, the preservation and management of cultural goods in rural areas, and energy saving. This is what we name ‘multifunctional’ (Huylensbroek Van and Durand (2003), Jones (2002), Plieninger and Spek (2006), Palang et al. (2015) agriculture. The paper illustrates, starting from a project realized in Milano in occasion of the 2015 Expo and promoting a multifunctional approach to agriculture, a proposal of an agricultural park for the protection of the cultural landscape of the Hakka settlements situated on the borders of the Chinese city of Hui Yang (Guangdong).

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1 Introduction

The term landscape designates an area, as perceived by the local people, whose character is the result of the action and interaction of natural and/or human factors (European Landscape Convention, Florence 2000). It follows then that the landscape structure of an area can only be understood and protected by taking into consideration all the natural and anthropic factors that have created it: a protection policy based exclusively on the bonds of law and the control through this of a purely visual structure is insufficient to guarantee the lasting quality of the landscape of an area.

Excluding natural desert landscapes or our highest mountains, it is easy to recognize how a large part of the landscapes on our planet are the result of man's intense and continuous work to transform naturally hostile areas into domestic places: the more difficult the hydraulic, orographic, climatic, or soil conditions, the more work must be done to treat the earth, manage the water, protect our crops from the weather and construct settlements suitable for civilized life.

From this point of view, there is no doubt that agriculture has always been the first and most important human activity in terms of producing landscape. It should be observed that it is an activity that must be carried out continuously and actually provides stability for a settlement. This stability is a condition, but also a consequence, of work in the fields, which allows the transmission over time of the work incorporated into the territory: through the continuous and regular addition of work to the natural environment, whether it be initial colonization or successive maintenance/improvement work. The harder the initial situation, the more work is needed: the agricultural landscape is, therefore, laborious to produce but equally laborious to preserve; it inevitably requires constant maintenance to protect it from returning to a natural state. It is clear that the 'difficult' landscapes are the most constructed but also the most precarious: they are, therefore, the first to be abandoned or transformed with the fading of their economic productivity.

In the best lands, over the course of the twentieth century, ancient agricultural systems based on the promiscuity of crops were replaced with new industrial mono-cropping, while the least productive or most laborious crops were gradually abandoned. In both cases, the result was an irreversible process of transformation of the order (and appearance) of the area. In other circumstances, the demographic pressure due to the imposing processes of immigration that happened on every continent has determined an expansion of urbanized areas, to the detriment of peri-urban agricultural land.

Traditional landscapes, therefore, only survive today if their profitability is still deemed acceptable: in developed countries, this means farmers who have no other employment alternatives or work is done in the free time of people who are normally involved in other sectors; in developing countries, this means the work of the masses of populations that have still not been affected by industrialization or cannot be involved in it due to culture or ability.

2 How Can We Guarantee a Future for Traditional Agricultural Landscapes?

If we were to exclusively examine the costs and benefits of agricultural activity in terms of its productivity, it is clear that the fate of 'difficult' agricultural landscapes has been sealed for sometime.

It is, however, necessary to reflect once more on the traditional role held by agricultural activity: as we have seen, it does not solely involve the production of consumer goods but also continuous and careful maintenance of the territory. The farmer sees his work repaid both by consuming what he grows and selling the products of the earth. The economic value of these products incorporates within it the job of farming as well as the task of construction/maintenance of the area. But this second job is not directly compensated. It is not only the landscape that has changed with the abandonment of marginal lands and the agricultural or urban transformation of the most profitable: the development of mono-cropping, agricultural mechanization, the overuse of pesticides and weed killers and intensive construction on wide portions of land have caused an increase in productivity, which have led to the destruction and degradation of traditional irrigation systems, the removal of the walls, hedgerows and tree lines that marked borders, the partial eradication of the rural road network and neglect of roadsides and terracing, etc. These phenomena, as well as the abandonment of low-yield or unmarketable crop varieties and the significant reduction of humid areas, have led to the alteration of historic ecosystems, the interruption of natural food chains, and a significant reduction in biodiversity.

Desertion of the mountains and the forests has initiated processes of hydrogeological instability or put large swathes of land at risk of fire, while expected construction in peri-urban areas has discouraged any land maintenance or improvement work.

Today, the costs of these phenomena are only partly at the expense of the agricultural producer, but they have certainly not disappeared: in fact, they are added to the bill of the community, which must suddenly tackle hydrogeological instability, flooding, fire, pollution from pesticides and weed killers, lack of biodiversity and emigration from economically less well-off areas. This is added to by impoverishment of the landscape, the decay of rural construction, and the progressive disappearance of traditional food production. Last but not least is the loss of a cultural wealth that could have taught us much in terms of environmental quality and the rational use of natural resources.

While it is true, at least in developed countries, that the modern farming industry has been able to resolve food supply problems at a low cost, the consequences of inattention to environmental and landscape problems risk coming back to haunt us, with a long-term deterioration in the quality of life in our regions.

We have seen that the farmer once acted as the careful manager of his land, ensuring it was natural and functional, having understood, often at his own cost, the importance of preserving the geographic, hydraulic, and ecological balance of the

land entrusted to him; it is precisely the decrease in this care that now leaves this task up to the community.

Today, it seems increasingly vital that we re-examine the farmer figure and his social role, reassigning him the once traditional tasks of producing consumer goods, and maintaining a good territorial structure. It would furthermore be necessary for him to return to constructing and maintaining quality landscapes, landscapes that can be recognized for their aesthetic peculiarities as well as their natural and productive value.

It is clear that this cannot be achieved by proposing ancient production techniques: however, the problem must be tackled in all its complexity.

Firstly, farmers must be reassigned, perhaps even with an economic reward, that role of maintaining the territory and acting as custodians of its landscape and natural quality, a role they once wielded with great skill. New professionals need to be trained to be capable of handling the environmental, agronomic, and landscape factors involved in managing the territory at the same time.

It also requires the renewed assumption of responsibility by all sciences and professions that can influence, directly or indirectly, environmental conditions, agricultural production, the territory, architecture, infrastructure, and the landscape.

How to preserve the landscape and environmental quality of traditional agriculture without forcing the farmer back into hard labor or poverty? How to achieve an adequate agricultural yield while maintaining a healthy environmental balance and the cultural values inherent to the historic landscape? How to create new agricultural landscapes that can be compared with the ancient ones in terms of environmental and aesthetic quality? How to find new ways to use these marginal agricultural landscapes that are slowly being abandoned? How to reconcile agricultural management of a territory with the development of the modern metropolis?

As you can see, studies are required to tackle the various problems, through an operational and managerial plan that employs all the synergy and economies of scale possible.

It is obvious that an agricultural economy in which the profitability per surface unit no longer represents the sole objective or involves more intense manpower will have to find new forms of economic support. It will be necessary to seek the involvement of employees in other, socially necessary, activity, such as hydrogeological analysis of the soil, landscape maintenance, protection of biodiversity, environmental management of the territory, cultural and environmental tourism, the preservation and management of cultural goods in rural areas, and energy saving.

Some of these activities will certainly produce additional income (think of agri-tourism); others can be funded by the community, obtaining a return on the correct use of the territory.

At the same time, the entrepreneurship within the agricultural world must be stimulated by increasing the possibility of its acting in complementary sectors, such as craftsmanship, tourism, recreation, and culture.

It will be up to public bodies, at various levels, to define specific experimental projects, especially in relation to some of the cultural landscapes that today appear at serious risk. I think especially of terraced farming systems, grazing lands,

cultivated forests, certain irrigation areas that still have their old hydraulic system and tree plantations.

There is now a sufficiently broad tourist and cultural demand for these areas, in themselves of great environmental and landscape value but also for their produce; broad enough to permit the development of initiatives with significant economic return and there are no few examples of success, in particular in the field of top quality horticulture, fruit, wine, or oil production.

The cultural, as well as social, interest of these projects and economies of scale that could be achieved seems clear, on the condition that they also involve public bodies and private associations, starting especially from suitable vocational training, and the creation of specific incentives toward a new development policy that has compatibility and sustainability as its objective.

3 The Agricultural Landscape in the Hui Yang Region: Proposal for a Peri-Urban Farm Park

The city of Hui Yang is implementing a new urbanization plan, which entails the transformation of a considerable part of its agricultural land into a built-up area. It is well known that this is one of the historic settlement areas of the Hakka community.

It is a cultural landscape of great historical and ethnographic interest that appears to be in grave danger. The current territorial structure is characterized by vast portions of agricultural land, generally used for kitchen gardens, fruit, and arable farming. A typical settlement is an isolated, fortified farm, although there are some small urban centers. The agricultural landscape includes broad irrigated flat areas alternating with soft forest-covered hills and orchards. Agricultural use of the soil is still well consolidated, although this is sometimes eroded by new production and residential construction of a growing city. There are clear symptoms of intrinsic weakness in the agricultural system: a good number of traditional residential buildings have been abandoned, and some agricultural land has been rented to immigrants who live and work there in precarious conditions.

The Town Planning Scheme is developed around a grid layout, defined by large two-lane roads that impose upon the natural landscape and historical agricultural fabric without any particular respect for it. Only the northernmost portion, close to a more defined hilly area, has remained untouched by urbanization and should act as a natural farm park (Fig. 1).

Some green public areas are planned within the road network: however, these too respond to a different logic (that of an 'urban park') compared to the historic settlement.

In light of what I have outlined above, the risk of a settlement policy of this type seems clear: the erosion of large portions of good quality agricultural land, loss of identity, loss of biodiversity, abandonment, neglect or destruction of important architectural assets and landscape.

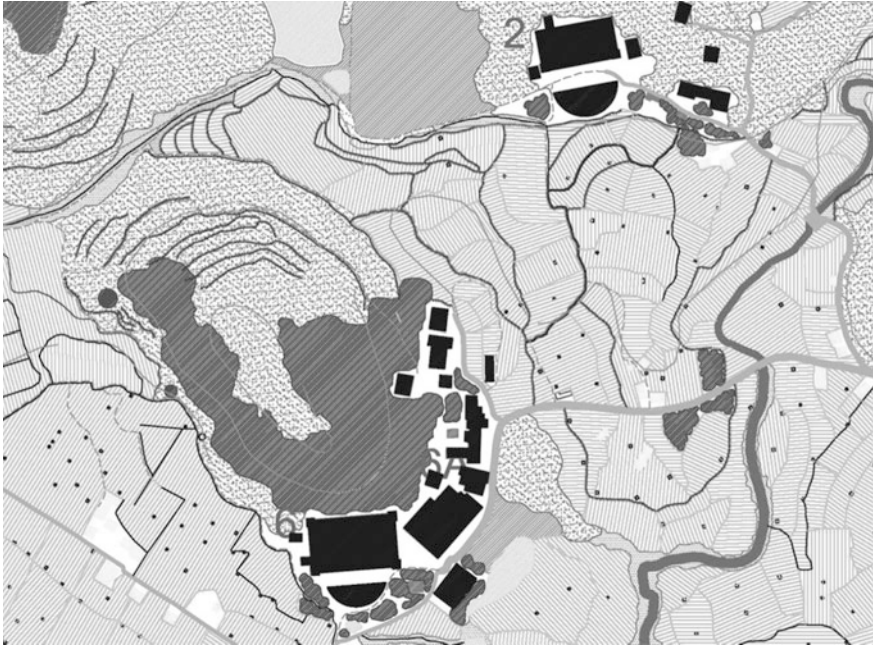


Fig. 1 Survey over a portion of agricultural land in the city of Huizhou. In dark gray are outlined Hakka's fortified settlements and the half-circular water basin in front of them. In light gray hatch vegetable gardens, in dark gray forests

The conceptual limit of a project of this kind lies in the fact that agricultural areas are considered as 'separate' to those destined for urban development, responding, therefore, to two different and distinct logics, so much so that it is almost possible to rationally plan the development of constructing a city separately from the context of the agricultural land belonging to it and the guidelines for its specific territorial planning.

European experience has in fact demonstrated for sometime (New perspectives for EU rural development 2012; The Common Agricultural Policy after 2013) that we need to change our perspective: in the matter of the relationship between city and country, we must leave behind area-oriented logic to tackle it with territorial logic. It is a matter, therefore, of understanding that peri-urban agricultural areas themselves constitute one of the components of the twenty-first-century city and must, therefore, be included in the overall city development project.

It is a matter then of overcoming a development model that has characterized the cities of the industrial revolution for over a century, which saw the city exported to the countryside and rural territory viewed merely as a reserve area for potentially limitless urban expansion.

Today, the problem seems to be how to bring the country to the city, seizing the opportunities that might emerge in a reciprocal relationship between the two contexts. What are these opportunities?

The term peri-urban refers to those urbanization processes that characterize the agricultural land on the edge of cities in which agricultural land is still functional and the rural society lives on (Fig. 2).

These are areas in which agriculture enjoys (and suffers from) some specific advantages offered by the city and, at the same time, the city can make use of some important opportunities offered by the countryside.

Among the city's positive exports to the country: proximity to market and consumers, a wealth of infrastructure, intense cultural exchanges, high demand for recreational facilities, protection of natural environments, and the possibility of income in addition to what is strictly linked to agriculture. In terms of the negative exports, it is essentially a matter of competition for the use of agriculture's fundamental resources: land and water. At the same time, the city can benefit from important advantages: the preservation of traditional agricultural landscape and maintenance of open spaces in general, the defense of sparsely populated land, recreational and cultural services for leisure and tourism. If the farmer is attentive to environmental sustainability, and in particular geographic contexts, there are also other advantages: maintenance/improvement of the biodiversity of an area and limited hydrogeological instability and fire.



Fig. 2 Huizhou: views of agricultural landscape, the water basins, and the traditional settlements of Hakka community

These functions are officially recognized by international bodies: ‘In addition to the production of food and fiber (healthy and of good quality) agriculture can modify the landscape, contribute to sustainable management of resources, preserve biodiversity, and maintain the economic and social life of rural areas’ (OECD 2005) (Fig. 3).

Therefore, we have reached a point where we must introduce the concept of ‘multifunctional agriculture’ into the planning of rural areas. Multifunctional agriculture covers all the contributions that agriculture brings to the social and economic well-being of the community and that this latter recognizes as deriving from agriculture.

The European Union indicates three factors that might characterize agricultural companies as ‘multifunctional.’ The economic factor, which takes into account the traditional function of the sector (production of consumer goods and consequent income and employment); the environmental factor, which connected to maintaining the quality of the environment, preserving the landscape, hydrogeological protection, preservation of biodiversity and more generally the optimization of local resources. And finally, the social factor, through the role that agricultural companies might play in maintaining sociocultural traditions and fabrics and in the provision of recreational, educational, and therapeutic services.



Fig. 3 Huizhou: views of agricultural landscape, the water basins, and the traditional settlements of Hakka community

There remains, however, a critical point in the case of peri-urban agricultural areas: the competition that develops between urban expansion and rural use. As agricultural areas become potential areas for construction, this short-term value might constitute an important economic resource for the farming sector, but in the long term, this destroys the possibility of competing against the threat of urban expansion (Fig. 4).

In order to take advantage of the benefits that these areas can offer the city, it is, therefore, fundamental that planning regulations are defined to protect the presence of rural areas on the margins or within the urban territory and that these regulations can be translated into town and regional planning schemes that optimize their advantages (protective belts, farm parks, natural oases, etc.) and in a way that provides economic support to the services that agricultural areas will be required to provide to the city.

Today, the area of the Hakka settlements in the city of Hui Yang exhibits the typical characteristics of peri-urban agriculture and makes for an extremely textbook case.

It is a settlement of great interest in terms of anthropology and landscape, due to the presence of important architectural monuments (fortified farms), a precisely regulated (Feng Shui) territorial layout, thriving horticulture, orchards and nursery stock, and the presence of natural areas of interest (forests and waterways).



Fig. 4 Huizhou: views of agricultural landscape, the water basins, and the traditional settlements of Hakka community

It is a territory that shows various similarities to the protected Parco Sud area of Milan: a level, irrigated agricultural area (paddy fields, water meadows, vegetables), on the edge of the southern suburbs of the Milanese metropolis, which has an agricultural landscape of great historical and environmental interest characterized by the presence of large isolated farmsteads, forests, waterways and irrigation canals, and small historic town centers.

The Park,¹ established in 1990 to protect a territory under great pressure from the expansion of the city, has played an important role in protecting, conserving, and redeveloping the agricultural landscape and natural environment, and it constitutes a valid example of what might be done in Hui Yang. In particular:

- conservation and redevelopment of the area's natural elements;
- protection of architectural assets, especially historic farmsteads;
- improvement of the area's ecological function through interventions aimed at environmental recovery and protection of biodiversity;
- reconstruction of ecological connections between the different areas of natural value (ancient trees, hedgerows, springs, and waterways), with particular emphasis on the needs of birdlife, reptiles, amphibians, and small mammals;
- improvement of visitor access and use through the construction of low impact structures;
- involvement of local communities through some exemplary interventions to demonstrate that 'redevelopment is possible';
- involvement of farmers through vocational training courses, the spread of good practices, and presentation of concrete examples;
- involvement of environmental protection associations already active in the area, as well as private participants, to achieve specific strategic objectives;
- promotion of agri-tourism;
- environmental training and education program for schools.

Therefore, various interventions were implemented for the recovery and redevelopment of humid areas, ditches, springs, and small-wooded areas, involving new planting, consolidation of banks, opening of paths, the creation of enclosures, etc.

At the same time, a dozen easy reading technical guides were drawn up, aiming to demonstrate the main problems concerning environmental protection to the public and farmers, along with specific methods to be used to appropriately preserve, and redevelop the territory.

Finally, a detailed map of the area was produced and distributed to the public, indicating protected areas, buildings of historical and architectural interest, and the vehicular and pedestrian routes open to them.

An important project (Park of the Paddy Fields 2008) currently underway plans the creation, in time for Expo 2015, of a 'Parco delle risaie' ('Paddy Field Park') in 650 Ha area in the immediate vicinity of the city, an area which includes seven

¹For more information, is hereby reported the website of Parco delle Risaie: <http://www.parcodellerisaie.it/en/>.

active farms in as many historic farmsteads. This plan foresees the creation of 20 Ha of new wooded area, renaturalization of an artificial canal, a historical–agronomic tour to enhance the landscape and culture of the area (the ‘rice road’), 40 km of cycle path, the restoration of a farmstead in order to establish an exhibition center dedicated to the rice industry, a ‘rice factory’ (documentation on the history of rice and tasting of wine and food) and other plans to redevelop the agricultural landscape and mitigate the impact of roads.

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Cultural Heritage for Urban Regeneration. Developing Methodology Through a Knowledge Exchange Program

Mariacristina Giambruno and Sonia Pistidda

Abstract The topic of urban regeneration shows a high complexity for the large number of issues and stakeholders involved. Within the city, the social and political dynamics interact and link together with the physical recovery of places. This complexity appears even greater in context that has just started recovery processes. What is the role of cultural heritage in the transformation processes? The existing built is an extraordinary condenser of micro-stories, material culture, traditional construction techniques and therefore identity: recognizing its potential and working for its recovery means to give to the cities more opportunity for their revitalization. Working for a better life quality of the inhabitants and improving their general conditions means strengthening the identity and the sense of belonging. The paper illustrates a path that, through a concrete knowledge exchange experience, tries to develop a methodological process. A learning from practice method was built through a study of local realities that finds in the knowledge exchange with the local authorities and administrators a real opportunity to increase the tools to face the future challenges. The object of investigation is represented from eleven cities in Europe and Central Asia, which are passing through real development phases and, because of their rich diversity, are an interesting subject of discussion and comparison.

1 The Role of Cultural Heritage in the Cities Regeneration

The concept of cultural heritage has had many meanings throughout the history, going on to include more and more elements deserving of care and respect as symbols of culture and civilization. “The concept of a historic monument embraces not only the single architectural work but also the urban or rural setting in which is

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found the evidence of a particular civilization, a significant development or a historic event. This applies not only to great works of art but also to more modest works of the past which have acquired cultural significance with the passing of time.”¹ Accepting this idea, now consolidated, the city as a whole becomes a cultural asset. This “stratified” texture is in fact the result of a continuous overlapping process that has left many tangible signs on the territory: the single “monumental” episodes, the historic center, the green area but also the suburbs, the industrial heritage, the abandoned areas. They are a constellation of elements that apparently do not interact with each other.

The city cannot be read and interpreted in separate parts because of the elements that compose it have scales of different values. Each one contributes to characterize the “existing city,” whether it is a “monument” recognized as an exceptional episode, a suburban neighborhood, or a disused industrial area. The disused areas, for instance, are fragments within the city and sometimes they become conflict places: it is necessary to look at them as opportunities, not only as isolated interventions, but also for the large-scale interaction possibilities; we have to think to their reintroduction in the life cycle.

To understand the potentialities and criticalities of the existing city, and to turn the last ones into a positive key for the processes of urban revitalization, it is necessary today, more than ever, an extended vision and a multidisciplinary approach in order to address the urban problems. Recognize and interpret the elements that contribute to define the territorial structure in order to reintegrate them into a virtuous circuit. The complexity of the issues involved requires a multilevel vision, able to range from architecture to urban space and mobility, to the issues related to the preservation of cultural heritage, as well as to the balance between urban and natural resources. One of the key issues of the approach to such complexity is the identification of a process, able to guide the knowledge and awareness of the site potential. To this end, an interpretative reading can extract the potentiality of the place, activate discussion tables, and then try to prefigure strategic actions. It is necessary to identify the local elements that, through an appropriate enhancement, can play the role of catalysts. The challenge lies in the constant search for a balance between conservation and transformation: facing the change by increasing competitiveness without losing the main resource, the local identities.

The recovery of the existing built can play an active role in the development of the urban processes. First, it represents the steps of the city development without which the urban form loses its meaning. Understanding its role and sense can help to drive revitalization projects, able to reverberate the positive effects on the urban set as a whole. Secondly, as many recent European and extra-European experiences have demonstrated, the promotion of preservation interventions on built heritage

¹*International charter for the conservation and restoration of monuments and sites* (the Venice charter 1964), IInd International Congress of Architects and Technicians of Historic Monuments, Venice, 1964, art. 1.

can trigger chain reactions, able to activate the great human and cultural wealth and the recognition of the collective identity.

2 Historic City Conservation and Urban Regeneration: An Interdisciplinary Project

The authors, together with a rich group of experts,² have been involved, starting from 2012, in the research project named “The Historic city conservation and urban regeneration (HCCUR) module within the sustainable cities initiative (SCI) in Europe and Central Asia (ECA)”³ developed on behalf of Fondazione Politecnico di Milano under the assignment of The World Bank.

The main premise of the Sustainable Cities Initiative (SCI), in which this assignment is integrated, is that cities in East Europe and Central Asia (ECA) have an important opportunity to learn from their Western European neighbors, which can provide practical examples and encourage ECA cities to promote policy changes and investments that will help them be better prepared to urban development challenges.”⁴ The aim of the project is to compare experiences among some European cities that have faced the global challenges and Central Asian cities selected as ECA guests to participate in the exchange program. “The goal (...) is to enable ECA cities to explore, understand, and apply best practices in developing strategies that promote historic city conservation and urban regeneration as vital elements of their sustainable future” (See Footnote 4.).

The final aim is to reflect on the possibilities and critical elements related to the recovery potential of these cities, while at the same time identifying future investment opportunities in order to guide the choices. The challenge is to provide practical tools to address the choices related with the urban development, planning transformations compatible with the city genetic code.

The articulation of the set objectives had to be addressed by a multidisciplinary team that included experts in urban and architectural design, mobility and transport, conservation of cultural heritage, economic evaluation of projects. An interdisciplinary overview is the basis, indeed, to face the complexity: in this way, it is necessary to use different eyes. Core issues as energy efficiency, urban transport, urban design and preservation of the existing built, and place identity cannot be treated separately. It is also necessary to look at the city and its heritage as an economic value, for its potential to participate actively in the growth processes. The different disciplines are in this case the different ways to look at the city and extract

²Fondazione Politecnico, the Department of Architectural Design of Politecnico di Milano and Systematica formed the working group. See the acknowledgments for more details.

³The World Bank, task team leader Stephen Karam, Lead Urban Economist and Guido Licciardi, Urban Specialist.

⁴TOR (Term of reference) Consultancy service.

its potential, by finding in the knowledge exchange the necessary synthesis time. A knowledge exchange program has the advantage to provide a continuous feedback.

The different expertise involved share experiences on real study cases, and at the same time they reflect on theoretical foundations; the representatives of local government share their vision and their on-field research as well as they talk about the tools put in place to manage the preservation of historic heritage. The work was therefore divided into different phases that were modified and refined in the content and in the way to proceed, referring to what was stated in the TOR of the contract, enriched in relation to the knowledge gained in the preceding stage as described in the following paragraph.

2.1 Lay the Bases for the Knowledge Exchange: Practical Issues and Tools

2.1.1 Comparing Experiences: Three Italian Case Study

“North Italy—an archipelago of networked city centers” is the topic proposed by the research group to show the Italian approach to the historic city conservation and urban regeneration.⁵ As case studies, three Italian cities from the north Italy have been selected: Milan, Genoa, and Bergamo. They are three sample cities very different from each other for urban growth, development and management dynamics but representative for the rich historic heritage, for the transformation events, urban texture and for their intrinsic potential. The three cities are also interesting for their different capacities at the same time to contribute to their sustainable development and to create virtuous networks with surrounding territorial realities.

The aim is to provide concrete examples of how the cities have faced some major challenges for sustainability such as energy efficiency, transportation, relationship between built heritage and urban dynamics.

The challenge of a cross-regional networking is also the element that joins the Italian experiences with the ECA candidate cities where local governments and private entities are working to develop synergies. During the seminar event, for the three case studies selected (Milan, Genoa, and Bergamo) have been organized visits guided by experts intended as knowledge tour, a sort of *in situ* work for a direct experience and verification of the issues. This gave to the host cities the chance to see how three very different realities faced the challenges of urban regeneration.

⁵This part of the research was developed by the team group of Systematica (F. Casiroli and R. Choubassi) and from the group coordinated by C. Macchi Cassia.

2.1.2 Searching for the Potential of Eleven Guest Cities: Factsheets and Questionnaire

The city factsheets

The eleven ECA cities,⁶ selected according with the World Bank staff, were been representative of different aspects in Europe and Central Asia. The Italian team developed specific factsheets dedicated to each city, referring, as a reading key, to the same indicators used for the Italian cities, in order to prepare the knowledge exchange event. The general goal is to build a first working base, able to provide a multidimensional reading of the aspects of each city, to stimulate topics of discussion. To this end, it was important to define in the initial phase the search criteria and the information sources, different according to the scope and level of investigation: Web sources, touristic guides, national and international databases for demography, statistics and economics, current and historic cartography, data from libraries and electronic database, etc.

The factsheets, synthetic and easy to read, have been built by defining the indicators necessary to understand the potentials and critical elements of each site. The factors taken into consideration are the regional context considered for asset and character, information about the city as population, productive sectors and economy, transport network and mobility, and specific characters as resources for development (e.g., nature of the historic center, relation between existing urban texture and new architecture, presence and diffusion of cultural heritage). The aim is to identify the elements representative of the local identity and the critical points related to their preservation and awareness, in order to define new strategies of reactivation. Another important point investigated is the topic “Learning from history”: know and analyze the specific events crossed by the city during its history, to better understand the complex stratification process, the relationship between the historic center and the new expansion. This permits to extract the urban and landscape values, intended both as environmental characters (natural resources) both elements that define the historic urban texture. A specific focus on cultural heritage permits to identify the richness and diffusion of the most important monuments and sites, also to include them in an economic vision for its potential to attract tourism. Based on the concept to enlarge the general idea of monument to a more widespread built heritage, other elements enter in the circuit of opportunity: brownfields, abandoned and disused buildings, etc. Culture and tourism network are also a potential for development: elements as cultural services, presence of museums, theaters, libraries, universities but also level of diffusion of cultural events as festival are elements able to define the attractiveness of the place by external users and tourists. Finally, the study takes in consideration the urban planning policies and the actual conservation valorization projects to investigate the tools developed

⁶Strumica in Macedonia; Samarkand, Bukhara and Nukus in Uzbekistan; Prizren in Kosovo; Berat in Albania; Lviv in Ukraine; Eskisehir and Gaziantep in Turkey; Klinty and Surazh in Russia.

by the local government and the possible trends over the next ten years, permitting to summarize the city challenges at a glance.

The Questionnaire

The questionnaire is a second step developed by the Italian team and addressed to the ECA guests involved in the knowledge exchange. It is at the same time a tool for comparing, verifying, and deepen the collected information. It is based on the structure of the factsheets and, for each topics, provide some questions to deepen the level of knowledge and to prepare the basis for the next seminar event. The main topics concern the regional context, the city considered in its distribution, economy and mobility, the urban and landscape values (cultural and environmental characters, historic urban texture, cultural heritage, brownfield regeneration, cultural and tourism network), problems and perspective for urban regeneration.

The aim is to identify and collect the necessary information from the participating cities, focused on the potential for historic city conservation and urban regeneration, able to define the interest of the World Bank in redevelopment/valorization project. The questions are structured with YES and NO modality or requiring a short description. In addition, it is required supporting documentation as maps, pictures, significant local documents to better clarify the urban and environmental character of the city useful to prepare the knowledge exchange program.

2.2 *Sharing the Knowledge: The Seminar Event (Urban Design Charrette)*

Milan has been chosen to host the knowledge exchange event with the participation of the World Bank staff, the Italian research team, and twenty-one representatives of ECA cities from local government or public and private agencies. The main goal was to strengthen the sharing with the administrators and authorities of the ECA cities to activate a discussion board on the challenges, tools, the issues encountered, as well as to create opportunities to build relationships.

A first part provided some seminars on the topics of urban regeneration with a focus on the themes of industrial heritage and regeneration of abandoned areas.

Urban design charrette has been planned as a moment of confrontation and concrete exchange of ideas: three days of very hard work session with a final collective presentation with the aim to share the information and encourage interactive discussion of design proposals according to a dynamic and continuous feedback process. The charrette was organized in four big groups, each based on specific topics: the urban design, the relationship with the historic city, the urban mobility and infrastructure in the historic cities, and the economic aspects involved in the urban regeneration processes. The round tables were developed under the guidance of experts with the participation of Ph.D. students and teachers with the

aim to reveal potentialities and critical elements of the cities, through the in-depth analysis and comparison with the local authorities. The final goal is to discuss challenges and opportunities, identifying the key elements to activate urban regeneration processes and to propose a series of concrete actions to start, reinforced by case studies appropriately selected to demonstrate the success and feasibility of operations. The local objective is to improve the living conditions through the enhancement of services and the design of open spaces, also to attract the income generated by tourism: a sequence of actions capable of generating chain reactions giving a contribution to the improvement of local microeconomics.

Some conceptual schemes and sketches have been used as a speedy synthesis tool for reflection to understand the urban grain, the characters of the city and the main attractors in order to identify potential and specific needs to develop sustainable strategies respectful of the local identity (Figs. 1, 2 and 3).

2.3 Synthesis Time: Diagnostic Tool and Pilot Project

The reflections developed during the early work phases suggested the use of a diagnostic tool⁷ to assess the overall opportunities of an urban context through the definition of some parameters: the physical, infrastructural, social and economic asset. Starting from these four dimensions of the city, it is possible to develop some considerations for the conservation and improvement of the local urban asset.

The toolkit is a simple tool, easy to use by the local authorities, intended as guidelines and verification tool. It is divided into three parts: one part focuses on the city potential index, evaluating indicators such as economic base, infrastructure, public services, land use planning, human capital, cultural heritage, natural resources, tourism capacity, and abandoned area. The second part analyzes the potential index of a selected area, while the last part focuses on the urban impact index prefiguring project scenarios oriented to specific topic such as infrastructure, housing, public services, and cultural heritage. The diagnostic tool was built and experimented on some pilot cities, but it was not used for all eleven cities because during the implementation of the work it was decided to focus the attention on three case studies, developing in-depth studies.

As final test, the entire research group selected, among the ECA cities, participants in the exchange program; three pilot cities were visited by the Italian research team to share and discuss concrete action plans for the city development: two Russian cities, Klinty and Surazh, and one Turkish city, Gaziantep. The cities hosted the Italian research team for an exchange. During the visit, the team had the opportunity to discuss on site the issues addressed in the workshop in Milan, thanks to the different meeting with the local administrators and other stakeholders responsible of the management of the city. The general aim is to define long-term strategies for urban regeneration and historic assets requalification.

⁷The diagnostic tool was developed by the research group coordinated by R. Camagni.

Fig. 1 A sketch for the city of Nukus in Uzbekistan. The presence of an important Museum of Art of the Karakalpakstan and the extraordinary architectural heritage in the surrounding permit to imagine a network with Nukus as starting point



“*Gaziantep 2030: innovative methods for revitalizing heritage*”⁸ shows the challenge for the city starting from four main topics: connectivity, urban revitalization, abandoned areas requalification, and transportation network integration.

With a double overview, on a macro- and micro-scale level, it is possible to identify different level of intervention. The promotion of a territorial network is the possibility to build a solid “backbone,” able to show the great potential of the context and give again an important role to the historic heritage, supported by the open space and the green areas as connection. The urban revitalization process aims at activating specific actions able to generate chain reactions, also promoting cultural tourism as opportunity for economic improvement. A new vision must necessarily promote the *mixité* as a condition, encouraging the people to stay in the historic center: for this, it is necessary to improve the livability and to offer services and opportunities (Fig. 4).

⁸A. Del Bo, R. Choubassi, P. Macchi Cassia and S. Pistidda took part to the visit and to the report.

Fig. 2 A sketch for Samarkand in Uzbekistan. The main axis of the city is identified as the central element to reactivate the local microeconomics penetrating the urban texture. [Uzbekistan charrette, group coordinated by M. Giamb Bruno with G. Alizzi, M. Guarisco, R. Mastropirro, S. Pistidda, V. Tolve]

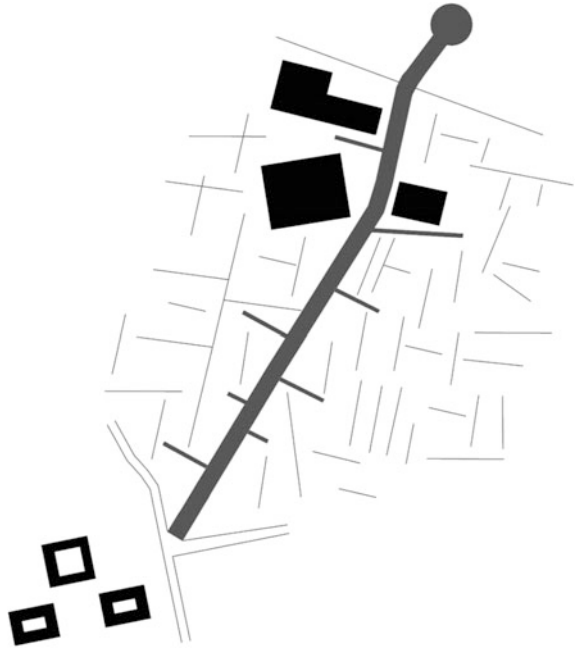


Fig. 3 A sketch for the city of Bukhara in Uzbekistan. The compact and dense urban texture is read as a quality to be preserved, revitalizing the historic city through the maintenance of the inhabitants in place [Uzbekistan charrette, group coordinated by M. Giamb Bruno with G. Alizzi, M. Guarisco, R. Mastropirro, S. Pistidda, V. Tolve]





Fig. 4 An abandoned village around the Rumkale fortress in the surrounding of Gaziantep on the Euphrates River (Photo S. Pistidda)

“*Surazh/Klintsy/Unecha: a new centrality for the Briansk region*”⁹ is focused on the relationship between landscape and heritage, searching the way to promote the local culture. The three cities are placed in a marginal area of Russia. Here the history has left many traces: a unique natural heritage, an industrial legacy that has transmitted many brownfields, a suggestive complex designed by Quarenghi in the Lyalichi village (Fig. 5). The challenge is to regenerate this forgotten heritage, and the key point is to consider the three cities not as single entity but as possibility to create a network, exploring the local potential of each reality. This requires an integrated vision that goes beyond the boundaries of single municipalities to establish a strategic group, where everyone working on the development of specific topics according to midterm and long-term actions: nature, landscape, historic heritage with the challenge of connectivity as common goal.

3 Some Provisional Conclusions

The activity conducted—object of a rigorous collaboration and a continuous confrontation of a vast multidisciplinary group for some months—allows drawing some preliminary and provisional conclusions.

Firstly, the need to understand and share objectives and working methodologies between experts that, even if coming from a similar background, might have diverse perspectives regarding the priorities to tackle on field. An example in this sense is the definition of what is encompassed in the concept of “cultural heritage” nowadays: Therefore, it comprehends what should be preserved in the stratified layout of the existing city in order to allow the preservation of its form, matter, and memory. Although the so-called definition of “monument” has passed in years through a path that led to acquire every product of a material society to the aforementioned

⁹The “development concept” has been elaborated by C. Macchi Cassia, M. Giamb Bruno and R. Camagni with the collaboration of S. Camolese, P. Macchi Cassia, M. Motti, S. Ivaldi and L. Santosuosso.



Fig. 5 Complex designed by Giacomo Quarenghi in the nineties of the eighteenth centuries for the count Zavadosky in Lyalichi village placed a few kilometers east of Surazh (*Photo M. Giambruno*)

concept, “on-field” often among experts there is not a shared vision concerning what is going to be preserved, demolished, or rather to use as fulcrum of urban regeneration interventions.

Observation through the perspective of “others,” as happened in this experience, can be useful to understand which “values” they use. Furthermore—in the perspective of the author, who deals specifically with “restoration”—it might help to find the reasons to defend the right of existence of those cases that might be considered as “expendable” and that, on the opposite, could be of fundamental importance as pivotal point of a new polarity. Similar considerations may be done when the confront occurs with cultures having traditions, references, and theoretical backgrounds diametrically different from ours, as happened in the urban design charrette. Observing together, or better, observing again together, is fundamental to avoid “colonial” cultural behaviors, which want to impose in “one-day” modalities and praxis that have been discussed faraway for a long time.

From both the situations, the lesson learnt concerned the “respect” of the opinion of others and the need to embrace them, to evaluating them properly to reach a shared common objective.

In this way, the methodology of best and bad practices was been essential. The aim is to show to the authorities which actions had a positive—or negative—impact in similar situations in order to compare the theoretical bases with concrete actions.

In the framework of the project, another experience that gives a significant lesson to the author is the attempt to create a “diagnostic tool” that can evaluate objectively which could be the possible critical aspects and positive impacts of a given intervention over the existing city.

Even though it was not possible to design tools that will “automatically” guide administrators in taking the best choices possible, trying to evaluate with measurable parameters, the actions can be of great importance, in order to encourage an objective analysis of reality without prejudices and of a priori judgments of value.

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Learning by Practice from an Early Researcher Perspective. Investigating Widespread Heritage in Transition Countries

Francesca Vigotti

Abstract Through the description of three experiences of field-based research in transition countries, the paper wants to give an insight regarding how the working methodology of an early-stage researcher can be conditioned, passing through the changes imposed by diverse contexts on time. Specifically, the contribute underlines the importance given to widespread heritage safeguard in different geographical contexts (Albania, Montenegro, Myanmar) and develops reflections regarding the influence given by the context over applied conservation policies. Starting from the challenge in trying to adapt a background of knowledge and studies developed in a determined culture and environment to radically different time by time, the paper then argues over the confrontation needed to further mature theoretical tools to manage diverse situations, so as to set in discussion and adjust to each context the methodology acquired in time.

1 Introduction

The opportunity to confront the training received during the years in higher education with three international experiences, profoundly diverse in context and partially also in final objectives—concerning applicative research projects—shortly after the graduation, was particularly significant in terms of shaping and structuring a working methodology. The background of studies and experiences gained during university I could rely on is based over a strong interest for preservation aspects, together with an attention—specifically developed in the Master of Science and after graduation—regarding International Cooperation and the protection of heritage in transition countries. This theme was the core of a one year post-graduate programme.

The practice gained on-site enriched significantly what I had the possibility to learn in the early stages of training, especially as a student. Before the three

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experiences that will be illustrated in the paper, the only occasion in which I could experiment on-field research in a transition country was during the Master of Science, in a multidisciplinary project. That being so, on-field investigations in Albania, Montenegro and Myanmar were a confirm to the significance of developing a working methodology designed over each site.

In Albania, the research was related to the city of Shkodra and its province. Starting from the information gathered by the Institute of Monuments and Culture (IMK) regarding more than 100 properties, of which over 80 were Albanian traditional wooden houses, the final goal was to structure three possible itineraries to allow the population to “rediscover” its own heritage.

The case study of Stari Bar, set in Montenegro, was used to organize a workshop in collaboration with Università Ca’ Foscari in Venice and the Municipality of Bar, where the students have the chance to develop a safeguarding plan for the ancient walled city and its surroundings, renowned archaeological site of the region. The last experience is related to the investigation of widespread heritage of Pyu cities, set in Myanmar: in this case, the direct confrontation with the site had a significant role in addressing future research.

Given the introduction, the centrality of the essay will set the focus not only over the investigation regarding widespread heritage set in the countries mentioned above, but also concerning the research approach—that had to change accordingly to each case study—and the evolution of a research method on time. How to deal with these situations that seem different superficially, but share more than what appear? In what way is possible to apply the experience gained in time, together with the theoretical bases, in context that are radically different from the ones we are—normally—used to?

2 Shkodra: (Re)Discover and Valorisation of a Multifaceted Heritage in the North of Albania

Concerning the experience in Shkodra, the greatest challenge was represented not by the vast extension of the region and the existence, at the same time, of a high presence of widespread patrimony in the area, but more concerning the identification of this heritage, only partly “recognized”. The competent institute and authorities have started since 2010 an interesting data gathering activity regarding architectures,¹ urban and landscape parts that could be eligible to become “minor heritage”.

For these reasons, the realization of a thematised map that could present the partially hidden potentialities of Shkodra and its province concerning heritage was

¹The paper is referring to data gathering campaign launched by the Institute of Monuments and Culture of Albania (*Instituti i Monumenteve të Kulturës*, from now on IMK), which material was possible to consult to develop the investigation.

considered an appropriate outcome for the research. The representation was intended to create a tool that could be useful to scholars and to non-experts. The firsts might have an interest regarding the investigation on the territory; the seconds might be involved in raising a major awareness of the region and its palimpsest, made of different cultures and traditions.

The realization of the map was the second—and last—part of a larger project started in 2010: “Albania Domani”. While the first part of the research was mainly focussed over the southern part of Albania, the segment of the investigation in which I was involved interested the northern portion of the country.

Although the objective of the research was clear since the beginning, the investigation process demanded an important effort in terms of structure and organization of the working and research methodology. The quantity of materials the research group had at disposal to develop the project was consistent. Nonetheless, it was felt the need to organize all the information gathered in time and to define a method to present the research outcome in an understandable and not minimizing way.

The outcome of the research project, a map that comprehends three different routes towards the heritage of Shkodra at regional and urban level, is therefore the result of a systematic investigation over cartographies, bibliography and archives. Thanks to this preliminary study, it was possible to structure a methodical framework useful to organize the in situ research, in the perspective to organize the mission in Albania in the most productive way considering the shortage of time.

A first identification and selection of the architectural and landscape heritages that could be interesting to the research was managed by using the investigation conducted by IMK, comparing the material retrieved by the institute with the documentation edited by *Monumentet*, a specialized publication concerning Albanian heritage. The Institute has listed a total amount of 132 properties in Shkodra, among which figure traditional wooden houses, historical streets and religious buildings. Based on the list and the material prepared by the institute (almost all the properties listed had a photographic archive and a geometrical survey), the study of documents and bibliography started in December 2013. That being so, starting from the material gathered through the campaign done by IMK, it was possible to proceed in the drafting of evaluation cards regarding the properties, to be used as working tool through the in situ research.

During the investigation process on-site, it was possible to figure out how the cards were significant as control tool. In fact, being structured as a sort of “identification card”² for each property and compiled before the mission with the information available gathered from IMK, the bibliography and documents, the sheets were updated based on the new material collected in Albania and completed with the description of the conservation status, accessibility and critical aspects of the property (Fig. 1).

²The sheets are organized containing the information as follows: name of the property, localization, dating, former and present use, date of inscription of the property in the list of Albanian Cultural Heritage. Such structure is derived starting from the classification of IMK listing, finalizing the data by adding the documentation gathered from other sources.

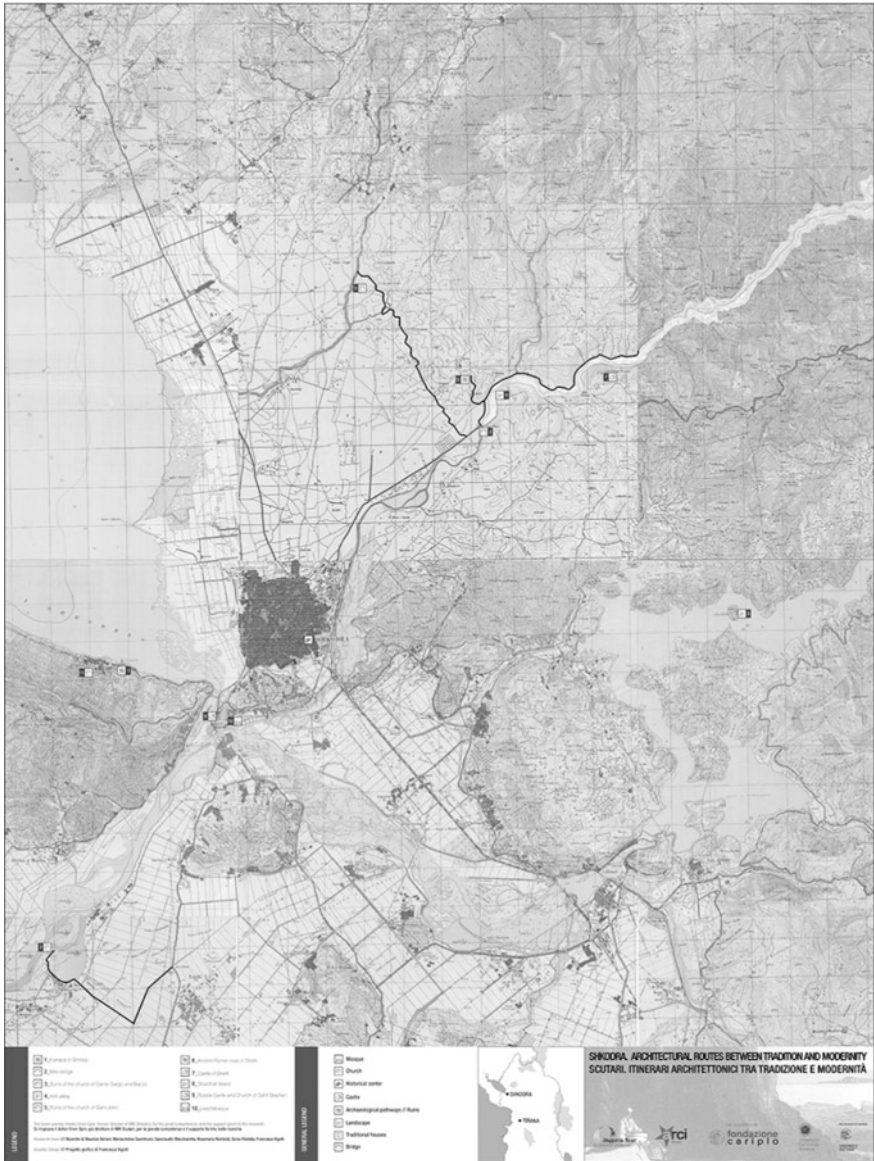


Fig. 1 Front side of the map represents the itinerary concerning the surroundings of Shkodra. Research team: M. Boriani, M. Giambruno, G. Macchiarella, S. Pistidda, R. Rombolà, F. Vigotti

The data gathering on situ was not a simple process. The problems encountered were several: the lack or difficulties in access to a part of the properties listed by IMK, since most of them were traditional wooden habitations still in use as private houses; another issue concerned the identification of the properties on the map. The

cartography at our disposal, updated to the 1980 and designed at 1:50,000 scale, did not allowed a precise identification of single buildings, but rather of the area where they supposedly were set. The same matter concerned properties spread in the territory around Shkodra: changes to roads asset in the last thirty years, even minor, led in some cases to difficulties in reaching part of the heritage listed.

As the first experience in investigation of widespread heritage on field, it was interesting to realize out the changes that occurred between the first draft of the map, mainly outlined at the beginning of the investigation based on the material retrieved by indirect sources, and the final decision concerning the properties to show to create the routes. Therefore, this choice was made not only over the information retrieved during the mission in Shkodra and its territory, but adding them to the research previously conducted and the considerations matured afterwards. In fact, the in situ investigation allowed not only the verification of accessibility and state of conservation of properties listed, but also to notify buildings of potential great interest: these are architectures mainly built from the first half of twentieth century to the 1980, with some exceptions of items constructed in the last ten years.³

Once the properties were individuated, the formulation of three different itineraries was done. In the final draft, the properties included in the map were 29. Those selected are architectures, parts of the city and significant landscapes of Shkodra district chosen not only for their conservation state, but also for their value as sign of the society who created them.

A first route regards the district of Shkodra, including heritages of different kinds: mosques, churches, the fortified castle along with places considered of high landscape value (ancient roads, terraced fields...). The other two itineraries are set in the city. One regards the historical centre, its main roads—recently part of a conservation project—and the significant architectures set along them (e.g. the *hāmām*). A second route concerns buildings from the twentieth century considered significant to illustrate the evolution of architectural design in the city.

3 Tutoring On-Field: A Didactic Experience in the Walled City of Stari Bar

In approaching the workshop in Stari Bar, Montenegro, the experience gained in Shkodra for the drafting of the map and the cultural routes has had a positive influence over the research work. Even though in this occasion, as mentioned before, the research context was specifically related to a didactic episode, the working methodology acquired in Albania few months before the workshop has permitted to respond promptly to the request advanced by the stakeholders, and so

³The buildings are mainly used for public functions (museums, radio stations, cinemas, theatres), although also some residential units were indicated.

to expedite the research on field. Thus, this was achievable by adapting the framework already experimented to newer but, if possible, comparable issues and critical aspects encountered.

That being so, the workshop was of great interest not only for the opportunity to work over a territory in which presence of heritage is widespread around the principal object of research—the walled city of Stari Bar—but also for the possibility to test the experience of tutoring in circumstances of on-field training (Fig. 2).

The workshop, structured for 14 students at their first year of the Master of science in Architecture, has permitted to individuate three major investigation themes: protection and identification of the “core zone” and drafting of intervention indications concerning the fortified city; survey and conservation project of the most important buildings, having as final objective the design of an exhibition path; definition of the “buffer zone” and drafting of guidelines related to this area.

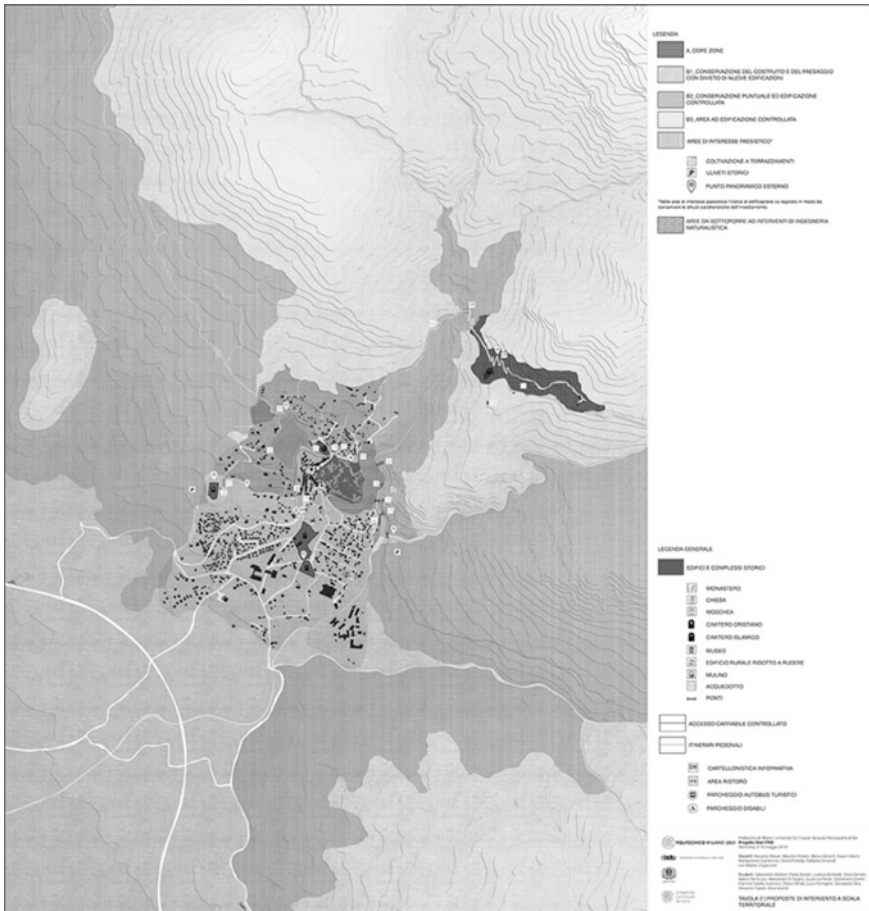


Fig. 2 Final draft of the project for the buffer zone. Project team: S. Demetri, F.C. Invernizzi, L.A. Panteghini, S. Vezzoli

In this case, the difficulties encountered were not only to organize and interpret the information gathered concerning the case study for myself, but also to create a common framework with the members of the group I was tutoring, so as to structure the more complete collection of data and materials regarding our research object in the short time of in situ investigation we have at disposal.

The workshop was not limited to the on-field investigation: after the mission, information and materials gathered were elaborated to obtain, as an outcome, the design of boards and guidelines concerning the elements interpreted as “backbone” on a territorial scale.

As a tutor, the most stimulating aspect was noticing how the individuation of “minor” and landscape heritage has needed a comprehensible further effort. Even though all the members of the team came from the same theoretical background, being the workshop their first experience of on-field research concerning widespread heritage, the elaboration of information acquired and the processing of the investigation—especially concerning the acceptance of what could be considered “heritage”—was not uncomplicated and led to the most heterogeneous conclusion. This last aspect enriched significantly the debate and the project process.

In fact, the territory of Stari Bar is composed and characterized by presences of different value. On the one hand, the research group formed by the students did not have difficulties in elaborate a great part of the constructions set in the area (e.g. religious buildings, mills, monasteries, hamlets...) as heritage: in this sense, the process was almost immediate. On the other, some considerations had to be done to understand that also terraced cultivations, ruins, valleys and even some trees—recognized by the community as valuable due to their age—should be as well included in the safeguard project.

Another challenge posed by the context was represented by the presence of the modern city. The growing urbanisation and soil changing have started to harm the area around the walled city of Stari Bar: during the field-based research, it was possible to figure out which were the most urgent issues that needed an intervention and to design some possible solutions. As an example, the team noticed how the presence of newer edifices was, in several cases, not aligned with traditional buildings in terms of materials, heights and volume; thus, this led to the draft of guidelines that might be useful to the population regarding maintenance of traditional buildings and construction of newer ones.

The case study of Stari Bar represented, from my point of view, an interesting exercise. For the first time, after having studied guidelines and reports of international agencies regarding conservation strategies applied to case studies similar to the one of the ancient walled city, I was finding myself to challenge the education received with the draft on a hypothetical safeguard and management plan for the area. During the whole process, I was aware of how important this experience would have been for my training, having the opportunity to investigating widespread heritage directly on field, together with the occasion of receiving indication from international experts having a multidisciplinary background. That being so, the interpretation and suggestions given by the experts in the development of the workshop have certainly helped the research group in structuring and addressing in

the most fruitful way the investigation and the draft of the plan. This has led also to stimulating debates and discussions regarding the outcomes of the research, which changed to better respond to the matter posed.

4 Changing Directions: Acquiring Knowledge from a Different Perception

The activity of research and documentation conducted in Myanmar—specifically concerning two of the three Pyu ancient cities,⁴ sites recognized as World Heritage properties—has been developed in the framework of the second phase of the UNESCO project concerning the verification of the state of conservation regarding the monumental complexes of the two sites in Beikthano e Sri Ksetra.

In this case, I had the opportunity to apply on field the knowledge and tools acquired thanks to the bibliographical research done in the months before the mission regarding the topic of widespread heritage and cultural landscape, major subject chosen for the development of the doctoral research. In this context, the experience in Myanmar was crucial to define, understand and address the investigations treated in the thesis, underneath the macro-theme mentioned above: having the chance to discuss and learn from the experts that are specialized in South-East Asia region enriched the methodology of work and the knowledge concerning this theme.

Myanmar has obtained in 2014 the listing as World Heritage by UNESCO of three cities dated back to the Pyu period: Sri Ksetra, Beikthano and Halin.⁵ The shared characteristic of the three sites is the presence of a territory that comprehends, at the same time, vast archaeological areas circled by walls and cultivated land still used by the inhabitants as sustain source.

The case study of Sri Ksetra is particularly significant among the three. A noteworthy number of small villages are set in the area posed under protection, both in the core and in the buffer zone. It is of great interest to notice how the development of everyday life and cultivation, still conducted in traditional way, is managed in harmony with the archaeological area.

Furthermore, the presence of Buddhist monasteries, together with a significant number of archaeological evidences (e.g. Stupa, gate of access to the ancient city, necropolis and burial grounds) occupies a wide portion of the site.

The on-site research allowed the identification of the main issues related to the methodologies of conservation of widespread heritage used at present in Myanmar, identifying also best and bad practices applied from the second half of last century until nowadays (Fig. 3).

⁴Pyu period is dated between 200 BC and 900 AC.

⁵The nomination documents and description of the sites can be retrieved at <http://whc.unesco.org/en/list/1444/>.



Fig. 3 Perspective of a Stupa in the cultivated area of Sri Ksetra

During the research period, 62 monuments in the city of Beikthano (60 Pyu buildings and two pagodas presumably dated back to nineteenth century) and 80 in the site of Sri Ksetra (of which 57 of Pyu attribution). The two sites are set at 350 km of distance, and present climate situations substantially different that influence not only the conservation state of the remains, but also the peculiarities of the cultural landscape itself. In fact, the archaeological site of Sri Ksetra is characterised, on the one hand, by a vast presence of cultivations, while on the other by religious buildings inside the ancient walls of the city. Both still in use, the first sustains the population of the nearby villages, while the second represents places of worship for the inhabitants.

In Beikthano, where the climate is arid, the presence of cultivations inside the archaeological area is limited to some fields set nearby the small artificial lake. Furthermore, the existing heritage is composed by the system of the ancient building that constituted Pyu city, mostly in the state of ruin. That being so, these are not used anymore by the population in their rituals (Fig. 4).

The opening to international trades' threatens the fragile cultural landscape of Sri Ksetra, and the traditional agricultural techniques applied on the site: during the research, it was possible to notice a progressive substitution of autochthone cultivations with other crops, considered more profitable. These fields, based on the observation that was possible to achieve during the on situ investigation, are the ones in which is used in mechanized cultivation. Since such methodology is applied over potential archaeological areas underneath the fields, not far from an urns burial ground, it is clear how the need of a preservation strategy over landscape is urgent.



Fig. 4 Archaeological evidences in the ancient city of Beikthano

Thus, the risk that the change of soil use and the rapid urbanization would overcome the ancient cities is reaching a critical point. As a confirm, while Beikthano and Halin are set at distance from the contemporary settlements, Sri Ksetra confines with the modern city of Pyay. The modern city has already partially occupied the ancient one by overcoming the walls with new buildings: consequently, this has led to a series of issues related to the conservation of the cultural landscape of the site.

The in situ research allowed a better comprehension of which is the differences existing between the two sites: moreover, it was of great interest to notice how strong can be the diversities even at a short distance. By doing so, it was possible to further analyse the existing compresence between built heritage and the landscape, profoundly transformed by the traditional agricultural techniques still in use. Another important aspect was represented by the individuation of the possible challenges that the sites will have to face: to mention some, the introduction of intensive agriculture and the use of mechanical means over the archaeological area, use of material, techniques and building typologies dramatically different to the traditional ones in the construction of religious buildings.

The direct contact with the context has been of great importance to understand the critical points and threats that subject this widespread and dynamic heritage.

Furthermore, in Sri Ksetra the possibility to collaborate with expert professionals coming from backgrounds different from mine and from diverse countries has allowed to deal with the issues of the two sites subjected to investigation under different and enrich perspectives. Thus, these assessments have then added value to the research, and permitted a better understanding of a vast and articulated territory.

5 Learning by Practice. Some Remarks and Open Questions

All the three investigations, hereby, presented have been combined by the opportunity and privilege to understand and get in contact with sites diametrically opposite to the ones I was used to through the guide of experts and professionals, local and international both. Their guidance was fundamental to deepen the knowledge regarding the sites and the conservation strategies to be applied, together with the increasing of awareness regarding how the properties create each time a system, which should be safeguarded in a shared perspective.

The on-field studies shared a common final objective: the enhancement of widespread heritage, in some cases already individuated, while in other still not completely valorised.

Starting from the common ground in determining that each place is unique and deserves a specific approach, in looking back to the three major experiences that I had as an early-stage researcher it was impossible not to find some shared aspects, being them “environmental” or based on the kind of heritage present, or in the conservation strategies applied to each site.

Therefore, it is not the geographical distance that marks the most important differences or the shared point in the conservation methodologies that should be applied over the presented case studies. For instance, looking to the experiences presented in time, it was possible to find some similarities between the case study of Sri Ksetra and the one of Stari Bar. Even though the context of the two sites is radically different in terms of social, economical and regarding the policies applied, both shared some critical aspects, such as the issue related to the protection of an ancient settlement posed nearby to a modern city in expansion.

It is important to make some considerations: on the one hand, in the case study of Shkodra, the research was facing the multifaceted widespread heritage of a whole province managed without a shared preservation plan; on the other, Stari Bar in Montenegro and the Pyu cities in Myanmar were already under the aegis of national and super-national conservation plans and policies. This aspect, that seems to set the three sites in a different perspective, creates in fact some sharing points. In the first case study, widespread heritage should be “discovered” or “rediscovered” and as described, the government is moving in this direction. In the other two cases, we were facing heritage sites already identified, challenging the preservation policies applied with their complexity.

Thus, the experience gained during the in situ investigation led me to consider how also the framework acquired in training cannot be—and must not— universal. The research methodology in the case studies illustrated in this paper could adapt and become different on time, even though the starting point was represented by a shared theoretical base, since the sites and the final outcomes of the projects aimed at different objectives.

In fact, from the perspective of an early researcher, aware of the fact that her path is only at the beginning, every change of place represented a sort of new beginning.

Subsequently to field training, awareness regarding how the methodology should adapt to the context in which it is applied, developing with the experience in time, has rose significantly: all the sites have had a strong influence over the approach and direction that might be applied to future research.

Acknowledgements The author wants to express her gratitude to the experts met in the sites presented in this paper. In Shkodra: Ervin Gjini, former director of IMK Shkodra; in Stari Bar: Sauro Gelichi, Riccardo Belcari, Claudio Negrelli, Mladen Zagarčanin; In Sri Ksetra, the Leric foundation and its staff: in particular, Patrizia Zolese and Mauro Cucarzi.

Minor Settlements: Setting up a Network of Creative and Sustainable Communities

Paolo Ceccarelli

Abstract In the last few years, both national governments and international organizations such as UN-Habitat and UNESCO have given increasing attention to the abandonment at a very big scale and fast pace of small settlements and intermediate towns in all regions of the world, as a consequence of the accelerated growth of urbanized areas. It is in this perspective that various projects and initiatives have been launched to see how to deal with processes of this relevance and impact. Among them, there is the research programme on small settlements in different regions of the world, promoted by European and Chinese universities along the lines of the UNESCO Global Report on Culture and the UN New Urban Agenda. This paper examines the issues faced and the strategies developed by villages in China, India, Japan, Italy. It also suggests alternative lines of action.

1 Introduction

In the last few years, both national governments and international organizations such as UN-Habitat and UNESCO have given increasing attention on the one side to the abandonment at a very big scale and fast pace of small settlements and intermediate towns in all regions of the world, and on the other to the parallel problems posed by the uncontrolled growth of urbanized areas.

It is in this perspective that various projects and initiatives have been launched to see how to deal with processes of this importance and impact. Among them, there is the research programme on different cases in different regions of the world, promoted by a group of European and Chinese universities, examined in this paper Verdini and Ceccarelli (2016). The project aims at exploring ways of developing strategies to reduce migrations from small centres and marginal areas and to possibly attract new and younger populations. These strategies are based on the crucial role

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that culture plays, and can have, in sustainable development. A number of places in different regions of the world which have implemented alternative strategies of development, from the ones based mainly on tourism and local traditional crafts, are examined. New roles and opportunities for small settlements are identified, and the possibility of exchanging experiences is considered. The development of a network among small settlements is one of the objectives of the project.

This research project was presented in the UNESCO International Conference “Culture for Sustainable Cities” held in Hangzhou 2015 and was supported by the UNESCO Global Report on Culture and the New Urban Agenda UN presented and approved at Habitat III, in Quito, last October. UNESCO (2016), United Nations (2015), United Nations (2016).

The relevance of these issues will be further emphasized in the UNESCO World Conference “Small Settlements: Culture for Sustainable Development” organized by the Government of Qiandongnan Miao and the Dong Autonomous Prefecture that will be held at Leishan, Guizhou, in September 2017. The outcomes of this research and the proposal of a global project will be presented there.

2 The Rationale of the Project

On which principles is the project based? Which is its rationale?

Principle 1 In our planet, a process of spatial transformation—that has no precedent in human history, and which is radically altering geographic, social and cultural realities consolidated by millennia of history—is taking place. The population of the world not only continues to grow rapidly (we are almost 7 billions, and we will be more than 11 billions at the end of the century); it also increasingly concentrates in enormous borderless metropolises between 30 and 15 million inhabitants (there are already a dozen of them, and within the next twenty years, several will triple their size) that have nothing to do with traditional cities. They result from the migration of hundreds of millions from the countryside and small centres in Asia, Africa, Latin America, who look for a job and the chance to survive. Immigrants settle on the edge of the existing cities in huge shanty towns, which will never be transformed into regular habitats (it is estimated that today 800 million people live in them. In the next twenty years, they will become almost 1 billion). As a result, everywhere in the world, there are thousands of empty villages and small towns often only inhabited by old and disabled people. This process took also place recently in Italy, albeit on a smaller scale, and we all know the consequences it had in many regions.

This is not a solution for an acceptable human settlement. While it can be possibly unavoidable in specific historical circumstances, it should not become the generalized habitat model of our species.

Original and effective actions must be imagined and undertaken to prevent a possible disaster.

Principle 2 These great territorial transformations go hand in hand with the change of the global economic scene. Looking ahead, Europe will only be a

component (relatively small and not very important) of a global economic system dominated by the major Asian countries, by some developing African societies, by parts of Latin America.

The world economic system is now based on a single model of development, with local variations more or less liberal, more or less consumerist, more or less based on advanced technologies, more or less dependent on the dictatorship of the financial system, more or less inspired with sustainability. In this great galaxy, motivated and governed essentially by the same principles, there are also spaces and opportunities to be different and not to be cancelled as irrelevant.

It is quite understandable that in the times of the “unique” development model, the perspective that places where past development took place can still have a chance to develop is not appreciated. But the fact that in recent years many things have changed, and that others are still changing, and will change even more in the near future, cannot be underestimated. Possibly by seriously thinking about how human beings have inhabited the earth, cultivated its soil, produced objects, elaborated ideas, new methods (with ancient roots) to handle present difficult situations might be found. Answers to extreme conditions that exist in the world (and will likely increase as a result of the dominant economic models) can possibly be given, but they cannot be solved by applying more advanced digital technologies, according to the rules imposed by the market. It is a matter of thinking: about mountains and countryside, water, rivers and seas, intelligent habits, the optimal use of manual skills, how to feed and care, the production of original ideas for science and society, and artistic creation in ways that are not conditioned by markets. These arguments must be converted into new techniques, procedures, tools.

To do this, it is necessary to examine issues outside the conventional models, the stereotypes that have been used by the European (and later by the North American) power elites in centuries of world domination. They were models that are still given and are also imposed for the future. But people in the rest of the world begin to think outside the point of view imposed by the West. As it is said, they look at reality “from the South”, think “from antipodes” and reason in a “post-western” world. This is an exercise that would be worth doing even with us, on ourselves. Comaroff and Comaroff (2012a), Comaroff and Comaroff (2012b), Connell (2007), Mbembe (2012).

There is an extreme need for this change in the world. And there are social and economic actors who already do it, because they know what role culture plays: the one, often very solid and sophisticated, a good peasant, a skilled craftsman, a researcher in a laboratory have. Because they have the desire and the ability to see things differently and they are intellectually curious (and perhaps even heretic). Because they believe that change is possible.

Principle 3 Parallel to the processes we have mentioned, there is one more. Today, everywhere in the world, less and less lies in the strategies and plans dropped from above. Not so much because plans and strategies are not shared—in their basic lines and goals—by the communities concerned, but rather because they are incapable of giving convincing answers to the specific problems of the places and situations where they are applied. Many policies foster processes of change in

general terms, but these processes need to be dealt with in specific terms, on a case-by-case basis, through specific solutions and projects that arise from local capabilities. They must be promoted and implemented by direct and responsible participation of the communities concerned. This does not result in a chaotic proliferation of fragmented and incoherent actions that do not lead to any positive and concrete results, but rather it shows how important is to rely on the ability of individual localities to solve their problems and how they can be helped do so.

Obviously is neither easy nor simple to do this; but it is not impossible. And in any case, it is only in this way that territorial development models that are not based only on the concentration of functions and initiatives in larger urban agglomerations (and on a unique model of development) can be set.

3 Reinventing Territories

Even if in the next future Chinese plan, by merging Beijing, Tianjiing and many smaller cities in Hebei, to make Jing-Jin-Ji, a “take-all” metropolis of more than one hundred million people, this does not mean that the rest of China and the world, with their huge number of large and small centres, will no longer play a significant role, no longer exist. To the extent that economic systems become more complex and societies have a wider variety of organized forms, the possibilities for more specific and specialized responses increase. And there are also margins for specific solutions concerning particular areas. But for this reason, these must be solutions based on their own “raison d’ être” and their own specific function.

This combination of responses, coupled with the opportunity that ICT today offers, gives us the possibility to create networks between different places. It enables us to develop systems of cooperation and integration between spatially dispersed entities, which are complementary to their modes of operation, functions performed and future projects. This is an important step forward in the implementation of sustainable development models.

Sustainability is achieved through the ability to fully and properly exploit local resources, but it can also be obtained by widening systems of places, even physically distant from each other, with similar characteristics and capable of introducing innovative elements, and correct practices in their territories.

The first contribution is to study each settlement in an original way, out of traditional patterns of interpretation, and to approach issues from a different point of view. It is the “thinking from the South” I mentioned earlier.

Some territorial organizations, some social and economic structures, some cultural models are considered outdated, in decay, irrecoverable. I think that, at a time when many assumptions on which the development of the last decades was based are radically reassessed (given their substantial failure and in any case given the crisis they are facing), it is necessary to have the intellectual determination to proceed along different paths and to examine solutions (that we feel obsolete) with different eyes.

In which way can we “reinvent” territories?

We must reverse the paradigm we were accustomed to use, e.g. to consider the regions with small and few urban settlements as marginal, subordinate to large urban structures. Nothing justifies this attitude. Inland areas, small mountain and agricultural settlements, fishing villages have little to do with some of economic models, but at the same time, they carry out and—can and must—perform functions that we cannot do without. They perform key environmental protection roles; they are laboratories for the development of new agricultural products and new cultivation techniques, places where more balanced fishing practices are implemented, experimental cases for offering different and more effective services. These are sources of information that are greatly needed in the present world, and of knowledge that is not developed in multinational research centres.

For the variety of problems involved, this task certainly involves universities, with their research skills in different disciplines and their responsibility of educating a new generation that will be responsible of leading the society (and should lead it in a different ways). In fact, it is to a large extent the rediscovery of humiliated and forgotten cultural models, which over time have become sclerotic. They have lost their ability to renew and adjust to changing situations, but they did not lose their basic properties, which are again being considered a great resource such as some principles of solidarity, collective responsibility towards common goods, attention and respect for nature and its rules.

4 The Selection of “Relevant Cases”

It is worth recalling that the research project is still at a stage of “pre-feasibility”, with respect to the wider development that will take place after the UNESCO Conference in Guizhou. Given these characteristics, how has it been defined with reference to the basic principles mentioned above?

The aim was to identify a first group of small settlements in different regions of the world that would make a first assessment of general assumptions possible. Based on the results, further research hypotheses were later formulated. To make easier the research work and as a consequence of budget constraints, the cases under consideration in this first phase are linked to existing projects. They are part of research programmes that have been designed for other aims but that have also proved to be useful for this purpose.

Four types of small settlements seemed to be particularly interesting.

- The first group corresponds to small settlements that have been seeking, or are experiencing, unconventional development strategies. These settlements do not base their rebirth and their potential for future development on the usual model of a tourist offer linked to the beauty of places, local traditions or food. This is the most common and easy-to-use solution, but it does not introduce truly innovative elements into the local economic system. It is heavily dependent on the general economic situation and does not stimulate new entrepreneurial skills.

These settlements have instead adopted strategies based on activities related to science, advanced technology and culture, and on the innovation these generate.

- A second group are settlements, where traditional production activities have been radically reorganized and have generated new opportunities for development. Or in alternative, settlements where new development opportunities, which can thoroughly change the local life, have been introduced from outside. The revival of local development can be triggered by two very different causes.

In some cases, it is initiated by initiatives promoted by concerned groups of citizens and small local entrepreneurs, or by local governments responsive to the opportunities offered by general political conditions and changes in the economy. Initiatives are based on specific local elements, such as existing resources, rich in potential but never properly used.

In other cases, external operators and circumstances locally unexpected can start processes that involve the local community in direct and active terms.

It is appropriate to examine what problems each of these processes may pose by comparing the paths of development that one or other of the situations determine. This makes it possible to analyse the forms of organization that are most appropriate and effective from the bottom.

- A third category of settlements that is important to study is the following: villages that have developed in good balance with the environment and are performing (and will continue to perform) important environmental monitoring and protection functions. These types of settlements have specific physical and functional characteristics which are different according to their location in mountainous regions, plains, riverine areas, sea costal areas and so on.

Finally, it is worth to study the networks that exist or can be created between small settlements in order to create integrated territorial systems to optimize two key functions. One, to improve and enhance territorial governance thanks to a wider and stronger operational structure. Two, to provide an adequate base for the development of local economic activities and the management of infrastructure and services. Often, this reasonable objective is not achieved because of ancient divisions and rivalries that have consolidated over time and are difficult to remove, even if their initial causes have been completely overcome. It is anyhow an important goal, the advantages and disadvantages of which must be carefully assessed.

As it has already been observed, it is clear that from this stage of the project only suggestions can be made to identify the specific characteristics of each place, and of its geographical and temporal context. In this sense, the cases that have been so far analysed only partly can provide usable indications. They should be rather considered as opportunities to proceed in the identification of further and more meaningful case studies.

5 The Selected Settlements

Which cases have been considered?

With reference to the first group of cases, the settlements of Gavorrano in Tuscany and of Gagliato in Calabria are interesting for the role that have given to culture in terms of advanced technology and scientific research. They pursue for the same objective different strategies. A good example of the second group are two settlements, Shuan Wang Cun in China and Kharighari in India. The third group is illustrated by the Satoyama-Satoumi settlements in Japan, and the village of Gerfalco in Italy. The opportunity to create networks of villages is exemplified by the case of a Local Action Group (GAL) composed by 14 small municipalities in Sicily.

5.1 *Inventing an Original Role for the Future*

5.1.1 **Gavorrano—From the Mining Crisis to Astrophysics and Space Industry**

A first interesting case is of Gavorrano, a small settlement in Tuscan Maremma, where in the late nineteenth century a very big field of pyrite, a key mineral for the chemical industry, was found and exploited for more than a century.

Mining induced activities in many other fields and originated a local base of technical culture.

When the mining activity ends at the beginning of the 1980s, a severe economic crisis takes place and, given the geographical location, tourism is the only alternative. Tourism makes the economic survival of the settlement possible, but it is not able to hold young people in the area, and to become the basis for a new and more solid and durable development.

Almost thirty years after, one year ago, a small exhibit of local mining history enabled the inhabitants of Gavorrano to rediscover forgotten aspects of their unusual and unimaginable cultural past. Among miners, there had been remarkable painters, sculptors and poets, and many local young people had become important scientists, medical doctors, geographers, historians and politicians. The brightest youth from Gavorrano was unexpectedly attracted by astronomy, physics, aerospace studies. One of the first NASA satellites, the “tethered satellite”, was designed by one of them at Harvard University; one of the most important space communication centres in the world, was developed at Fucino, near L’Aquila, by another young Gavorrane, and there were several important astronomers active around the world...But this scientific tradition continues: there are young physicists working at CERN in Geneva or teaching at Stanford University and astronomers carrying on research at Hawaii and Canary Islands. Gavorrano was galvanized by this discovery; local authorities, citizens association and the school system

mobilized, and a number of projects were immediately developed. Local companies and banks are providing initial financial resources, and crowd funding will be launched. At the end of September 2017, an important meeting on astrophysics and aerospace technology will take place. A mobile planetarium will be donated (through crowd funding) to local schools to stimulate further local interest in astronomy. A project to support start-ups in space science and technology will be set up, and the possibility to establish a “business incubator” is considered.

Once the strong cultural roots of this small settlement have been rediscovered, a strategy of development in scientifically advanced and high-tech fields developed amazingly fast, with a snowballing effect. This is an extremely stimulating experience that can have important developments and can teach many positive lessons.

5.1.2 Gagliato—Nanotechnologies for Medicine

The case of Gagliato is different but equally challenging. Few years ago, this small settlement (500 inhabitants) in the Calabria region was selected by a group of scientists from the USA as a place where summer workshops and meetings of researchers (in the field of nanotechnology applied to medicine) could take place. The village does not have any peculiar attraction, but it is a quiet place with very friendly and cooperative inhabitants. It was chosen because of this pleasant and familiar ambience.

Since 2008, every year, dozens of world-renowned experts of nanomedicine gather in Gagliato for the five-day “invitation-only” Nanogagliato Conference to discuss about nanotechnology applications to medicine, and how to disseminate the knowledge of these among general public. Over the years, the Conference evolved in a think tank focusing on translational innovations. In 2009, a Nanogagliato Academy was established; around this core, a number of other projects have developed. In 2010 was established the Small Nanogagliato Academy concerned with the education of youth in sciences and the production of medias for education. NISE, Nanoscale Informal Science Education Network, promoted a very successful festival for the school children of Gagliato and the neighbouring villages.

The strategy of the Nanogagliato group is to generate local projects that can create employment and generate shared development initiatives with other settlements in the area. At present, the focus is not just on sciences but also on arts and creativity. Fellowships and grants are also given to students of the region to improve the quality of their education.

The Conference and the Academy have had a strong impact on the sleepy local community. The village has become a small nanotechnology capital city. It is visited by famous scientists and people interested in science; it attracts media; it has raised national political interest. The positive impact of all this on Gagliato real estate, commercial activities and services is clearly visible.

The opportunity for a radical change came to Gagliato from outside, and by chance. A very interesting process of development, connected with an advanced

branch of science and technology, took place; it was, however, largely separate from the local community. At present, new local independent activities have begun to develop.

5.2 How to React to a Big and Unexpected Economic Opportunity

5.2.1 Shuan Wang Cun—The Advantage of Selling online

Another interesting case is that of Shuan Wang Cun in the Lake Tai area, in the Province of Jiangsu, China. Shuan Wang is a small settlement of 2500 inhabitants, 1000 of which are immigrants. Its economy is based on agriculture and aquaculture and on knitwear produced by small family workshops for big clothing companies. Shuan Wang does not have interesting heritage properties or an attractive natural environment. It is a “plain” small settlement as other thousands in the world without real opportunities of change. Its development prospects have changed as a result of two bold decisions taken by few young entrepreneurs and young local politicians with the support of the whole village. The first was to sell local knitwear products directly online, bypassing brokers and distributors. Choosing to sell through Taobao (the Chinese equivalent of e-bay) was successful. It showed that it was possible to improve and diversify the product, and to generate their own services to production. The second was to use the aquaculture areas that the central government asked to reconvert to agriculture to produce flowers for the pharmaceutical and cosmetic industry. This decision was taken not only because of the highest income generated by floriculture compared to other crops, but also because at certain times of the year tourists can be attracted by large handsome flowered areas. The presence of visitors may also favour the direct sale of garments produced in the village.

5.2.2 Rakhigarhi—How to Protect Its Own Identity in a Process of Substantial Change

Rakhigarhi is a settlement of 10,000 inhabitants in an isolated location (the nearest town is 40 km away) at the centre of a predominantly agricultural area in the State of Haryana, in India. Agriculture and small craft have always been the basis of a balanced and quiet life. Few years ago, however, it was discovered that Rakhigarhi is located in an area of great archaeological relevance for the study of the Harappan Civilization, one of the oldest but also of the less known civilizations in the world. In the next future, Rakhigarhi could possibly become the largest archaeological site in India. Since recent excavations have highlighted the existence of a large pre-historic city, one can imagine that the valuable relics that will be found will become

a powerful tourist attraction. A big and fast tourist growth can have a dramatic impact on a settlement that has simple traditional living styles and a social structure predominantly based on farming and small crafts. It can actually transform it into a mere device to service visitors making its social and economic structure more fragile. Part of the original population can be marginalized for the benefit of newcomers operating in tourism-related services and commercial activities. The same goes for the governance of the settlement as actors, principles, goals and value systems will change, and decision-making processes will be deeply transformed.

For this reason, the Indian National Trust for Rural Heritage and Development has begun to develop and implement projects that help the local community to resist the impact of such a strong change and help to guide and manage the development process as much as possible. To be resilient to the impact of a sudden and radical economic and social transformation, all members of the community must learn the skills to react and adjust. Rakhigarhi's case is a good example of the necessary actions to avoid the damages that fast and large-scale processes of change, imposed from outside, can produce.

Both Shuan Wang and Rakhigarhi are interesting cases of innovative choices that generate new and unexpected development opportunities. The answers are inevitably different.

5.3 Models of Environmental Balance and Control

5.3.1 The Satoyama and Satoumi Experience

The extraordinary model of environmental balance characterizing the Satoyama and Satoumi villages in Japan has become a strategic element for revitalizing these small rural settlements and attracting new inhabitants. Satoyama and Satoumi settlements can be found in different regions of Japan; some of the most important (designated as Globally Important Agricultural Heritage Systems (GIAHS) by FAO) are in the Ishikawa and Niigata prefectures. The Satoyama principles have also become a reference model thanks to the Satoyama Initiative, an international programme launched in 2010 by the Japanese Government and the United Nations University in Tokyo. Duraiappah et al. (2012), Takeuchi et al. (2013) Through the International Partnership for the Satoyama Initiative (IPSI), projects of rural development based on the Satoyama principles have been implemented in Malaysia, Nepal, Thailand. They are also an example of intelligent use of the specific resources of a sophisticated agricultural society in a heavily urbanized world. The culture of Satoyama is based on a particular way of life, specific types of agricultural production and a rich variety of handicrafts. The rediscovery and exploitation of these features has become a landmark attraction for city dwellers. At the same time, it has stimulated a reorganization of local production, an integration of skills and knowledge and the marketing of their products in cities. Successful cooperatives have formed to sell traditional handicrafts and foodstuff on wider markets.

Satoyama and Satoumi settlements also attract residents of large urban centres interested in changing lifestyles while continuing to pursue their usual professional activities. An interesting case is the project experienced in Tsukuba.

A major real estate company from Tokyo has been cooperating with the local Green Tourism Promotion Council. The company called on residents of condominiums and tenant companies and launched the “Kayabuki no Sato (thatched house village) Project” which aims at establishing a sustainable cooperative relationship between cities and farming settlements.

A very important aspect of Satoyama is the role that the villages continue to play in the protection of the territory and the environment. This issue is extremely relevant with reference to the Satoumi villages located in the coastal areas, facing floods produced by sea rising. The problems that their tentative protection raises are crucial to set both strategic guidelines and specific solutions which can be used in different regions of the world.

5.3.2 Gerfalco—Rediscovering Silence

Gerfalco is a village in the Apennines in Tuscany. Forestry, charcoal production, sheep farming were its economic resources until recently. One century ago, more than 1000 people lived there; today, they are less than 200. In the summer, tourists join the local population.

Due to its geographical isolation, Gerfalco is characterized by two elements (generally considered negative): it is extremely silent and it is located in one of the darkest areas of the Italian peninsula.

Few years ago, some viol players (the viol is an instrument of great importance for the Renaissance and Baroque music; it has a sound similar to the human voice) attracted by the quietness of the place started refresher courses of ancient instruments and a viol festival. This initial embryo created the premises for further developments. The inhabitants of Gerfalco and neighbouring villages through a bottom-up participation process decided that the human-like sound of viols, coupled the silence and the darkness of the site, were important and rare resources in a world increasingly polluted by noise and lighting. “The sound of silence” then became the motto of a project based on silence, darkness and sound of human voice (and similar instruments) as resources for innovative activities.

This led to two lines of initiatives intertwined with each other. The first aims to make of Gerfalco a training location for students in the field of bio- and eco-acoustics, but also a place for studying and treating pathologies originated by noise pollution, a non-marginal cause of cardiovascular diseases. Since these initiatives involve universities and research centres, there is the possibility that more permanent workshops develop. The second line of action is to strengthen music-related initiatives, since silence is a key component of music. Training courses and concerts can take place during the whole year; musical ensembles can have their permanent headquarters in Gerfalco; elocution and language courses can be offered.

5.4 *The Need for Networks*

5.4.1 The Local Action Group (GAL) Tirrenico in Sicily

Finally, a different lesson is learned from a group of municipalities in the Province of Messina, Sicily. Fourteen municipalities have established the Local Action Group (GAL) “Tirrenico” to overcome the financial, technical and organizational limitations in the implementation of projects and policies that each individual municipality faces. This is particularly useful in developing joint strategies for social and economic development, and for protecting the natural and historic heritage. As it is well-known, building systems of small-size local governments is one of the key conditions to ensure the survival and recovery of many territories. It makes possible to provide types and quality of services capable of retaining and possibly attracting new inhabitants. Unfortunately, as we all know, it is also a goal that is not easy to achieve and a result that is not easy to maintain over the years. A particularly interesting aspect of the recently launched experience of the GAL Tirrenico is the decision to collaborate with UNESCO and UN-Habitat performing the role of an observatory/laboratory of interventions promoted by the 2030 Agenda for Sustainable Development, the Global Report on Culture and New Urban Agenda for UN. To accomplish this programme, GAL Tirrenico has requested the collaboration of the Mediterranean UNESCO Chairs Network, MUNCH and the Regional Office for Science and Culture in Europe of UNESCO. The programme will provide a variety of initiatives ranging from the protection and restoration of natural and built heritage, to field training activities and to projects for supporting immigrants who live in the area.

6 Concluding Remarks

Which are the outputs of studying these cases for developing a larger UNESCO project of territorial organization?

Along with the specific experiences of the cases examined (many others could be obviously added), there are useful elements for developing specific strategies. They have different characteristics, appropriate for each region of the world, while sharing several background elements.

A first element: the varieties of possibilities that emerge when working more thoroughly on individual cases. There are specific local features that make possible the development of new strategies strongly supported by many components of the community. It is essential that these features be carefully taken into consideration.

The second element: emerging new opportunities of development for activities that until recently seemed doomed to disappear. Among them, the cultivation of particular crops which are important for nutrition, but also for medicine, since they can replace artificial products. The same for practices related to health care,

for activities that are mainly based on digital systems, or for very specialized crafts that supply international market niches.

Third and crucial element: it is important to build networks between local and distant places (with different cultures, traditions, conditions) in order to acquire information and to continue experiences, but also to formulate new forms of cooperation based on digital networks. There is no doubt that social media, with their extraordinary connectivity, can be used more intelligently when they link communities, and not just individuals.

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The Heritage Value of the Craft Sector in Fast-Growing Cities

Laura Pierantoni

Abstract Culture is a key dimension in the history of cities where the design of urban development strategies combines the aim to preserve the wealth of cultural heritage with the search for contemporary progress. Along the centuries, arts and crafts have always occupied an important place in the life of cities because they contribute to preserve local identity and traditions through skills, they provide jobs and contribute to the local economy, and they are a source of interest for cultural tourism. Historically, artisan workshops are to be found in cities, where the high concentration of people and products provides the perfect framework for buying raw materials and selling the final products in markets. Today, workshops have often been substituted by industrializations and those left are increasingly being forced out of the city or to die to leave space to new businesses. What is the place of handicraft today? Is there still a strong linkage between handicraft and places? And what has been the role of public policies in encouraging (or discouraging) this kind of activity in the past century? The article discusses these questions and provides examples taken from the observation of the historical and sociopolitical context of handicrafts in India. The conclusion reflects over handicraft as a marginalized sector with great potential to become a driver of sustainable development in cities.

1 Introduction

Historic cities are the places where tangible and intangible heritage has coexisted throughout the centuries, maintaining urban agglomerations constantly thriving by keeping the relationship between *urbs* and *civitas* balanced. In some cases, historic cities are undergoing a transformation from “the place where to live” to “the place where to consume”, mainly due to tourism activities that are intensifying the gentrification and depopulation processes. This phenomenon is visible, for instance, in many Italian historic cities. On the contrary, in the case of emerging societies like

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India, rapid and incessant urbanization has often meant that heritage is pushed in the background to leave space to a prevailing development of the city based on contemporary economic activities and amenities, threatening the identity of the historic towns and cities.

In the last decades, in order to prevent both the museification in historic cities and the losing of their uniqueness when searching for modernization, the focus of strategies to support sustainable development has been set on soft regeneration based on making cities more accessible, improving the quality of life and making cities more attractive for local communities as well as for tourists and external investors. Today, countries like India are in the midst of an intense debate about the directions that their economy is taking and the likely impact of current policies on their future. The promotion of new forms of city valorization starting from values and innovative approaches such as participation, experience and sustainability, where people are at the centre of policies and strategies for cities, is at the heart of this soft regeneration that is in charge of filling those global concepts with local contents for being successful.

The growth and richness of cities and more generally of territories have always been characterized by the simultaneous development of economic and cultural aspects of the city. In the last decades, a new understanding of urban development has been gaining more ground in urban development discourses. This new approach moves from a market to a social approach to local development. It has been more than a decade since Moulaert and Sekia wrote about the idea that “territorial development does not only mean enabling the local market economy to thrive, but also empowering the other parts of the economy (public sector, social economy, cultural sector, low-productivity artisan production) as well as community life (socio-cultural dynamics as a level of human existence by itself, political and social governance of noneconomic sections of society, cultural and natural life)” (2003: 300). Within this framework, local identity and culture have become important factors in urban planning and territorial concerned disciplines (Kunzmann 2004). Territories acquire new content of sociocultural values, and traces of the local history are set as basis for their future sustainable development. In this context, “local development becomes less a question of guaranteeing purchasing power, and more that of promoting structural change to improve the individual and collective potential to respond to needs, and thus to participate in a production process aimed at the satisfaction of the basic needs of all” (Moulaert and Nussbaumer 2004: 250). This social-oriented approach is particularly relevant when we discuss about developing countries and fast-growing economies. Globalization does not concern only goods and services but also the ideas, and their underlying norms and values (Kennedy 2004: 95).

This discourse has been taken forward by international organizations that have set culture as a strategic factor to achieve sustainable development. The increasing number in guidelines, conventions and charters that have been proposed, at the European as well as the global level (Historic Urban Landscape, Hangzhou Declaration, Millennium Development Goals, Rio+20, Creative Europe, EU 2020, Workplan for Culture 2015–2018, only to mention some), demonstrates the novelty

and importance of this area of research. At the same time, creative industries are increasingly occupying an important place in the cultural heritage domain and arts and crafts are considered valuable sectors able to contribute to the further development of cities while keeping the heritage status.

What is the role of culture and creativity in the past and in the future of heritage cities? In order to answer to that question, the author has reduced the field of investigation and focused on handicraft as a key sector dealing with issues of sustainability in India.

The study aims to look into the relationship between handicrafts and places in order to explore and understand the spatial politics of craft practices in fast-growing cities. Moreover, the role of governmental and legal policies in fostering handicraft has been addressed to explore whether we are witnessing a market-oriented or government-driven development of the sector. The conclusion reflects over handicraft as a marginalized sector with great potential to become a driver of sustainable development in cities.

2 Methodology

The methodology adopted to accomplish this study is based on a mix of qualitative methods ranging from grounded theory, direct observation and reflection field notes, qualitative research interview and comparative study. Starting from the assumption that there is very little literature and research done on the topic of handicraft and that most of the literature dealing with this field of research is focusing on history and artistic quality of handicraft products, the intention of this research project was that of undertaking the field work in order to collect first-hand testimony or direct evidence concerning the topic under investigation directly from primary sources.

The vast literature concerned with the broad framework of this research project covers different fields of investigation that range from urban to economic, political, social and cultural studies. In this context, culture becomes a strategic asset for the definition of policies and strategies of economic development, urban regeneration and social inclusion. It was also important to start from an accurate study of already existing materials on the topic (documentary sources) as well as from resource available in the territory. The archive research includes documentary sources including plans, programme reports and studies produced by various public entities (Ministries, Municipalities, Regions, Councils, etc.) and international organizations (UN, UNESCO, EC, COE, World Bank, etc.), as well as materials and documentation of historical value covering some aspects of the research topic in the past centuries.

The decision to pick India is due to its longest and prolific traditions in handicraft which is worldwide famous and, at the same time, the fast growing of its cities, that is, rapidly changing the understanding of what is heritage there.

3 Handicrafts: Place and People

There is no universal definition of what handicraft exactly is around the world. As the word says itself, handicraft is, first of all, a type of work where objects, they can either be useful or decorative, are made by hand or by using only simple tools. Over the centuries, different types of crafts have been evolved in India and in many other places around the world. There are folk crafts, which are created by the people for their personal use, or by the village craftsmen for a limited clientele, with whom they are in touch. There are crafts that have been developed around religious centres and that answer the needs of the religious institutions and the ceremonies associated with them. And there are commercial crafts, which are made by specialized craftsmen who belong to a group, or a caste in India, who work together often in centres specializing in specific skills. Here, there is a complete mastery over the technique, for their process is complicated, and is mastered through long years of apprenticeship. Here, the skills are hereditary and passed on from one generation to another, so much so that their way of life is built around the particular craft tradition.

If we go beyond the literal meaning of handicraft, we find that the main aspect that characterizes handicraft is the strong relationship between a place and its human part, the people living in a specific place. The encounter of places and people creates a space for relations where the concepts of community, market and heritage coexist. It is the immaterial heritage of a place that, through the hands of artisans, can create unique objects that carry special meanings related to a specific place. Handicraft would not exist without human beings based in a specific place rich of raw materials. People, through the application of their knowledge and skills, can create new objects that are sold in a market, which can happen in the same place or be based elsewhere.

Historically, artisan workshops are to be found in cities, where the high concentration of people and products provides the perfect framework for buying raw materials and selling the final products in markets. Handicrafts have always occupied an important place in the life of cities because they contribute to preserve local identity and traditions through skills, they provide jobs and contribute to the local economy, and they are a source of interest for cultural tourism. Today, artisan workshops have often been substituted by industrialization that facilitates the production of bigger quantity with fewer resources. Still existing traditional workshops are increasingly being forced out of the city or to die to leave space to new businesses. The workshops left are struggling to survive because of the sharpening competition on the market, the rising costs of renting out spaces in the city and the lack of skilled workforce. Moreover, global competition and new digital devices are pushing traditional handicraft workshops to go online and developing their business on the Web platform instead of having face-to-face commerce. It seems that the *vis-à-vis* relationship among suppliers, artisans and buyers is becoming less relevant in the digital era. Still, place is considered to be central for most form of cultural production, including art crafts, and the local factor seems to be essential for the development of traditional handicraft. What does it happen

when the global forces get in contact with the handicraft sector? Is it a threat or can it also be positive?

The following chapters are going through the development of the handicraft sector in relation to cities and how this specific sector has changed in accordance with the challenges that Indian cities have gone through the history.

4 Handicraft at the Core of the Indian National Development Programme

The Independence that India achieved from the British in 1947 is for sure one of the most important milestones in the history of the country. After several centuries of British ruling India, finally the country was free to set its own rules. An important part of the reconstruction of India as an independent country has been made by cultural policies in the search of a renew identity for the country that would include traditional values that were somehow put on a side in the colonial times.

For India, Independence thereafter meant falling back on everything national and not opening up to the world (Dorin 2004). Culture became intrinsic to the concept of planned national development and a key factor for the Planning Commission since its setting up in the 1950s. Since then, culture has been linked to ideologies of development, even though little has been done to connect, for instance, traditional craft and advanced technology. In the definition of its new cultural policy after Independence, India made a distinction between arts and culture. On the one side, the arts were constituted by the fine arts, included contemporary and classical forms, which were housed in the *Akademies* and promoted by the Education Department. On the other side, culture was identified in a range of practices—from handicraft and textile (*khadi* and handloom) to folk and tribal cultures. Culture was divided under a range of ministries and departments: Textile, Khadi and Village Industries, and Education. Nevertheless, the arts and culture were part of the same cultural policy centrally tied to India's development vision.

In brief, according to the International database of Cultural Policy, national cultural policy in the period right after Independence adhered a series of definitional criteria. Among all, the following ones are interesting for the handicraft sector, which is the object of this study.

- India's cultural policy presumes that India's cultural resources, represented by the artisan-producer and crafts-producer, are a repository of national resources and as such are central to the very enterprise of nationalism, informing all of its programmes;
- Handicrafts contribute a crucial component to India's nationalist project of identifying and protecting its national heritage;
- While the protection and sustenance of the artisan has a cultural justification as representative of national heritage, it is nevertheless its economic component

that gives it such visibility, informing the most ambitious and difficult aspect of national development;

- Perhaps most daringly, the founding documents would claim that the nationalist programme presents no contradiction—indeed, a synergy—between the support and development of artisanal practices on the one hand and the stated nationalist goals of industrialism and the emphasis on science and technology on the other.

From these criteria, it is evident that handicraft represents a crucial sector for India, in between the safeguarding of local identities and promoting economic development through the introduction of new technologies. Besides the development programme for the handicrafts industry, a parallel programme to create awareness among Indians of heritage and traditions was launched. Bringing tradition, livelihoods and development together into a single unified cultural *developmentalism* is of outmost importance for today neoliberal ideology.

As historian Bipan Chandra shows (1968) the ruin of artisans through the nineteenth century, and in particular the ruin of the textile weaver in competition with imported yarn, and, more generally, the decline of handicrafts and the spinning industry leading to the penury of the peasant and the artisan, is one of the more elaborately discussed issues of colonial Indian economic history. Still, Dastkar¹ strongly believes in “craft” as a social, cultural and economic force that, despite being marginalized due to urbanisation and industrialization, has the strength and potential to play a vital role within the economic mainstream of the country (Tyabji 2017). Artisan clusters are widespread phenomena in India, and it is estimated that it has around 3500 such clusters producing a variety of items including basketry, mat weaving and cane articles, woodwork, leather, jewellery (Sarkar and Banerjee 2007: 3).

In the contemporary context, despite the growing compulsion to industrialize and globalize, there is also an increasing awareness of ecological viability and sound growth. With its rich resources of skilled hand-spinning and weaving, India is advantageously placed to show the way in balancing the slower but high-skilled production sectors, with the mechanized, high-technology end. Though there has been a gradual exodus from these professions in the twentieth century, what they are going through today is unprecedented. Weavers are losing high-skill livelihood without alternative options, facing starvation-like conditions and joining the rank of unskilled (Kapur Chishti 2010:14). Moreover, the social distance separating managers and workers, a legacy of social history, constitutes an obstacle to the setting up of an environment favourable to the learning process, a necessary condition for constant innovation (Kennedy 2004: 100).

¹Dastkar is a private not-for-profit NGO aimed to support traditional Indian craftspeople in regaining their place in the economic mainstream. Most of Dastkar’s employees are women and village based (<http://www.dastkar.org>).

5 Heritage Value of Handicraft Sector at Risk to Boost Economic Development

This study, about the relationship between handicraft, development and places, has shed light on three important dimensions in the life of fast-growing Indian cities: culture and identity, communities within space and socio-economic development. These three dimensions are integrated, and whenever one of the three is triggered off, the other two aspects are heavily influenced and change accordingly.

From a cultural and identity perspective, the distinction made by the Indian government between high arts and culture has had an important impact on the general understanding and value of the handicraft sector. Handicraft has acquired a positive meaning often associated with its social value. Because of that, it has been showed that handicraft occupies a central place in the national cultural policy, which clearly defines the handicraft sector by providing its connection with the national identity, its role within the economic development of the country and its new relation to the industrial sector.

However, the fast and uncontrolled growth of Indian cities gives rise to a whole series of new opportunities that seem, at first sight, very attractive, especially for the young and well-educated population. Artisan community-based workshops are therefore abandoned for mainly three reasons. Firstly, artisans move to better-paid jobs in the industrial and new technology sector. Secondly, industry and new technologies are meant to serve handicraft for a better, and bigger, production. As consequence, the relationship between industry and handicraft has increased the gap between managers and workers. The workers are today often considered as human machines rather than skilled workforce; in addition, they are dragged out from small family workshops to join bigger workshops where they can use proper industrial machines. Thirdly, entire areas where workshops used to be based are pulled down to leave space to new real estate developments. Traditional artisans still resist only in rural areas.

Unfortunately, until now, only few cities have taken stock of how much informal settlements contribute to the urban gross domestic product. The informal sector of any economy is largely seen to be residual, peripheral and often invisible. Jhabvala et al. (2003) demonstrate that, in India, informal economy, such as one of the handicraft sectors, creates employment, provides good and services, creates savings and investments, and yet the workers and producers of this economy usually live in poverty.

The cases of handicraft in India also show that the loss of artisans in cities means the loss of a specific livelihood that for centuries has characterized heritage cities: the sense of community, the ability to learn from the past generation and to teach skills to the new ones, the job creation that goes hand in hand through generations, the sustainability of using local raw resources and selling in the same market. The local factor is essential because the proximity and spatial concentration of specialized enterprises in a single sector gives rise to external economies based on

trust, common culture and social institutions deeply rooted in the territory (kinship, caste or community).

In order to answer to the initial questions “What is the place of handicraft today?” and “Is there still a strong linkage between handicraft and places?”, and to discuss the relationship between heritage cities and their cultural heritage through the case of handicraft, it is clear how handicraft is rapidly disappearing from large cities. This statement has been further confirmed by Chatterjee² “Although the Sixth Economic Census included handicrafts with a view to reflect the huge contribution the artisan communities make to India’s economy, much is to be done to recognize their actual contribution in overall economy”, adding that at a time when West (UK, France, Italy)³ is looking towards handmade crafts, in India craft traditions are getting destroyed. “India is the only country in the world with largest and most diverse crafts”, where over 200 million people are associated with the crafts sector in the country (Chatterjee 2012).

In conclusion, due to its importance within the life of Indian cities, the handicraft sector could eventually move away from the status of marginalized sector when the heritage and social value of it will start to be considered again as key added values rather than limits to foster economic development. At the same time, public policies should start to encourage handicraft-based activities not only as money machines but, first of all, as a way of living, bringing back their initial positive meaning often associated with their social and heritage values. Therefore, in the Indian handicraft sector, as in most of the creative sectors in fast-growing economies, culture and identity are therefore embedded in an informal socio-economic system which has great potential to become a driver of sustainable development as long as its heritage value is set back at the heart of development policies.

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²Chatterjee Ahmedabad is former executive director of National Institute of Design (NID) and honorary president of the Crafts Council of India for over 20 years.

³According to Cumming and Kaplan (1991:9), the British Crafts Council’s goal is to make the UK the best place to make, see, collect and learn about contemporary craft. In France, the Institut National des Métiers d’Art, which was created in 2010, is a semi-public body focused on the crafts industry, a sector which is believed to have strong growth potential. Italy is also looking into the craft sector and was promoter of the signature of the International Charter of Artistic Craftsmanship in 2010.

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Part IV
Integrated Strategies to Reduce the
Territorial Risks

Resilience Thinking as a Useful Approach to Reduce the Territorial Risks

Marcello Magoni

Abstract In developing countries, built areas that are most affected by high levels of natural disaster risk are typically areas where there are informal settlements. The mitigation and management of these risks require good availability of economic, professional, technological and human resources and good organizational capacity, aspects that are often lacking in these countries. However, through a resilient approach, it is possible to optimize the scarce resources available and, above all, to leverage human resources, which in developing countries are often relevant to improve the organizational capacities of communities and their institutions. This contribution framed the meaning of resilient thinking and shows the main theoretical references and intervention criteria that characterize a resilient co-evolutionary approach, that is, aimed at seizing the opportunities associated with subsistence or potential critical events to improve the system itself, thus making it less vulnerable and more prepared to respond to both known critical events and other critical events that may occur.

1 Introduction

In a world characterized by a strong uncertainty on future prospects both globally and locally, the concept of resilience provides useful indications on how to guide strategic interventions, including those aimed at managing and reducing the risks of natural disasters that are an increasingly important field of intervention as a result of climate change and the strong expansion of human settlements in flood plains and coastal areas, coupled with inappropriate building standards, which increase the exposure of people and assets to natural hazards. Among these expansions, the informal ones, which are of great concern to developing countries, are usually

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located in areas with high levels of catastrophe risk, since these areas are of less value and therefore the interest of their owners is less to enforce their rights. Moreover, disasters trap people into poverty because poor households tend to face greater difficulties in absorbing and recovering from disaster impacts (Hallegatte et al. 2017).

Since the mitigation and management of such risks requires high availability of economic, professional and technological resources and good organizational capacity, aspects of which developing countries are often lacking, the adoption of a resilient approach aims to optimize and to increase available resources and to make greater use of human resources, which in developing countries are generally relevant, to improve the capacity to deal with these risks. These objectives require “that people have the agency to prepare, adapt and transform the given social cohesion, community involvement and trust” (Parsons et al. 2016, p. 3).

This paper initially mentions the meaning of resilient thinking, whose main theoretical references are exposed, in the light of the many definitions and applications of the concept of resilience that distinguish the current debate. Subsequently, the intervention criteria that characterize a co-evolutionary resilient approach, that is, aimed at seizing the opportunities associated with potential critical events, to improve the system and make it less vulnerable both to such events and to other critical events which could happen are illustrated.

2 The Characters of Resilient Thinking

The concept of resilience is a concept that, starting from specialist fields such as engineering, ecology and psychology, has involved more and more ambitious areas of intervention to be used also in the analysis of territorial systems and in the elaboration of strategies and actions to improve its characteristics (Colucci 2012). This is because in communities characterized by deep and diffused uncertainties about their future, the concept of resilience offers interesting answers. In fact, resilient thinking has a positive approach to problems because it seeks opportunities to be realized even in crisis situations, in order to overcome them in an innovative and structural way.

The concept of resilience has over time become increasingly complex and complex that, on the one hand, has led it to become an “all-inclusive” concept and therefore increasingly “attractive”, while on the other hand, it has made uncertain and ambiguous its applications and measurements. Moreover, if its metaphorical use made this concept very useful to construct “reasoning”, it tends to become a slogan that with its “malleability” leads to motivating divergent actions and practices and in some cases contradictory in their outcomes (Davoudi 2012).

2.1 *Definition of Resilience*

Among the various resilience definitions that have been given in the specialized literature, one that best suits the definition of resilient thinking in territorial systems is one that considers the resilience as the ability of socio-ecosystems¹ to change, adapt and, crucially, transform in response to stresses and strains (Davoudi 2012). Moreover, the evolutionary understanding of resilience has been best articulated by the metaphor of the “adaptive cycle” (Holling et al. 2002) and its graphical representation in the panarchy model, to be considered in an advanced version where the outcomes of the social context are treated as tendencies and not as inevitabilities. This means that interventions can diminish, sustain or enhance resilience and the resilience must be considered as a continually changing process. Besides, in the process of resilience building, some people or places gain while others lose and we cannot consider resilience without paying attention to issues of equity in terms of both the procedures for decision-making and the distribution of burdens and benefits (Davoudi 2012).

Two systemic factors to be considered in evaluating resilient strategies and actions are the multiple space and time scales because a social–ecological system is connected in various ways to a hierarchy of nested systems and undergo change over time. Those changes can be slow and predictable or fast and unexpected. When crises occur at smaller or larger system scales, they can signal or accompany a loss of resilience at the focal scale (Resilience Alliance 2010).

The elements on which resilient thinking is focused are phenomena that disturb or may disturb a social–ecological system, which can be acute shocks, when occurs as a relatively discrete event in time, or chronic slow burns, when it is a gradual or cumulative pressure on a system. As the resilience is performed when the system is confronted with the disturbance, a community might become resilient not in spite of adversities but because of them. A useful concept to understand one of the characters that should assume a resilient system is the subsidiarity, which finds an important reference in plant characteristics, which, being unable to move, are strongly vulnerable to external agents and thus have developed a high resilience spreading vital functions throughout their body (Bruni 2015). Thus, in a socio-ecosystem, the most suitable subject for action is the subject that is within a problem and therefore its capabilities when thinking the measures to improve the resilience of a system need to be considered.

The resilient capacity of a socio-ecosystem can be improved by target-oriented measures, responding to potential or active disturbance phenomena, or aiming for an increase in the overall ability of the system to respond to disturbances. In this regard, referring to the concepts of evolutionary adaptation elaborated by Gould (Gould and Vrba 2008), the resilient ability of a system can be considered active

¹The socio-ecosystem is conceived as an integrated system of people and natural environment that is complex, nonlinear, and self-organizing and permeated by uncertainty and discontinuities (Berkes and Folke 1998, p. 12).

when it manifests its advantages for a given system with respect to the disturbances it faces at a given moment, non-active, when it is indifferent to the disturbances that a given system undergoes at a given time, and pre-adapted (by exaptation) when some features previously thought for different types of problems manifest their advantages at another time for a different disorder. For example, an organization thought to intervene in the event of a high gravity industrial accident is useful in responding to an alluvial phenomenon. This means that in the first type of intervention we will have a potential or direct real utility, in the second case we may have no utility or indirect utility.

2.2 Resilient Capacity Analysis Criteria

The resilient capacity of a socio-ecosystem should be related to its structure, its functions and the relations with the system itself and can be analysed with respect to three complementary criteria.

The first criterion concerns the ability of the system to withstand the disorders it is subjected to and thus not to undergo significant changes. While resilience is a feature that is often contrasted with resistance, increasing the ability to resist a system is a positive gesture until it entails such high costs to make changes to the system preferable or when certain conditions can no longer be sustained. In this case, resilience can be represented by the distance between a system state and a critical threshold. This distance varies over time in response to variation in the different factors and even if the exact location of a threshold is unknown, simply being aware of a threshold can help to reduce the likelihood of a crisis (Resilience Alliance 2010).

The second criterion concerns the ability of the system to return to structural and functional conditions equivalent to those prior to the modifications it has suffered as a result of a disorder. In this case, the judgment on the equivalence between different structural and functional conditions of the same system is a considerable theoretical problem as it requires comparisons that are highly subjective as they are characterized by the distribution of advantages and disadvantages between people and places and by the existence of trade-off.

The third criterion concerns the ability of the system to identify and capture opportunities for change resulting from a potential or active disorder to improve the system itself. Even in this case the judgment on which change to do is a problem because it is characterized not only by strongly subjective assessments due to the distribution of advantages and disadvantages between people, places and the presence of trade-offs, but also by the need to carry out, within a community, a comparison of the values underlying the causes and effects of the disturbance considered and the types of responses and objectives that are to be achieved. Moreover, turning a crisis into an opportunity requires a great deal of preparedness which in turn depends on the capacity to imagine alternative futures (Blecic and Cecchini 2016).

The ideal situation would be to “anticipate changes” by identifying in a shared way the most desirable scenarios between the various possible future ones and looking for the means and tools needed to make that vision come true. This also means getting ready to intercept the novelties that are in gestating, increasing the measure of the uncertainty that a community or territory could proactively manage according to their goals and values. Between potential futures and better futures, it is necessary to identify the factors that hinder the preferred future and to work in the present to remove them.

In this evolutionary vision of resilient thinking, where a resilient system is about being prepared for innovative transformation at times of change and in the face of inherent uncertainties, there are two fundamental aspects to consider: the process, that is the path of choices, projects and interventions that from a given condition leads to a new condition, and its preparation, intended as the construction of the resources and expertise needed to enable the system to deal better with the disturbs.

3 Criteria for a Resilient Approach to Reducing Territorial Risks

Natural hazards need not turn into disasters. Prevention is less costly than disaster relief and response and disaster risk can be reduced by strengthening resilience. This answer requires to integrate the resilient thinking with the instruments for managing territorial risks and this can be done through the use of a disaster resilience approach, that is the capacities of communities to prepare for, absorb and recover from natural hazard events and to learn, adapt and transform towards resilience (Paton and Johnston 2006).

There are important relationships between disaster resilience and disaster management such as preparedness, social capital, mitigation and risk perception. Managing disaster involves multiple values and stakeholders, incomplete knowledge and high stakes while resilience arises from dynamic social, economic, behavioural and protective factors that influence the ability to cope with or prevent disturbances. The more a territory and its community are resilient and the greater their ability to recognize and use their resources, focusing on enhancing them and maintaining their diversity and quality and protecting their value.

There are two main sets of capacities in the disaster resilience: coping and adaptive capacities (Parsons et al. 2016).

Coping capacity is the means by which people or organizations use available resources, skills and opportunities to face adverse consequences that could lead to a disaster. It relates to the ability of a community to prepare for, absorb and recover from a natural hazard event.

Adaptive capacity is the dynamic adjustment through learning, arrangements and transformation, and it needs a decision-making process and actions undertaken to adjust to current or future predicted change. These capacities focus on the existence

of institutions and networks that learn and store knowledge and experience, generate flexibility in problem solving and balance power among interest groups.

Coping and adaptation could be immediate reactions in response to a natural hazard event or could emerge from social processes that develop the capacities required to anticipate and withstand unpredictable adverse conditions.

3.1 Coping Capacities

Coping capacity mainly consists of the following factors.

The social and demographic factors, like age, disability, health, household size and structure, language, education and employment, because they influence the abilities to build disaster resilience.

The economic factors like access to finance, the difficulty of which is a barrier to resilience, and the presence in a territory of a large amount of goods, a factor that increases exposure to natural hazards and hence possible economic losses. On the other hand, a high potential loss of goods becomes a strong motivation for mitigating a risk.

The financial protection strategies, to protect governments, businesses and households from the economic burden of disasters. These strategies can include programs to increase the financial capacity of the state to respond to an emergency. Few countries have the tools and expertise to consider the potential impact of disaster risk on their investment decisions. They rarely account for disaster losses, collect data, and assess risks systematically. As a result, they are not able to direct the necessary resources to protect their investments and reduce their exposure to future disaster impacts.

The PPRR model (Emergency Management Australia 2000) is an interesting example of a comprehensive approach to risk management. It is structured in four steps:

- Prevention (P) of the incident by understanding disaster risks and anticipating the potential impacts of natural hazards;
- Preparedness (P) before an incident to ensure effective response and recovery, also because disaster risk can never be completely eliminated. For example, the early warning systems save lives and protect livelihoods and are one of the most cost-effective ways to reduce the impact of disasters;
- Response (R) to control or minimize the impacts of an incident;
- Recovery to minimize disruption and recovery times (R), to promote disaster risk management through integrated resilient recovery and reconstruction planning.

The presence of emergency services and disaster response plans represents the potential to respond to a natural hazard event, while the cohesion and connectedness of the community represent the features that facilitate coordination and

cooperation for mutual benefit. From this point of view, fostering widespread knowledge and awareness of territorial risks help to reduce the distance between experts and the population and thus increase the interest of a community to undertake adaptation practices.

Availability of natural hazard information and community engagement to encourage risk awareness is connected with the relationship between communities and information, the uptake of information about risks and the knowledge required for preparation. Community engagement is a vehicle of public participation in decision-making process and emergency management. In addition, common initiatives need to be taken to strengthen community cohesion and involve citizens who are not directly affected by emergencies in order to favor consensus in achieving those actions that are not visible. In addition, bottom-up actions must be activated at the most appropriate operational and decision-making level and must find strong integration and significant synergies with the top-down ones.

3.2 Adaptive Capacity

Adaptive capacity consists of themes that express the processes that enable adjustment through learning, adaptation and transformation. It represents the flexibility within organizations to adaptively learn, review and adjust policies and procedures, or to transform organizational practices. Effective response to natural hazard events can be facilitated by long-term design efforts in public leadership. Bonding, bridging and linking social capital can enhance solutions to collective action problems that arise following natural disasters. Cooperation and trust are essential to build disaster resilience and arise partly through social mechanisms including social capital.

Transformative adaptation requires altering fundamental value systems, regulatory or bureaucratic regimes associated with natural hazard management. Collaborative learning facilitates innovation and opportunity for feedback and iterative management.

The pattern of disturbance events over time can inform how to work with a disturbance regime as opposed to attempting to control or prevent it, which may ultimately weaken a system's resilience. There are many ways to characterize disturbances, as their frequency, duration, severity and predictability. In addition, any given system may be vulnerable to a suite of different disturbances. Combinations of disturbances and the timing of events can cause interaction effects: an otherwise benign disturbance may have much greater consequences if it follows another disturbance from which the system has not yet had a chance to recover. Similarly, systems that have been "protected" from particular types of disturbances may not have the capacity to cope in the absence of such protection. Management strategies that strive to control disturbances excessively, for example by reducing

variability to improve efficiency, can erode system resilience, making the system increasingly susceptible to disturbance events that it would otherwise have been able to accommodate.

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New Strategies and Four-Layer Approach for Disaster Risk Management in Complex City Environments

Funda Atun

Abstract The research introduces an innovative approach including four layers: spatial, organizational, tactical, and public layers, and their interaction with an agent-centered perspective as a response to three challenges: (1) disregarding the interdependency among components within a complex city system, (2) underestimating secondary effects of a hazard, and (3) not fully considering the social system that is embedded within the spatial pattern of a city. The research provides examples from real cases. Indeed, failures or incidents during a disaster are emergent phenomena that are hard to predict. Furthermore, outcome of actions, which are defined in the plan by regulations, could be different from those anticipated due to constantly changing environment during disasters. The system gets stuck when people insist on applying written plans to fluctuating circumstances instead of reorganizing strategies and priorities. During disasters adapt the plan according to changes, and reorganizing resources in an environment that is changing constantly is key to enhancing resilience.

1 Introduction

Physical, economic, and social losses continue increasing after each disaster, although we know more about the causes of losses (White et al. 2001), and we are able to integrate better science and technologies (Cash et al. 2003). Even though the situation has been considered rigorously in the pre-event phases, there occurs a gap between normative and actual patterns due to the complexity of the situation, as seen clearly in the Hanshin-Awaji Earthquake in 1995 in Kobe, and the Great East Japan Earthquake–Tsunami in 2011 in Tohoku. This gap occurs mainly in metropolitan areas like Kobe and Tohoku, due to the interaction and the effects that may occur as induced and indirect consequences of any triggering hazard (Menoni 2001). Case studies of two well-known disaster events in Japan, the 1995

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Hanshin-Awaji earthquake, and the 2011 Great East Japan Earthquake and Tsunami, are provided as evidence to back up ideas presented within the paper.

In Japan, when the earthquake occurred in Hanshin-Awaji in 1995 the normative pattern was ready. The disaster risk-related plans were prepared by authorities according to the conditions of the current environment to respond to the chaos created by a disaster, such as using the highway for emergency services and locating the emergency operation centers at the Port Island Headquarters. However, immediately after the earthquake, the reality was not as it was written in the normative pattern. The central command center started receiving messages about the highway collapse, cars falling off with drivers inside, collapsed houses, etc. The command center was unable to respond to all requests due to the large scale of the event. The common answer to such messages was “*Central command unable to function. Deal with the problem on-site!*” (Shimbun 1996, 44).

The world owes thanks to Japan for the disaster risk reduction and management system established in the following years after the Hanshin-Awaji Earthquake (Mori et al. 2011). Japan is leading the way in developing earthquake early warning systems, disaster risk education to the public, and the construction standards of buildings, bridges, tsunami barriers, and disaster-proof nuclear plants (Mori et al. 2011; Norio et al. 2011). The Japan Meteorological Agency owns the world’s first earthquake early warning system and the system can distribute a warning 80 sec before an earthquake (Norio et al. 2011). Moreover, the Japanese population is highly aware of the risk due to a comprehensive public disaster education program (Norio et al. 2011). Japan is also a pioneering country in terms of the construction standards of buildings, roads, and bridges, and is also accustomed to earthquake proofing procedures for nuclear plants (Norio et al. 2011).

However, the system failed again when the Great East Japan Earthquake-Tsunami on March 11, 2011, hit. Tsunami barriers were severely damaged, some reinforced buildings collapsed, the cooling system of the nuclear plant did not work (although the system was shut down automatically), and citizens could not get to the shelters for many reasons, despite the fact that local governments had organized several training drills previously (Mori et al. 2011; Norio et al. 2011; Holguin-Veras et al. 2012). The system got tangled. The immediate picture after the event was totally different than the planned one.

In Japan, after the event, a group of researchers (see Holguin-Veras et al. 2012) conducted interviews with people from the public sector involved in disaster response activities. The respondents outlined that they could not follow the plans, as the plans did not consider such a large and complex disaster—the actions included in the plan were only for solving smaller scale problems and were not sufficient to answer their need (Holguin-Veras et al. 2012). Although the disaster response plans clearly define the structure of the post disaster humanitarian logistics and distribution centers, in reality, things did not function as previously planned (Holguin-Veras et al. 2012).

The research effort within this paper organizes challenges into three main groups. First is the fact that interdependency of components in a system and interdependency between systems is often disregarded in the DRM plans. When a

disaster hits, the largest amount of damage occurs due to mismatching or misaligned urban plans, components, or systems, or due to connections that had never been established, or had been ignored. Second, indirect and multiple hazards, which highly depend on the complexity of the environment, are mostly ignored. Indirect hazards occur in complex systems because of the proximity and subsystems' interconnectedness; such factors may lead to increased numbers of causalities. Last but not least, social structures of cities are dealt with as if they were separated from the physical structure, even though the social structure is strongly embedded within the spatial system of a city. People are strongly embedded within the spatial pattern, as they are the users/organizers of streets, buildings, and other infrastructures. Hence, the structural subsystems cannot be taught separately from the social subsystem.

In Table 1, the gaps observed are matched with the problem typology and the layer approach defined in this research.

2 How to Deal with a Complex City System: Agent Perspective and Four-Layer Approach

The word “agent” comes from a Latin verb “agent,” which means “doing.” According to the Oxford dictionary, an agent means: “someone or something that produces an effect.” In the research, agents represent all the stakeholders involved in every part of the DRM system's phases and all the elements in a city. Agents are grouped in four layers: organizational, tactical, public, and spatial layers. An agent could be a lay person living, working in, or just passing through the area (public layer), or they could be decision makers (organizational layer), emergency personnel, or employees of the transportation system (tactical layer), or it could be the road network (spatial layer) (Fig. 1). The public layer consists of the general population—their families, neighbors, etc. The organizational layer is the highest layer in this hierarchy and consists of decision makers. Emergency personnel, police, and employees of the transportation system make up the tactical layer. Moreover, there is a fourth layer, the “spatial layer”—the environment that includes their own spatial elements and the other three groups who are acting and living in.

The spatial layer is static during peace time and fluctuating during and right after a disaster. There is a substantial difference between the environment as perceived and reacted to by the agents, as the environment has changed due to the occurrence of a disaster. The static situation of the spatial layer represents the perceived one by agents from organizational, tactical, and public levels. Agents form a “mental representation” of the environment that they are living and working in. In psychological terms, this representation is called the “cognitive map.” In daily life, agents perform actions according to these previously formed “cognitive maps.” Indeed, agents can adapt their cognitive map by interacting both with each other and with their environment, and can make decisions and change their actions

Table 1 Differences between the plan and the actual situation, with examples from 2005 Hanshin-Awaji Earthquake and 2011 Great East Japan Earthquake and Tsunami

The plan	The actual situation	Problem typology	Affected layer
<i>2005 Hanshin-Awaji Earthquake</i>			
Operation center was assigned as the Port Island Headquarters	The headquarter building collapsed due to liquefaction, and the road which connects the island with the city was closed	Not considering indirect hazards	Organizational layer due to spatial damage
The emergency road network was planned as the main arteries and Hanshin highway	The Hanshin highway collapsed. The ground, underground, and elevated road networks were unusable due to distractions at several locations	Disregarding interdependencies	Organizational and spatial layers (fluctuating environment)
To organize the traffic, having 200 personnel was sufficient	There was a need for having 6000 personnel to organize the traffic	Not considering indirect hazards; disregarding interdependencies; not considering social system (reaction of the public)	Organizational layer
Providing information on TV	As a result of not having electricity/TV/telephone, it was not possible for the victims to receive the information provided on TV	Disregarding interdependencies	Organizational layer, spatial layer, and public layer
Police officers' responsibility is to rescue people and gather information	They were unable to conduct their duty due to a worried public trying to get information from them	Not considering social system (reaction of public)	Public layer
Accommodation: 84 hotels, with a capacity of 17,774 people	Without water and electricity, 10% of the rooms were usable	Disregarding interdependencies	Problems at the organizational level due to systemic damage
<i>2011 Great East Japan Earthquake and Tsunami</i>			
Structural measures, such as tsunami walls, reinforced buildings	Reinforced buildings collapsed, tsunami barriers damaged	Not considering indirect hazards (although it has been considered previously)	Spatial layer (fluctuating environment)
Nuclear plant's automatic shut down system	The system shuts down automatically, but the cooling system did not work	Disregarding interdependencies	It includes all four layers

(continued)

Table 1 (continued)

The plan	The actual situation	Problem typology	Affected layer
Drills including public	Locals did not want to leave their houses to go to shelters	Not considering social system (reaction of the public)	Public layer
Disaster response plan	Private sector chains were affected, the public sector could not fill the gap, helicopters and planes were destroyed by the tsunami, and drivers refused to go to the nuclear accident area	Not considering indirect hazards; disregarding interdependencies; not considering social system (reaction of the public)	It includes the four layers

Information gathered from Shimbun (1996), Menoni (2001), Mori et al. (2011), Norio et al. (2011), Holguin-Veras et al. (2012)

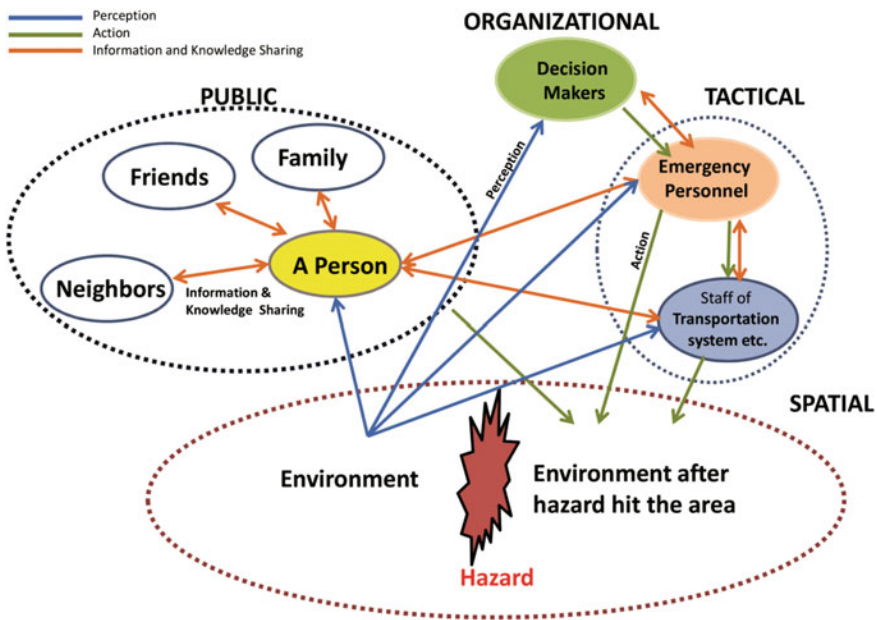


Fig. 1 Agents in a city system are grouped in four layers (modified after Atun 2014b)

through this interaction (Ferber 1999). In a defined environment, an agent collects information by perceiving the environment, or behaviors of others. In addition, they can share information and stay connected with other agents from all over the world in real time through social media. Each agent is an autonomous entity and can choose either to follow the rules or not, and agents have diverse perceptions of a risk situation due to various “priorities” and “values,” and this leads to them having

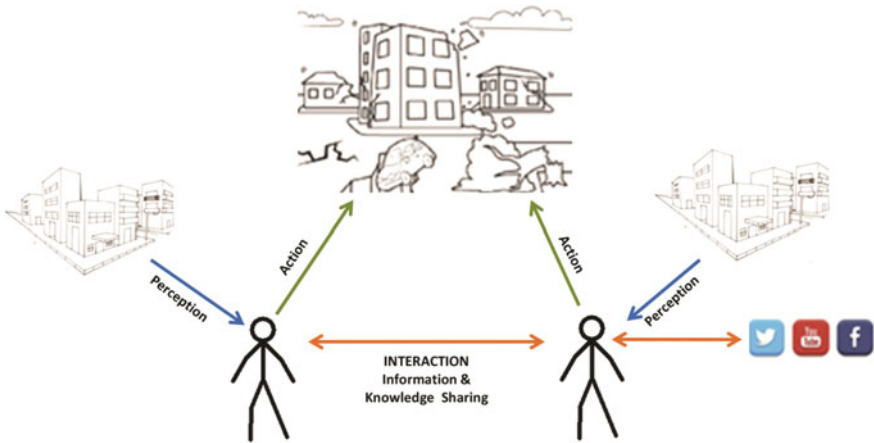


Fig. 2 Agents and the environment after a disaster

different reactions (Ferber 1999). An agent makes decisions and takes actions regarding the knowledge that she/he possesses. Thus, we see that the perceived, and reacted, environments are the same (Fig. 2).

However, if the environment is affected by a disaster, it changes in a very short time and turns into an environment that is completely different from the previous one. In such a situation, an agent needs to understand the new configuration and act accordingly with his/her perception that was established in connection with the previous environment. The actions could be individual or collective, and the purpose of both types of actions is to respond to the new environment in an attempt to reconstruct the current situation. The latter is formed only when agents take actions in groups (Bonabeau 2002). However, although actions have to be taken immediately, in a fluctuating environment, agents are unable to respond to the wider picture given in a short period of time. For an authority, it is not possible to forecast the reaction of agents before the occurrence of an event. The collective behavior of agents may affect emergency/response phases either positively or negatively.

2.1 Spatial Layer

Some major issues show that there could still be failures causing changes in the environment that would be different after the occurrence of a disaster with respect to the planned one. There is generally overreliance on current structural defenses; in addition, there is disparity between the rapid real-world development of cities and the static nature of the plans.

Additionally, changes in the geopolitical pattern, encompassed by the organizational layer, could hypothetically have huge effects on the spatial layer.

In Istanbul, for example, some municipalities' borders have changed due to the establishment of new municipalities in 2008 according to the law number 5447. This situation has led to changes in the population, structural density, and the proportion of void/solid areas in those municipalities. Although the emergency management plan for the entire municipality area has previously been prepared, it must now be prepared again taking into account these changes to reduce risk in future disasters.

Besides, rapid development-related problems in cities can create challenges for implementing strategies and policies to provide disaster risk reduction, such as implementing the emergency road network plan and organizing the traffic in the first-degree disaster-emergency roads. However, those areas are near to the low-rise building neighborhoods, and as a result, the road infrastructure is not developed according to the demand created by the new developments. This makes traffic congestion and scarcity of parking lots the two major problems in Istanbul. It is not sustainable to turn a street into an emergency response road which prohibits parking without provision of replacement parking locations. Due to the scarcity of parking lots in the area, and inadequate controls, those first response roads would soon start to be used for parking again to meet public demand.

This highlights the key issue: not being able to combine development plans with disaster management plans. In addition to forbidden parking activities in an area where previously people were allowed to park, the parking problem has to be solved by opening new parking lots and/or restricting car access into those areas. Disaster risk reduction plans have to be supported by development plans. Otherwise, provided solutions—as it is seen in this case—could be short-lived.

2.2 *Organizational Layer*

Two sets of in-depth interviews were conducted with people from the organizational layer both in London in 2011, and in Istanbul in 2012 by the author.¹ The results show that in London there is overconfidence of respondents' in the current disaster risk management system. In the case of Istanbul, however, the respondents are more cautious. One of the respondents says that “the system has been developed within the last decade and has never been tested by a major event.” Respondents from the organizational layer generally fully trust the staff in the tactical layer.

¹There are three types of survey tools applied both in the London and Istanbul case studies: first, in-depth interviews with the subjects at the organizational level; second, questionnaires with people from the tactical layer; and third, questionnaires on the subjects from the general public. The latter includes four parts: “Perception and Awareness of Risk Conditions,” “Awareness of Flood Warning,” “Awareness of the Information Programs,” and “Population’s Individual Preparation,” with the general public. The questionnaires in Istanbul and London are slightly different from each other as the hazard typologies in these two cities are different as well. To see the entire questionnaire forms conducted in London, please see Atun (2014a).

Furthermore, as an example of connection among the public and organizational layer, in both cases, respondents believe that the information provided to the general public is sufficient and accessible. Regarding the spatial layer, respondents think that structural mitigation measures are state of the art. In general, they think that the system established is faultless; the people in the tactical layer are trained well; the information is open to the public and accessible being provided through campaigns and media tools; the structural mitigation measures use the latest technology.

2.3 Tactical Layer

First, there are several stakeholders/teams working in different disaster phases, and the extent of interaction among those stakeholders/teams directly affects the quality of response. The stakeholders/teams have already met during several training sessions, they know each other personally, and during an emergency they know who the responsible person is and how to reach them. The second issue that affects the quality of work in the tactical later relates to the allocation of resources, and the budget, which are limited in the both cases. Although preparing a disaster/emergency plan is an obligation, municipalities are free to allocate their resources and budget according to their priorities. As a result, the quality of emergency planning differs significantly from one municipality to the other.

2.4 Public Layer

The most prominent issue regarding the public layer is the large gap between the public's actual awareness of information/risk and what the respondents in the organizational layer think about what public awareness of information is. Respondents from the organizational layer believe that the information to the public is sufficient and accessible.

In the public layer, perception of risk differs according to education, economic status, beliefs, previous experiences, and even gender. People with higher education levels show little interest in the survey at first; however, their interest increases proportionally as they realize that they know nothing about the risk that they are exposed to. The economic situation of people may affect their level of preparation against disasters. Economically disadvantaged people cannot invest in their futures if they have to focus on how to survive tomorrow. Migrants, especially, are the newcomers in the area, mostly belonging to the lower income level. They do not know the risks present in the area, as they do not know the history and have not experienced disasters that have occurred in the past. They are also unaware of the present public campaigns, Web sites, and early warning tools in place.

3 Discussion: Interaction Between Layers

Almost four decades ago, Ian Mitroff coined the term “*the error of the third kind*” or “*solving the wrong problem*” (Mitroff 1974, cited in Hollnagel et al. 2006, 22). This occurs when people insist on applying written plans to fluctuating circumstances instead of reorganizing strategies and priorities. Too static plans without flexibility and robustness are one of the problems seen in the spatial layer in the two case studies in London and Istanbul (Table 2). Indeed, during a crisis situation flexible systems could be better than overly rigid schemes. The kind of failures that have been identified here through the use of two case studies and survey data from two different countries is hard to predict (Table 2). These failures result from the interaction of physical and social components (Hollnagel et al. 2006). The outcome of actions, which are defined and regulated in plans, could be different from those anticipated as a result of constantly changing environments during disasters. In such a situation, new decisions, which are not defined in the plan, have to be made with limited knowledge of the current situation.

To decrease the gap between the actual and normative patterns, another crucial issue is to increase the communities’ perception of risk through risk communication. However, in both examples, respondents from the organizational pattern strongly believed that public information is sufficient and accessible to public. Having information accessible does not mean that the general public receives and understands it correctly (Atun 2014a). This is the main tool to inform agents before the occurrence of an event, or during an event, regarding the possibility, and impact, of risk. This could help the agents to take action faster in the changing environment during/after an event as they have been educated about the potential effects of the event previously.

Maps, scenarios, strategies, policies, and legislations are the tools from which agents gather knowledge to feed into action. Decisions and strategies are set in the organizational layer following information produced by experts and scientists. People at the tactical layer apply strategies and decisions actively in the spatial layer. Staff at the tactical layer implement strategies in the field and have direct contact with people at the public layer. In perfect conditions, communication should occur both vertically between these layers and horizontally within the same layer. In reality, the interaction between the four layers is considered poor or nonexistent during the preparation of the normative pattern before a disaster (Table 2).

4 Final Thoughts

The findings of the research indicate three main common challenges which span all the four layers (spatial, organizational, tactical, and public), and the effects of these deficiencies are seen most strongly in the spatial layer. The deficiencies derive from a failure in considering interdependencies, and they are the following: “disregarding

Table 2 Discussion of the findings

Layer	Defined problem	Main reason of the problem and suggested strategy
Spatial layer	Problems at the spatial layer are related to rapid development, such as: traffic congestion, density of buildings, the low maintenance degree of buildings	Connecting development plans and disaster risk reduction plans
	Too static plans without flexibility and robustness	Plans should be flexible, especially in terms of management. The manager of the plan should have sufficient space to improvise, when it is necessary
Organizational layer	Too much confidence in the system	Although the system is reliable and state of the art, it can be affected by a human failure. What if plans should be prepared
	Believing that public information is sufficient and accessible	There is a need to conduct a social network analysis
Tactical layer	Limited resources	Priorities should be defined carefully due to limited resources and budget allocation.
	Budget allocation	
	Not having interaction between teams	The transportation, spatial planning, and DRM teams should have met regularly
	Not having interaction between neighboring municipalities	Municipalities should have strong interaction as well
	Fragmented training programs	The training program should be planned according to the need; in Istanbul, it is not organized systematically
	Problems during the implementation phase due to not involving the general public in drills/training programs	As the resources are limited, one representative from each social network (neighborhood, school, etc.) shall be invited to drills
Public layer	The large gap between the actual awareness of public's awareness of information/risk	With involvement of one member (at least) from each social network (or as much as possible), help to make them aware of disaster information/risk and better use of technology
	High awareness of risk and low preparation	The ignorance is high, especially in Istanbul. Some role playing games with general public shall be a solution. Seven educational and economic level may affect the willingness of learning

interdependency of components in a complex system,” “disregarding secondary effects of a hazard,” and “disregarding highly dominant social system embedded within a spatial pattern.” Besides, recent disasters have highlighted deeper problems, such as too much confidence in current operational and technological tools, lack of experience and misunderstanding of disaster situations that are directly or indirectly deriving from the given three challenges.

To sum, the research suggests we need to encourage flexibility at structural, organizational, tactical, and public layers by providing policies and regulations accordingly. A DRM system is constructed by rules and regulations, which is theoretically correct; however, failures or incidents during real-world emergencies are changeable phenomena that are hard to predict (Hollnagel 2006). There is an urgent need to take into account the complex interaction pattern of the three layers while making decisions based on uncertainty and with limited knowledge. This will allow a decision maker to take into account the behavior of others at these critical times (Hollnagel 2006). During disasters, flexible systems generally perform better than very rigid ones. Quick response, ability to monitor and adapt the plan according to changes, and reorganizing resources in a constantly changing environment are the keys to enhancing resilience. Indeed, the findings here suggest a clear course of action in which policies and regulations must encourage flexibility at structural, organizational, tactical, and public layers to be effective.

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The Economic Impacts of Natural Hazards: Lessons Learnt from the PDNA International Damage Assessment Project Implemented in Haiti After the Earthquake of 2010

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Abstract On January 12, 2010, an earthquake of magnitude 7.3 on the Richter scale shook Haiti for 35s. It was the most powerful earthquake to hit the country in 200 years and one of the most severe at the world level. Such earthquake caused an unprecedented situation in Haiti, with enormous repercussions affecting all sectors of society, well beyond the areas directly affected by the catastrophe. The essay, after introducing the issue of the economic impact of natural catastrophes, offers the example of the Post-Disaster Needs and Assessment Report for Haiti as an innovative reference instrument for damage reporting and reconstruction organization. The Report, developed with the assistance of many international organization, from the UN to the European Community, has been designed not only to assess the whole of the territorial values destroyed or damaged referring to direct, indirect, and systemic damage, but also to enlighten the most important impacts and the reconstruction needs for different economic sectors and territorial resources. It therefore offers a complete list of elements to take care of together with the timing and organization of the reconstruction phase.

1 Introduction

A country is a territorial system. Territorial systems are aggregates formed by combining several territorial components, subjects and objects, functions, and/or systems of interests, which represent a specific territorial capital. Such elements represent the system of resources the country or the territorial system may rely on to function and continuously evolve. This is based on specific and different dynamics and referring to different territorial components, which interact with each other over

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time producing new components. Such elements and capital resources are the values exposed to natural hazards.

The shapes, characteristics, local specificities, and availability of the whole of the territorial resources in an observed territorial system is the result of a complex system of actions/reactions/non-actions which are, at their turn, the results of combinations and interactions of elements and their dynamics. Combinations and interactions which are stratified over time and integrated in the territorial “objects,” activities and resources and produce territorial capital as the result of a variety of decisions and decision processes developed over time by a huge variety of different territorial subjects/stakeholders, with defined systems of interests, needs, goals. The territorial capital which characterizes a country has different roles, potentials, and values, according to its availability, renewability, sustainability and, of course, direct economic, and financial values. Moreover, territorial capital not only sustains the usual, everyday, functioning of a country or a region but also have potential functions and roles for future developments, often not completely exploited or visible.

As a consequence, following an economic perspective and looking at the conditions of a developing country, the damage produced by a natural disaster always means a loss of resources/territorial capital which will affect the territorial system to a certain degree over time (Pesaro 2007). The greater are the vulnerability, or fragility, of the territorial components exposed to hazards and their values and the lower are their substitutability, renewability, or recoverability, the greater will be the total value of the losses. The application of the economic approaches and assessment tools can therefore offer an effective support to explain to what extent and how a disaster will affect the capital of local resources. This in terms of direct and indirect values of the whole amount of resources involved in the disaster, looking to the capability of the system to continue producing over time goods and services, values, and revenues for final consumers and production means and to reproduce (if possible) the lost resources.

An increasing number of official/scientific-based Reports are available at the international level concerning ex-post damage assessment methodologies and practice and knowledge building on damage from an economic perspective but still the variability of the damage lists and of the methodologies is very high. Moreover, there is an increasing evidence about the importance to better understand the specificities of the damage models in developing countries. This is for two main reasons. The first is the need for improving the assessment activities in countries where the available data are often poor, and the direct accounting of damages is often made difficult by the lack of information and hard access to the hit areas. The second is the importance to learn from past events, in order to improve mitigation and prevention measures and the related investments benefit/costs ratios.

The essay will be developed in two parts. The first will very briefly introduce to post-event damage assessment from an economic perspective, paying particular attention to some main elements and conditions for its operational implementation. The second will propose the case study of the Haiti Earthquake Post-Disaster Needs Assessment project (from now on PDNA 2010), related to the event of January

12th, 2010. An event listed as one of the strongest earthquakes ever recorded worldwide, with a number of deaths amounting to between 200,000 and 250,000, and damages amounting to between 7.2 and 8.1 billion dollars, 1 billion more than the entire Haiti's annual GDP (Carvalho et al. 2010). The catastrophe resulted particularly heavy compared to the population exposed (between 20,000 and 25,000 killed per million inhabitants, as in Carvalho et al. 2010) and because of the very bad average quality of the built environment in the country (InsideDisaster 2010). The impacts were enormous from all viewpoints, causing an unprecedented situation in Haiti, with huge repercussions affecting all sectors of society, well beyond the areas directly affected by the catastrophe (PDNA 2010).

2 Recognize and Measure the Impacts of Natural Catastrophes from an Economic Perspective

As already stated above, the damage provoked by a natural extreme to a country means a loss of developmental resources for the territorial system as a whole, and damage impact can affect such areas for long periods, contributing to slow down development (Pesaro 2007). This of course results in an additional burden in countries where the development level is still very low, like in Haiti, whose position in the Human Development Index list in 2016 was 163 on 188 listed countries (UNDP 2016). The presence of major natural or na-tech hazards should therefore be regarded and accounted for as an additional weakness the country is exposed to, as hazards mean potential losses of tangible and intangible resources, producing “obvious” negative externalities, that is *losses of values*. In an economic perspective, vulnerability means to what extent and how a disaster will affect:

- the capital of local resources—that is direct and indirect values of the whole amount of resources;
- the capability of the system to continue producing goods and services—that is values and revenues produced for final consumers or as production means;
- the capability of the system to reproduce the lost resources and in how much time—that is direct and indirect values related to reproducible and non-reproducible resources.

The greater the vulnerability of the territorial components exposed to hazards and their values are, and the lower their substitutability, renewability, or recoverability, the greater will be the total value of the losses. The application of the economic approaches and assessment tools can therefore offer an effective support to explain to what extent and how a disaster will affect the capital of local resources. This particularly considering the direct and indirect values of the whole of the resources involved in the disaster, looking at the capability of the system to continue producing over time goods and services, values, and revenues for final consumers and production means and to reproduce (if possible) the lost resources. The

economic dimensions of damage will not therefore only depend on the lost values expressed in money but also, and mainly if developing countries are involved, on the impact of such damage on the socio-economic systems and the related capabilities and resources to face the events. The economic vulnerability assessment will therefore depend on:

- the type of hazard/disaster and its “local characteristics” (droughts, seismic, earthquakes, hurricanes, etc);
- the characteristics and values of the exposed system of resources: which resources, for which uses and with which availability, renewability, and reproducibility profiles;
- the territorial system as a system of monetary and non-monetary values, as in the social model, in the economic model, and in the built environment, made of settlements, buildings, and infrastructure systems;
- the over-local role of the territorial system and the interdependence with other territories;
- the existing development conditions and the fragility of the local communities and activities facing unexpected events and shocks.

An increasing number of official/scientific-based Reports have been made available at the international level from the late 1990s concerning ex-post damage assessment methodologies and practice [see, as an example, the Report from the USA Committee on Assessing the Costs of Natural Disasters (1999), and Van der Veen et al. (2003) for the EU]. Different evaluation methods have been object of discussion and testing activities over time at the international level (see, among other early studies, Hubert and Ledoux 1999; Cochrane 2003), and some literature reviews are now available (for instance Shreve and Kelman 2014; Mechler 2016). Monetization models have also been developed over the last 15 years but still, monetary evaluation remains very difficult (see, among others, Meyer et al. 2013). This is why, again, the availability of damage assessment experiences like the Haiti one are even more important, apart from the image itself of the impacts a catastrophic earthquake like the 2010 (one of the most disruptive in the human history) may produce in a vulnerable and exposed developing country. In economic sectors, for instance, indirect and systemic damage may be huge (Cochrane 2004) and the time needed for restoration or reconstruction may become crucial factors for the capability of the whole territorial system to start again with its “everyday life.” These factors should be better recognized and deepened, the costs being related to the cascade of impacts coming from business interruptions (direct or because of the interruption of lifelines and other territorial infrastructures and services; see Rose and Huyck 2016), rebuilding and reconstruction investments and time needed, substitution of machineries and production materials, injuries to workers. This may result in a deep loss of competitiveness and reduction of market shares. So high, sometimes, to pull economic subjects to stop their activities. It is therefore easy to understand how indirect and systemic losses might weight in terms of future development of the territories hit by natural disasters.

Despite the increase in research and operational applications, still, the variability of the *damage lists* and of the data collection and elaboration methodologies is very high. Moreover, there is an increasing evidence about the importance of better understanding the impact of extremes, through satisfactory damage and losses assessment models, better taking into account the specificities of the damage profiles in developing countries. The goal is to improve information and knowledge about the *numbers of damage*, to better evaluate the damage in the aftermath of an event in a less developed region. Damage assessment should be designed not only to define the direct economic impacts of an extreme and assign a *dimension* to what has been lost (and is therefore needed for reconstruction) but also to:

- control the reimbursement amounts due to local territorial subjects;
- identify the elements and values more exposed to the disaster and the dimension of damage (exposure and vulnerability);
- understand the resistance of the territorial system facing disasters (coping capacity and adaptation);

A second important element is to design the damage assessment model so to improve the capability to learn from the past events, organizing data collection and analysis and enlighten the needs for further knowledge to enhance the reliability of future *ex-ante* damage scenarios. This in a preparedness perspective, looking at improving mitigation and prevention measures and better address decision-making and benefit/costs ratios of investments.

This is why it is so important to treasure on-the-field experiences, especially when the damage information collection and the related assessment has been developed in the best possible way even if facing a critical situation and in countries where “normal information” activities can be difficult. This is the case of the damage assessment activities developed in the aftermath of the Haiti earthquake 2010, as clearly explained in the document “Haiti Earthquake PDNA: Assessment of damage, losses, general and sectoral needs” (PDNA 2010).

3 The PDNA International Damage Assessment Project After the Haiti Earthquake in 2010

The Post-Disaster Needs Assessment Report (PDNA) has been conducted in Haiti in February and March 2010, at the request of and under the direction of the Government of the Republic of Haiti. The technical support has been provided by the United Nations, the Inter-American Development Bank, the Economic Commission for Latin America and the Caribbean, the World Bank, and the European Commission (European Commission DG DEVCO 2015). The PDNA has been designed in order to respond to such a highly severe event going further than traditional post-disaster assessments (PDNAs 2010). The objective has been not only to better understand the whole of the damages and losses and the related system of chain effects, but also to lay the foundations for reconstructing the

damaged areas and to contribute to a long-term national strategic development plan, in order to begin rebuilding Haiti.

The approach used to develop the PDNA was quite unusual compared to similar Reports, as it goes far beyond a damage and loss assessment as a list of deaths and injured individuals and of the number and typology of lost buildings and physical infrastructures on whose basis to calculate the economic damages and losses. The Report distinguishes short-term rehabilitation needs and offers an estimate of the medium and long-term needed interventions to rebuild the country. These have produced a quite complete image of the economic values at stake. Damages and losses from the one hand and the rehabilitation and reconstruction costs or, better, investment needs to sustain the country's development.

The two main assessment goals have been based on two different, here integrated, assessment models. One is the DALA (Damage Assessment and Loss Assessment), developed by the United Nations Economic Commission for Latin America and the Caribbean (UN ECLAC) and introduced in the early 1970s (of course enriched by integrations and research developments over time). The second is the HRNA (Human Recovery Needs Assessment), a United Nations method for assessing recovery needs at community level. Taken together, the HRNA and the DALA make up the Post-Disaster Needs Assessment (PDNA) in which the two assessments come together to identify the disaster characteristics and impact and how to intervene, in the reconstruction phase, so to reduce future disaster risks and to accompany the affected communities on the path to recovery.

The Haiti earthquake has been one of the first experience in the use of the HRNA, whose development started with an agreement among the UN, the European Commission and the World Bank, together with other international partners, signed as a Joint Declaration in 2008 (GFDRR 2013). The HRNA is the most innovative part of the PDNA, as it reflects the concerns and priorities of disaster-affected individuals and stakeholders to recover their full potential and to lead productive, creative lives according to their needs, rights, and interests (GFDRR 2013). Based on these perspectives, the HRNA estimates the requirements for each sector, assigning particular importance to restoration of governance and social service systems, post-disaster capacity building, measures to ensure the fulfillment of rights as well as access to reconstructed infrastructure, approaches to fully restore livelihood systems, and strategies to enhance resiliency against future disaster risks. This includes measures required, for example, to restore gender equity in school enrolments, reversing disaster-induced destitution, protection, and regeneration of natural resources affected not only by disasters but also by reconstruction programs, etc.

The PDNA, as the integration of the two assessment methodologies, mainly follows a people-centered approach, but in the Haiti case also, the built environments and infrastructures have been attentively considered, together with the macroeconomic impacts and the needs to make the economic system begin to work again, taking into consideration that it was already very weak before the event. The main assessment elements of the PDNA are summarized in Fig. 1.

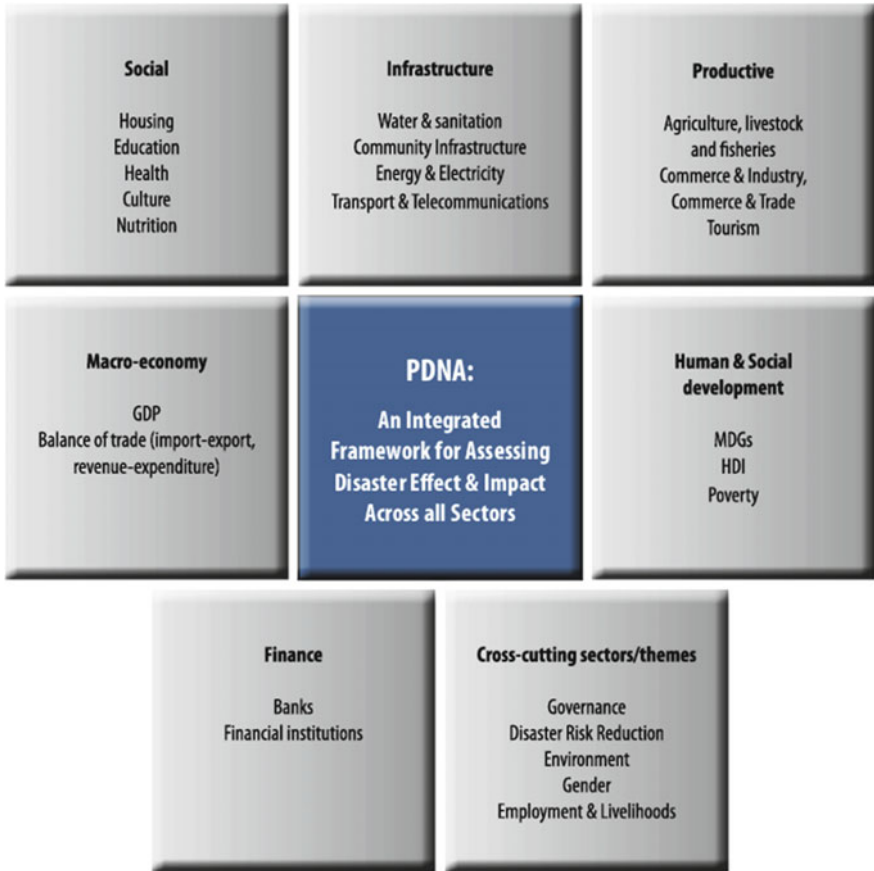


Fig. 1 Sectors assessed in the PDNA (Reproduced from GFDRR 2013)

In the Haiti case, eight essential sectors have been identified, looking at impact, urgency and feasibility criteria, time (from short to medium and long-term) and the availability of economic means: governance, the environment, disaster risk management, social sectors, infrastructure-related sectors, the production sector, a macroeconomic analysis, and cross-cutting sectors (youth, gender, vulnerable persons, employment). These have been integrated and connected with each other as the results of the cross impacts produced by the event on the human, infrastructure, and environmental systems. Based on this, socio-economic impacts have been finally highlighted (see Fig. 2).

The specific elements assessed in the Report have been summarized as in Tables 1 and 2, which follow.

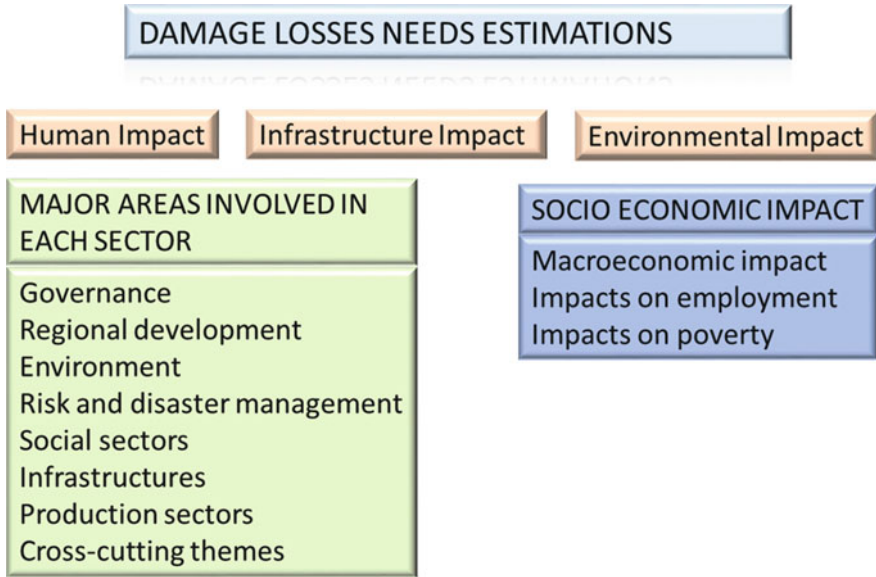


Fig. 2 System of the impacts of the Haiti 2010 earthquake as in the Haiti PDNA (Author’s elaboration after the Haiti PDNA Report, Haiti Government 2010)

4 Conclusions

The Haiti experience has made the effectiveness of the PDNA model and strategy clear. The model developed for Haiti has been object of further studies to fine-tune the scheme to collect and organize data about damage and losses, together with the assessment of the recovery and reconstruction needs. This in order to obtain a tool able to address the decision-making system and to enlighten the whole of the amounts needed to allow developing countries to bounce back after an extreme. Elements which are also needed to better organize the international intervention and support. The lessons learned have then been treasured by the more important international bodies and gave birth to the 2013 Global Facility for Disaster Reduction and Recovery Report (GFDRR 2013) in which schemes and lists of elements are made available to facilitate the needed assessment actions. This particularly when facing a huge variety of local conditions influencing the impacts of natural events on territorial subjects and objects, with reference to exposure and vulnerability.

The socio-economic-based evaluation has to be applied to a variety of physical territorial elements and their characteristics and interactions, whose dynamics depend on the development stages of a country and the ways in which local communities take advantage of their territorial capital. These also according to the different characteristics of the built environments, of the related use functions and the different profiles and features of the communities of users and stakeholders.

Table 1 Summary of the damage and losses, US million dollars

Theme/Sub-theme:	Damage			Losses		
	Public	Private	Total	Public	Private	Total
Environment and disaster risk management	3.00	0.00	3.00	321.40	1750.00	496.40
Social sectors	153.80	805.40	959.40	197.80	355.60	553.30
Water and sanitation	20.90	13.10	34.00	8.40	193.00	201.40
Health	94.70	101.70	196.40	187.70	86.10	273.70
Education	38.20	395.60	434.00	1.70	41.50	43.20
Food safety and nutrition	0.00	295.00	295.00	0.00	35.00	35.00
Infrastructure	628.1	2 538.60	3 166.7	774.2	520.60	1294.8
Housing	0.00	2333.2	2333.20	459.40	279.30	738.70
Transport	188.50	118.6	307.10	91.60	197.50	289.10
Telecommunications	66.00	28.00	94.00	24.00	22.00	46.00
Energy	20.80	0.00	20.80	37.23	0.00	37.23
Urban and community infrastructure	352.80	58.80	411.60	162.00	21.80	183.80
Production sectors	3.10	394.00	397.10	0.00	933.30	933.30
Agriculture	3.10	49.90	53.00	0.00	96.00	96.00
Industry	0.00	74.60	74.6	0.00	267.70	267.70
Retail	0.00	148.70	148.7	0.00	490.60	490.60
Finance and banking	0000	98.20	98.2	0.00	0.00	0.00
Tourism	0.00	22.60	22.6	0.00	79.00	79.00
Total	781.80	3738.00	4526.2	1293.4	1984.50	3277.8

Reproduced from Haiti PDNA Report, Haiti Government (2010)

Finally, as the involved territories are systems of interconnected resources and values, a systemic perspective should be applied, to make the assessment processes more accurate and able to mirror reality.

The Haiti PDNA Report also offers evidence of an important element, which till that moment was quite underestimate in developing countries. In the aftermath of an event like this one, the main attention is often paid to the emergency and recovery phases. In this case, emergency and damage accounting were immediately complemented, with a great evidence for the reconstruction needs and the related timing and phases, according to urgency and importance of the different sectors for coming back to everyday life. This is how a *damage and losses assessment Report* has become a *Post-Disaster Needs Assessment Report* as a comprehensive policy instrument, to support public action in the aftermath of disasters. This has been useful not only to better understand the economic and social impacts and the financial needs related to a certain natural catastrophe during and after the event but also to offer a reference for the building of a strong and well-recognized governance system for the recovery process and the reconstruction phases. Initially, the economic approaches were meant to enhance the capabilities to identify all damage

Table 2 Summary of the needs for recovery and reconstruction, US million dollars

	6 months Sep, 2010	18 months Sep. 2011	3 years	Total 0–3 years
Total	1477.5	3086.1	7627.2	12,190.9
Governance	329.3	374.3	215.0	918.6
Rule of law, justice, security	44.0	215.5	200.0	455.5
Democratic process	40.3	35.2	0.0	75.5
Administrative governance and public services	249.0	123.6	15.0	387.6
Regional development	0.0	182.0	533.0	725.0
Regional development	0.0	46.0	118.0	164.4
Land tenure management	0.0	54.0	100.0	154.4
Decentralisation and decencentration	0.0	92.0	315.0	447.4
Environment—disaster risk management	60.1	345A	992.7	1398.2
Environmental governance	3.0	15.0	12.5	30.5
Land and resource management	10.0	58.5	380.8	449.3
Pollution and nuisance	43.1	221.9	472.9	737.9
Disaster risk management	4.0	50.0	126.5	130.5
Soda sectors	900.4	1547.0	3928.9	6376.3
Health	283.0	500.0	708.0	1491.0
Education	449.3	465.4	1685.1	2599.8
Food safety and nutrition	21.0	299.1	399.5	719.6
Water and sanitation	95.4	199..2	776.9	1071.5
Sport and leisure	11.4	22.8	258.5	292.7
Culture	40.3	60.5	100.9	201.7
Infrastructure	124.9	417.4	1295.1	1837.5
Housing	5.2	149.8	505.0	660.0
Urban and community infrastructures	0.7	68.0	96.6	165.3
Transport	29.7	118.8	448.0	546.5
Energy	83.3	71.8	192.2	3473
Telecoms	6.0	9.0	53.3	6873
Production smears	29.6	108A	204.5	342.4
Agriculture and fishing	6.9	13.7	20.5	41.1
Tourism	1.7	16.2	25.7	43.6
Trade and industry	6.1	75.8	151.7	233.6
Employment	14.9	2.6	6.6	24.1
Transversal	48.1	101.7	458.0	607.8
Youth	45.0	93.0	440.5	578.5
Sender	2.8	8.4	16.9	28.1
Vulnerable persons and social welfare	0.2	0.3	0.6	1.1
Information management	0.1	0.0	0.0	0.1

Reproduced from Haiti PDNA Report, Haiti Government (2010)

typologies—direct, indirect, and systemic—involving a specific territorial area both in physical terms (number and typologies of territorial subjects and objects exposed to hazards and their vulnerability) and value terms (using money as the measure unit). After the Haiti PDNA experience, the immediate integration of these with the following needs for reconstruction and sustain of the development became more clear and important.

Finally, a careful evaluation of the past events and the related impacts has also been more and more recognized as a prevention tool itself for future events. Complete images of past damage and needs dimensions and characteristics are one of the mainstays of hazard management and disaster risk reduction over time and the basis for choosing among many possible tools and intervention options. Damage is the benchmark for analyzing past predictions and key element to build better correlations between exposition and vulnerability evaluations. Needs are the element needed to better prepare the system for future events. It is however clear that, to obtain these goals, damage and needs estimation must exist as a concrete, precise, and stable practice and the results be recorded and easily accessible for users. According to this logic, damaged elements recognized and evaluated after a disaster become precious information sources to assess the future potential impacts of hazard, while the needs emerging in the aftermath of events should be carefully considered and forecasted because it will represent the resources for future development.

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Perceiving Urban Resilience Within Post-quake Recovering Processes. An Experimental Approach for Emergency Housing in Emilia Romagna, Italy

Doaa Salaheldin Ismail Elsayed

Abstract Traumas do not only erase but also produce. Opportunities could be tackled in order to examine the city systems and modify it within the reconstruction process. This mind shift shall take place starting from the recovering phase in order to fulfill one vision of transformation that gained consensus of different stakeholders. This intention protects it from deviation or deformation within an atmosphere of uncertainty. Emergency housing installed after disasters create temporary environments fertile for examining new transformation visions and evaluating its pragmatism, opening up chances for people to participate in the reconstruction phase through modifying, evaluating, or proposing integrated ideas. In this sense, the recovering phase would be an effective action guaranteeing the sustainability and durability of the proposed transformation plan. The article proposes an alternative scenario for emergency housing urban environment, through methodological strategies and practical applications, responding to the short- and long-term social and physical needs of the city. The proposal tackles challenges related to food security and distribution, mobility and transportation, temporary housing construction, energy production, scarcity of building materials, risks of post-disaster's social fragmentations. The study is experimentation for both the design as well as the recyclability of the proposed temporary environment during and after natural disasters that will be practiced in Finale Emilia town after Emilia Romagna earthquake in 2012.

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1 Introduction

Geography is continuously in a state of motion, causing series Traumas for cities and its affected communities. Earthquakes are one face of these motions, a sudden redeem of energy causing destruction and deformation for the physical components of cities besides the unexpected civil unrest. Within this context, unpredictability is becoming the new normal, where Traumas have always been a fertile environment for transformation in order to respond to the severe contextual and social mutations. Reconstruction after natural disasters requires a sensitive consciousness of the aspect of time, related to the recovering, adaptation, and finally the transformation phases, in order to achieve a resilient environment capable of coping future disasters. Thus, while thinking about a future vision for the city, it's important to fuse this perspective through the whole phases of reconstruction, starting from recovering till the mature form of transformation (Elsayed 2017). This approach is quite relevant to Arata Isozaki's words when he said that: "*A ruin is the future of our cities and the future city is a ruin itself.*"

In order to face our new normal of uncertainty, a true mind shift needs to be achieved, that perceives opportunities within crisis, tackling catastrophic areas as places of production and not only destruction. Achieving a flexible adaptation of cities with the continuous contextual mutations is relying on our consciousness regarding urban resilience approach that is based on continuous learning processes. Urban resilience tackles the effective utilization of current resources within times of crisis besides learning from previous errors. It's not only aiming at regaining what was lost according to "Com'era Dov'era" approach, but also to introduce open and regenerative systems instead of hidden closed ones, to be capable of modifying and upgrading strategies for city management. According to the previous argument, the article is introducing urban resilience approach guiding the recovering phase in finale Emilia town after Emilia Romagna earthquake in 2012.

2 Aim of the Study

The aim of the study focuses on the recovering phase as a productive and educative period for the community, in order to examine its capacity not only to adapt with changes but also to take the responsibility of adopting the transformation vision. It examines permanent blue/green infrastructures related to the transformation visions, within in situ temporary housing installations. Optimizing the recovering phase to achieve a resilient environment capable of coping future disasters, through a comprehensive strategy integrating urban agriculture, water harvesting, energy production, mobility, recycling materials, and social empowerment.

3 Background and Previous Practices

According to the previous argument, the article is introducing urban resilience approach as a tool of transformation for cities under stresses. The first part of the article adopts a theoretical background discussing urban agriculture as an effective tool capable of reversing conditions of food distribution into food production and from food dependency to food security. Consequently, urban agriculture is connected with a sustainable irrigation system responding to the current scarcity of water resources, which introduces water recycling as an adopted approach for water supply within emergencies. Energy production is as important resource to supply during crisis. Urban agriculture, water harvesting, and energy production systems are implementing a new anthropology built up through developing community's competences within crisis times. This new anthropologies would be developed through cultural platforms of common spaces, where these vulnerable social groups could be healed through building up their self-determination once more.

3.1 *Urban Agriculture ... from Crisis to Development*

Urban agriculture has always been a guaranteed strategy for achieving food security during emergencies witnessing food instability especially after the departure of relief agencies. Thus, the external resources decline, often leaving large numbers of affected people suffering scarcity of food aids, declaring the need for local food production (Bradford et al. 2009). Accordingly, urban agriculture is recommended not only for offering food supplies but also as a therapeutic landscape as it integrates people in shared activities helping them to regain back their dignity, hope, and self-respect and enhance overall well-being. Urban agriculture increases self-reliance, allowing people to grow their preferred crops and varieties, besides improving their skills and knowledge. From the logistics point of view, it works on reducing operational costs for humanitarian agencies contributing in restoring the social fabric of disaster affected communities. Moreover and on the long-term, urban agriculture generates income for refugees or local communities, and contributes to the broader development of the area. But urban agriculture on its own doesn't exclude processes of nutritional aids after disasters; on the contrary, food distribution should be planned in conjunction with food production in order to fulfill the time lag before the first crop harvest to provide food security. The transitions from food dependency to food security preferred to be done at the earliest opportunity that is the main component of mitigation and preparedness strategies (Hoekstra 2009). This approach had been widely practiced within crises, where after the Second World War that witnessed scarcity of food, a British campaign was launched entitled "*The Dig for Victory*," encouraging people to transform gardens, parks, and sports pitches into allotments for agricultural production. Moreover, the agricultural development program entitled "*Operation feed yourself*" in Ghana in 1970s that was directed toward food

production directly after a crisis that manifested itself in an increasing import of food and a rise in local food process. These critical conditions urged the government to start this national campaign to increase food production. The previous experiences during crisis reinforces the role of urban agriculture in a successful recovering process, but urban agriculture could not be planned without an irrigation system guaranteeing its sustainability that would be discussed in the next point concerning rain water harvesting (King 1959).

3.2 Rainwater Harvesting ... from Scarcity to Storing Benefits

Consequently, urban agriculture is connected with a sustainable irrigation system responding to the current scarcity of water resources, which introduces water recycling as an adopted approach for water supply within emergencies. Water recycling is one of the most important issues that recommend adopting new cultures and behaviors concerning water use and consumption. Rainwater harvesting is one of the widely practiced water recycling systems. It is a simple low-cost technique that acts as a supplement for other water sources when they become scarce or are of low quality. The technology of water harvesting is flexible and adaptable where rainwater is collected on rooftops to be directed toward gutters connected to storage reservoirs, providing water for consumption. This method had been practiced in Kerala, a state in the south-western part of India, through a program entitled "Mazhapolima: keeping water in your well year round". It is a community program started in 2008, responding to the problem of scarcity of water. Even though the town has more than 6.6 million wells storing the high annual range of rainfall, but due to the topographical conditions a quick run off for the water take place causing their dryness soon after the monsoon rains leave. Mazhapolima program encouraged water harvesting to recharge the wells in order to have availability of stored water throughout the year, besides recharging the ground water. Different approaches related to water recycling are crucial to be practiced within our contemporary time of uncertainty. Water means life for the worlds habitats which are now threatened due to different factors, where this condition requires serious toward water's conscious use and consumption, especially in post-disaster contexts.

3.3 Energy Production ... from Central to Distributed System

Natural disasters and human-induced conflicts declare the vulnerability of our urban environments, where emergencies usually produce damages to infrastructures and power supplies. Lacking access to energy represents one of the immediate problems

faced by the affected social groups, which requires fast actions to be taken. Proactive interventions need to consider renewable energy that can be adapted to emergency conditions (Micangeli et al. 2013). The recovering phase is considered an opportunity to improve energy security strategies through energy efficient practices. Introducing distributed systems, as supplements of centralized ones shall be considered, where distributing the sources of energy are better strategies than depending only on one central source, which can cause critical conditions in case of sequential shocks. The distributed energy generators could occur through installing solar panels to emergency houses that would enhance energy security to the newly constructed temporary environment (William 2005). Modular solar panels connected to storage batteries could allow 24-h use, depending on consumption, which relies on the stakeholder's evaluation for their needs, where minimum demands are recommended to save energy for other uses during emergencies. Solar energy could cost more during the construction process but it could be dismantled and reused in permanent housing after the temporary mission is finished. Moreover, activating the use of renewable energy during the recovering phase is promoting safe energy production culture to take part in the transformation phases of cities and towns after disasters (National Renewable Energy Laboratory (NREL) 2009).

Adopting productive approaches like urban agriculture, energy production, water recycling had proven that the costs of restoring communities back to how they were are much greater than the costs of investing in a community risk mitigation program in order to increase its resilience before a disaster strikes, which is one of the proposal's main goals (Hoekstra 2009). The previously discussed approaches are developing new anthropology built up through developing community's competences within crisis times. This anthropology needs to be shared, discussed, and developed, through cultural platforms. These platforms are composed of common spaces where replaced social groups could heal through building up their self-determination and self-competences once more which are discussed in the following point.

3.4 Common Spaces ... as Tools for Community Resilience

Community resilience targets building community competencies to the community capacity in order to continue increasing overtime. After disasters common spaces play an important role in increasing the resilience of the vulnerable social groups in terms of community attributes, such as the ability to self-managing and self-determination. Integrating common spaces within the emergency housing urban aggregations is crucial, for preparing communities to cope future disasters. Common spaces are therapeutic places to relieve stress and gain confidence. This approach was examined after the earthquake of Christchurch in 2009, 2010 which triggered lots of community attempts regarding the use of the newly emerged vacant lands resulted after trauma; these attempts were named the Gap Filler Christchurch. Emerged voids had been transformed into flexible open spaces

embracing different entertaining activities, giving chances for people to meet and build up new relations after the earthquake. In this sense, common spaces helped in stabilizing post-disaster places through preparing the human capital heal and rebuild itself within unpredictable conditions.

3.5 *In Situ Temporary Housing Installations ... Opportunities or Threats*

After disasters cities face huge threats of being abandoned and forgotten, where usually the installations of temporary houses take place in peripheries or along borders. Thus city cores turn to ghost cities, especially historical centers due to their urban vulnerabilities. This problem took place in L'Áquila after the earthquake of 2009, where the city core had faced wide range of destruction. Many refugees were in need for shelters to survive, thus the decision was taken for the reconstruction of new satellite towns on the outskirts. Unfortunately, this action caused more social fragmentation, where the existing social fabric was not considered during the resettlement process. Although the earthquake of L'Áquila was extremely destructive, but the possibility to find out safe points could have been studied in order to reinforce the relation between the people and their home environment. Till now, the city of L'Áquila is in a process of recovery after almost 8 years from the trauma. From this sense, the article shares different perspectives offered by in situ temporary housing installations that could be suitable only in cases of medium to limited damages:

Financial perspective. Investing the national and international financial aids, in restoring and repairing the city facilities and infrastructures instead of building new ones of longer distances to serve emergency housing located in the outskirts. The costs saved from doubling services and extending infrastructures could be used for realizing the reconstruction plan of the city. This method responds to the limited financial resources that are common in these cases.

Infrastructural perspective. Repairing and upgrading the existing infrastructures take place instead of building and extending new ones, which direct all efforts toward advanced phase reconstruction.

Services and facility perspective. Offering the use of existing sanitation, commercial, and educational services after implementing the needed reparation and restoration processes instead of building up temporary service poles outside the cities that would be deactivated after the reconstruction process. It's more recommended to enhance and activate the existing service poles for better performance during and after the recovering phase.

Public policies perspective. Empowering communities to supervise, evaluate, and modify the reconstruction plan of their own cities before, during, and after it takes place. Decreasing the possibility of corruption that could occur within post-disaster contexts where the community is involved in all phases of reconstruction according to its strategic location. Increasing social trust between

communities and local government, through fixing new norms based on transparency and mutual exchange of knowledge.

Time management perspective. Working in double time strategies, the first seeks for constructing proper facilities serving the affected social groups during the recovering phase, while the other works on restoring the city's infrastructures and services for the transformation process. This mind shift accelerates the reconstruction time period through saving all efforts toward development.

Sociological perspective. Finally, this option enhances the sense of belonging to the city and avoids tearing out the social fabric, which actually decays the social structure. Moreover, using the city's open spaces like sports fields, churches back yards, gardens and piazzas decrease the sense of alienation after trauma allowing the generation of new social relations between the affected communities. It could be positively leads toward social participation during reconstruction and opens up opportunities for new emerging paradigms integrating social aspirations within the new visions for the city after the hazard.

The previously discussed topics are introduced in the second part of the article concerning the methodological approaches proposed for the recovering phase of Finale Emilia after the earthquake of Emilia Romagna in 2012.

4 Study Case: Finale Emilia After the Earthquake of Emilia Romagna in 2012

Finale Emilia is a town and municipality of 15,735 inhabitants (ISTAT) in the province of Modena. The Panaro River is considered the most important waterway in the territory, where the settlement structure of finale Emilia had followed the form of water canals that generated the historical center of the town. This is clear in the historical urban tissue of the Ghetto neighborhood. In May 2012, an earthquake of magnitude 5.8 rectors shock Emilia Romagna region, where the Finale Emilia had witnessed significant damages to both its physical and social structures. Most of them concerned the productive and industrial sector that caused huge problem of unemployment after the collapse of lots of factories. The industrial sector was not the only loss, but the earthquake seriously affected the historical and cultural center according to its urban vulnerability. The historical center, which is the article's area of focus, had been considered the red zone in the town, which would take huge efforts to regain back its livability (Giberti 2013).

4.1 Hypothesis

The study proposed a hypothesis stating that the reconstruction plan proposed by the commune of finale Emilia in February 9, 2013, could better adopt urban resilience approach in order to enhance the town's capacity to cope future disasters.

This approach would be examined during the recovering phase through emergency housing installations. Through the above hypothesis, the proposal's description would be developed aiming at generating new morphologies that could be recycled afterwards to take part in the landscape of the town. Besides growing new anthropologies that could help the people to adopt and adapt with the new transformation visions based on urban agriculture, water recycling, and energy production (Arslan 2007).

4.2 Methodology

The proposal is examining a methodological approach to install emergency housing context guided by urban resilience approach. This approach targets the affected social group inhabiting the Ghetto of Finale Emilia, this historical urban structure that suffered serious damages after the earthquake, which finally led to the displacement of most of its residents. The Ghetto neighborhood was actually facing depopulation problems even before the earthquake due to the critical living conditions. From this sense, the reconstruction process should not only tackle problems emerged after the Trauma, but it should also offer effective solutions for accumulated pre-existing problems, in order to create a livable and secured environment.

Site Selection criteria. To achieve such goals, a serious preparation for the community needs to take place where the recovering process integrates the social groups through all phases of emergency housing installations, starting from the site selection till the occupation and management phases. The agreement of the community regarding the alternative sites chosen for the emergency houses is crucial to avoid social fragmentations and the rapture of existing social fabric. This process will be practiced by the people through mapping and choosing the most suitable locations considered as safe points inside the city that are highlighted on maps by professionals. In this case, all the chosen sites are of walkable distances from the Ghetto in order to preserve the relation between the people and their neighborhood during reconstruction.

Double Time Strategy. It's crucial for both the local and regional governments to gain the social trust during the reconstruction of the city. Therefore, the study is suggesting the restoration and rehabilitation of the historical Ghetto (based on urban resilience approach) in a parallel time to that of the emergency housing installation. Apparently, the local government would have the opportunity to modify or update the proposed strategies according to the people's guidance.

Morphological Flexibility. The strategy is based on designing an overlapped layer of temporary environments as shown in Fig. 1, working as experimental laboratories inhabiting emergency houses. This layer surrounds the red zone (historical center) and could be activated within the urban fabric only in times of disasters; otherwise, it is integrated within the landscape of Finale Emilia as permanent infrastructure. It adopts urban agriculture, wastewater management, energy

production, and public spaces for shared activities. But how to design the forms of these infrastructures were one of the studies accomplished by the proposal. The proposal observed three main functions of voids, the first acts as a core, the second is a limit while the third functions as a boundary. These three typologies of void are the ones generating the geometry of the overlapped temporary layer proposed by the study. They act as new objects as shown in Fig. 2, temporary inserted in the town stimulating the transformation process during the recovery phase. The chosen morphology needed to be distinctive but rooted, where the form of each temporary habitat is different according to the contextual variations, which enriches the morphological diversity of the proposed strategies (Figs. 1 and 2).

Geometrical Diversity. The geometry of each object is based on the dimension of the housing module which is 12 m × 12 m, including inner courtyard. Every compound could be divided up to 4 units each of 4 m × 8 m inhabiting four families. It could also be divided into wider living areas for less families, couples, or individuals. The urban aggregation of these modules together composes the temporary infrastructure proposed by the study.

Integrating Fixed with Pugged-In Structures. The designed temporary urban context is composed of two main components. The first is the fixed structure where all the technical systems are installed, while the second is the Plugged-In units concerning the housing modules and the common spaces shown in Fig. 3. The whole system evolve and grow according to the intensity of the emergency condition, as the structural system could have only three modules installed to inhabit 12 families maximum. But it could grow by time according to the increasing number of replaced families (Fig. 3).

Systems of Co-existence. One of the challenges that concerned Finale Emilia after the earthquake was the lack of fresh food, where Finale Emilia is surrounded by agricultural lands but mostly for biomass production. Therefore, introducing urban agriculture within the proposed emergency housing context was important to support the living social group with the needed vegetables, fruits, herbs or others, where after a certain period of food distribution, food security will overwhelm. Actually, urban agriculture has further advantages in post-disaster conditions as



Fig. 1 Existing voids in Finale Emilia surrounding the historical center, and the overlapped structures of temporary habitats—designed by the author as part of the final project submitted in the course of COOPERA(C)TION: Knowledge and Skills for Sustainable Cities in the Global South



Fig. 2 Morphological Atlas including different alternatives for temporary habitats, within different contextual conditions—designed by the author as part of the final project submitted in the course of COOPERA(C)TION: Knowledge and Skills for Sustainable Cities in the Global South

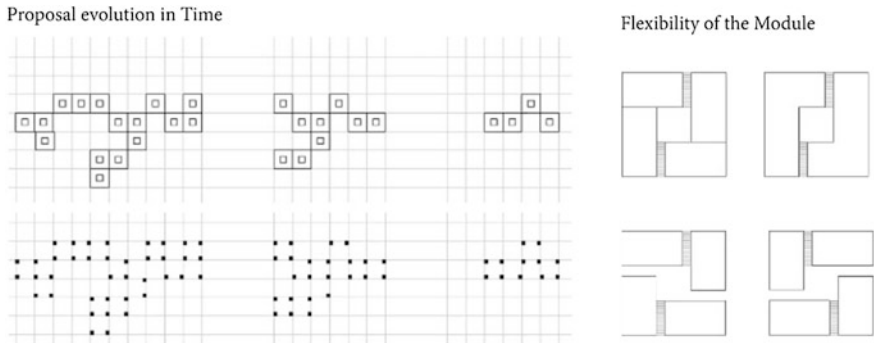


Fig. 3 Evolution of the proposed structure according to the continuous increase of replaced families after the earthquake—designed by the author as part of the final project submitted in the course of COOPERA(C)TION: Knowledge and Skills for Sustainable Cities in the Global South

explained before, where from one hand it offers job opportunities, which is quite related to the condition of finale Emilia that faced a serious increase in unemployment rates after the calamity. From the other hand, it acts as a therapeutic landscape that establishes new relations between different social groups involved in shared activities concerning agriculture, that is, practiced in vacant lands, community gardens, sports areas, court yards, or others. Furthermore, urban agriculture could catalyze urban economy, as the proposal suggests the installation of temporary food markets that participates in flourishing the temporary economy emerging in post-disaster conditions.

But this approach could not work efficiently without a sustainable water system, where the study adopts the integration of waste water management system along with urban agriculture in order to enhance the blue/green infrastructure proposed in the transformation vision for finale Emilia. The roofs of the installed emergency

housing modules will collect rainwater and filter it through simple technologies to be used after words in irrigation and domestic uses.

As the article introduced before the scarcity of energy resources is an important issue to be tackled through emergency housing construction. Thus, the study proposes the integration of a distributed energy system that functions for consumption as well as production. The system is based on solar panels that are installed on the roofs of the housing units, and offer limited but sufficient electrical and thermal energies for each house. By the end of the recovering phase, these solar panels could be dismantled and reinstalled in the Ghetto neighborhood after its rehabilitation, as part of the recycling culture introduced by the proposal. All the previous systems need cultural platforms to grow and develop by time. People needs space to discuss, exchange knowledge acquire information, precede educational activities, or participate in medical aids. From this sense, the proposal integrated common spaces within the emergency housing modules to enhance the temporary environment with a social spirit based on the evolving mixed uses.

Emerging Anthropology. According to the scarcity of resources the construction of the temporary housing shall adopt new culture based on recycling and exchanging knowledge as shown in Fig. 4. From this sense, the study suggests reusing the steel members of the collapsed factories and stores, to install the fixed structure of the temporary urban context. Moreover, the study responds to the unemployment problem through offering job opportunities. As this vulnerable group could be integrated within the installation process for the housing units with the help of professionals and technicians. Along with the previous attempt, the proposal performs continuous and productive relationship between different social groups. In order to adopt urban agriculture, as a tool for developing a new urban economy, a mutual exchange of knowledge shall take place between local farmers and replaced people. From one hand, the farmers are facing problems in repairing their collapsed roofs and walls, which is a skill that has been acquired by the social groups helped in installing temporary housing. From the other hand, local farmers could help replaced people with knowledge concerning agriculture, irrigation, and cultivation. This new anthropology could develop a resilient community, economy, and urban context emerging from a temporary environment based on urban resilience approaches (Fig. 4).

From Traditional to New Design Paradigm. The study proposes a framework underlining the main principals suggested by the proposed paradigm for designing emergency housing as shown in Fig. 5. These principals adopt urban as well as architectural perspectives. The aggregation of the proposed units is integrated not separated. The preservation of the soil is recommended to be used for urban agriculture and to avoid any damages for the soil. Afterwards these areas would participate in the town's landscape after temporary housing is dismantled. Open spaces and shared places are integrated within the modules and not separated. The proposal recommends continuous rooftops in order to utilize the space for energy production. The concept of landscape is integrated in all levels of the design and not separated. Finally, the transformation of recycled steel members develops healthy

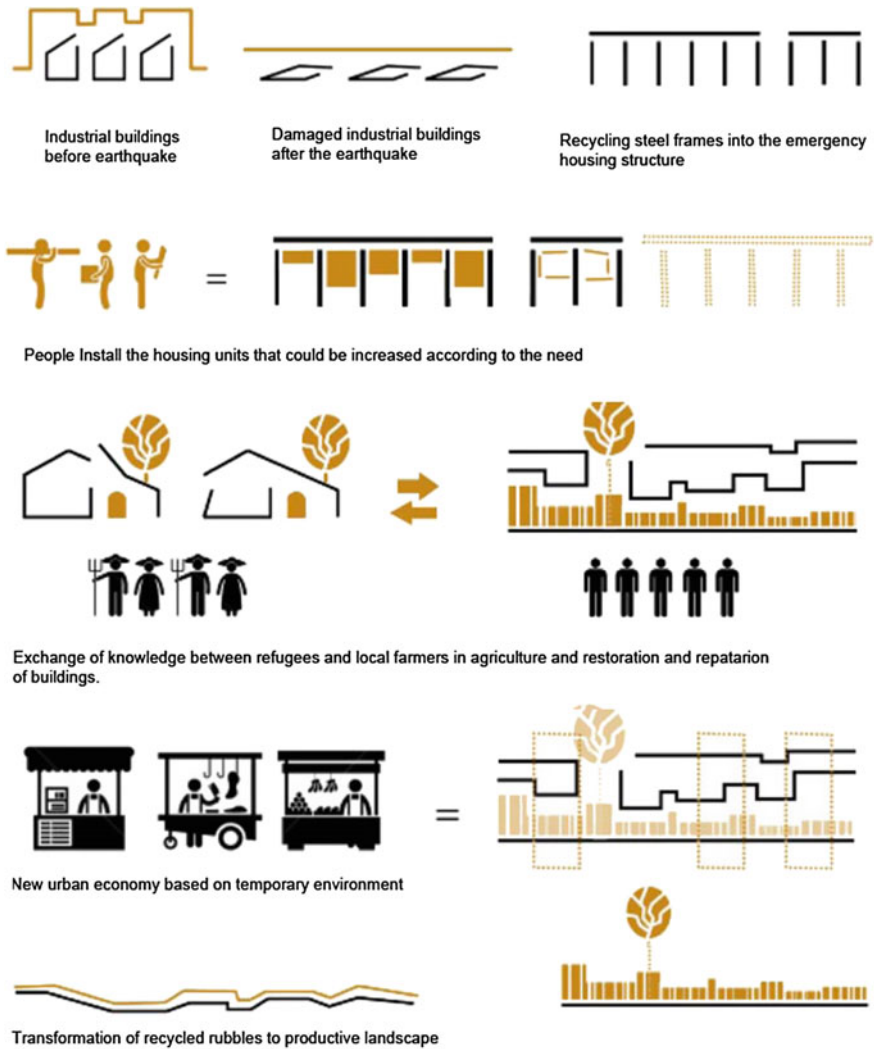


Fig. 4 Designing process—designed by the author as part of the final project submitted in the course of COOPERA(C)TION: Knowledge and Skills for Sustainable Cities in the Global South

housing units for refugees, while this vulnerable social group transforms abandoned voids into productive landscape (Fig. 5).

Design’s Time Line. The study proposes a complete life cycle of the project starting from installing and inhabiting the temporary houses then its gradual evolution within different integrated systems. Finally, transforming the place from an opened space (or in some cases abandoned one) into a green productive area developed through a new social experience. This process develops the social responsibility toward the adopted tools of the transformation based on a contemporary paradigm for emergency temporary environment.

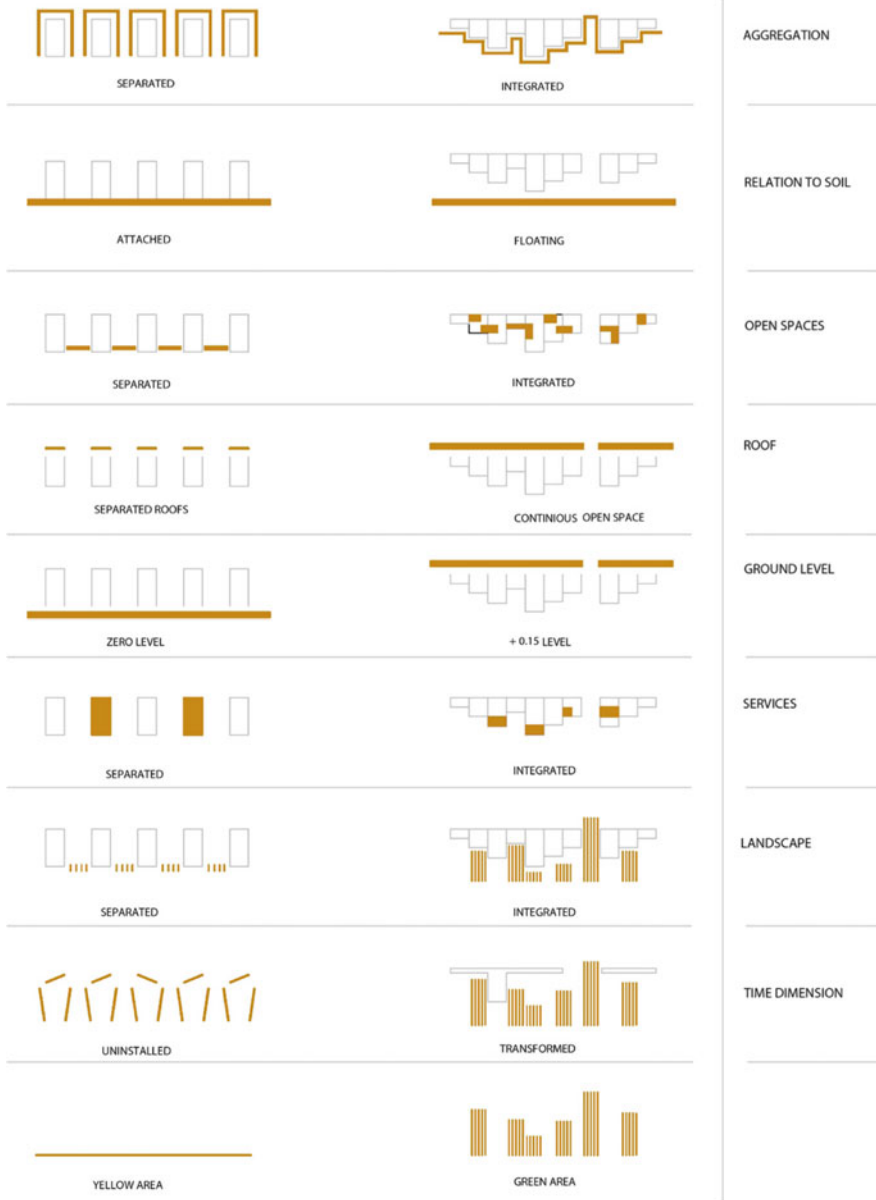


Fig. 5 New design paradigm—designed by the author as part of the final project submitted in the course of COOPERA(C)TION: Knowledge and Skills for Sustainable Cities in the Global South

4.3 Application

The last part of the experimentation examines its applicability with in a real context; where the study proposed to temporary inhabit the sports field beyond the Ghetto of Finale Emilia as shown in Fig. 6, Fig. 7. This area actually inhabited lots of replaced people after the earthquake, and shall be the proposed context for experimentation (Figs. 6 and 7).

The main components of the proposal are the basic structure supporting the technical installations. The housing modules are plugged into the recycled steel structure which is attached to the ground only through pillars. The section presented in Fig. 8 shows the minimum contact with the soil, as the design is suspended preserving, the ground for agriculture and social activities, thus avoiding soil consumption in traditional construction activities. From this sense, the roof is considered a duplicated ground, another zero level to be utilized in installing solar panels for energy production, or as a continuous open space. There is continuity between both levels of intervention through voids distinguishing the courtyards of the module, besides permitting air and light to reach the ground. The roof is considered a substituted soil participating in the productive landscape after the temporary modules are dismantled. This emerging landscape is sustained through a water recycling system, based on collecting rain water from the roof tops then passing it through simple filtration process in order to be used for domestic housing needs. The remained water portion would be stored in distributed reservoirs to be used in irrigation. Adopting water harvesting system is recommended specially in the case of Finale Emilia in order to preserve the natural sources of water, as the town depends on Panaro River as its main source of water. Furthermore, the proposal allows the integration of social services and common spaces among the modules in order to offer a mixed-use environment responding to the transformative vision of the Ghetto after its rehabilitation. The application intended to examine the transformation vision of the Ghetto within temporary environment created through a studied sequence of actions integrated in a comprehensive model for temporary housing environment. It aims at designing a healthier, livable, and productive context for those vulnerable social groups (Fig. 8).

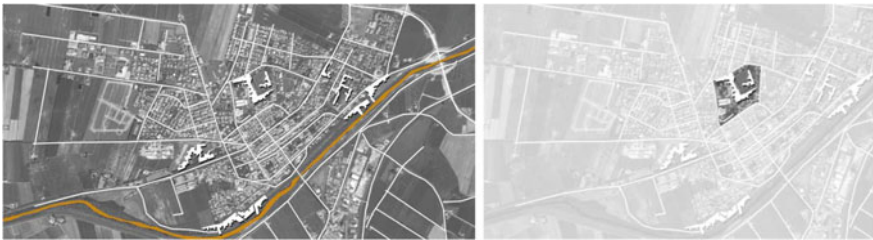


Fig. 6 Installing the temporary housing structure beyond the ghetto neighborhood in the sports field—designed by the author as part of the final project submitted in the course of COOPERA(C) TION: Knowledge and Skills for Sustainable Cities in the Global South



Fig. 7 How the temporary environment develops and grows—then how it’s dismantled leaving behind an integrated productive landscape—designed by the author as part of the final project submitted in the course of COOPERA(C)TION: Knowledge and Skills for Sustainable Cities in the Global South

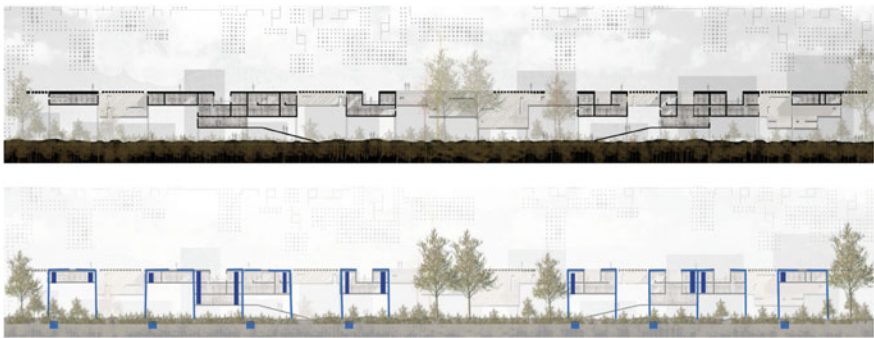


Fig. 8 Section in the designed system underlining the urban agricultural activities along with the water harvesting system—designed by the author as part of the final project submitted in the course of COOPERA(C)TION: Knowledge and Skills for Sustainable Cities in the Global South

5 Discussion

Emilia Romagna had faced huge challenges after the earthquake. One of these challenges was the unemployment of more than 40,752 workers due to the huge damages in the productive sector. An important reality was revealed during the recovering phase, where 68% of refugees living in tents, witnessed noticeable declination in the living conditions. On the contrary to the conditions of those inhabited hotels and temporary houses. Moreover, the region in general faced financial challenges after the crisis due to the scarcity of resources that usually follows natural disasters. All the previous challenges reinforced the importance of the recovering phase, which could regain back the balance to the region. From this

sense, Finale Emilia was a case study embodied most of the regional problems. It was a fertile laboratory to examine the proposed methodology adopting a new design paradigm as an alternative to traditional temporary housing reconstruction. This paradigm embodied a threshold between recovering and transformation phases. It tackled not only the emerged problems after a natural hazard, but it also offered support to solve pre-existing problems like depopulation in Finale Emilia. The proposal adopted flexible, fast, recyclable, and economic housing system that is not based on separated housing units but on integrated living environment. The developed system offered job opportunities concerning installation of temporary housing, urban agriculture, reparation activities, marketing as temporary solutions using the energy, and capacity of these vulnerable social groups. The proposal aimed at building trust and transparency between communities and local governments in issues concerning the reconstruction phase. Where every step is examined by the target groups to evaluate its efficiency, and modify its out come. After discussing the opportunities offered by the new paradigm, it's important to point out the threats that could face such experimental method:

- The proposal is based on the capacity of the local government to have a comprehensive reconstruction vision based on an integrated time plan for recovering, adaptation and transformation. In addition to its capacity to participate and examine it with the community and different stakeholders to launch this experimentation.
- The design of the housing unit shall respond to the living exisminimum (while preserving good living conditions), in order to encourage people to return back to their permanent houses in the Ghetto and avoid settling in the temporary houses.
- The vulnerable communities/local government shall successfully manage the time lag between food distribution and food production to develop the proposed urban economy.
- Adjusted and monitored coordination shall take place between the executive organizations responsible for reconstruction and the community/local government/NGOs responsible for the application of the research experiment, in order to guarantee the efficient development of both environments (temporary and permanent) together.
- The affected social groups shall have the capacity to exchange their knowledge to achieve a mutual increase of their social competences.

6 Conclusion

This article tackles serious problems faced by contemporary cities during and after natural disasters, which encourages a rapid mind shift to perceive opportunities of transformation within crises. The proposed logistics could take place within different conditions and approaches of transformation underlining the importance of a

single comprehensive vision for reconstruction that shall be examined within the recovering phase in order to protect it from fragmentation caused by the continuous emerging challenges.

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Climate Change and Heat Waves in Colombia. Possible Effects and Adaptation Strategies

Marcello Magoni and Carolina Mesa Munoz

Abstract The purpose of this article is to describe the phenomenon of heat waves in various realities such as the Colombian one. The main characters and effects of heat waves are at the beginning described for the main geographic areas of the country. Following, the strategies and actions for adaptation to the heat wave at national and local levels are exposed. In particular, the measures to the territorial and urban infrastructures, the economic-productive systems, and the behaviors of the inhabitants are considered.

1 Introduction

The climate change has as its main effect on the territory the accentuation of the level of danger of certain hazards, especially those related to the alteration of the water cycle, due to an extreme ordinary atmospheric events. Among these risks, there is also an increase in the duration and intensity of heat waves, in which agricultural areas lead to a reduction in crops, while urban areas, exasperating the phenomenon of the warm islands, lead to a discomfort of the urban climate at much higher levels.

Heat wave phenomena and their effects depend heavily on the specific realities in which they occur. So, to find suitable adaptation strategies and actions is of great interest to deeply know the characters that heat waves assume in different contexts and the effects they have.

This article is intended to bring the reader to the case of a country that belongs to what in this book is called the South Global and which is very interesting because of its remarkable size and its diversity from the climatic and territorial point of view.

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2 Characters and Effects of the Heat Waves in Colombia

Colombia has a wide variety of ecosystems, relief, climate, population, cultural traditions, and socioeconomic conditions. All this variety is contained in a total area of 2,129,748 km² conformed by the continental territory and the two oceans, Atlantic and Pacific. The continental territory has 1,141,748 km², distributed by 33% by mountains and 67% by low plains.

The country has an estimated population of 49,164,856 habitants and a density of 43.06 per/km². The most populated cities, above the million inhabitants, are five (Bogota, Medellin, Cali, Barranquilla, and Cartagena, of which the capital has 8 million people). Cities between 500 thousand and one million are six in total (Cucuta, Soledad, Ibague, Soacha, Bucaramanga, and Villavicencio). Cities between 200 thousand and 500 thousand are 20, Santa Marta, Pereira, Bello, Valledupar, Montería, Pasto, among others are included in this final range.

The rainfall distribution is influenced by the “*Inter-tropical Convergence Zone (ITCZ) and the spatial and temporal contrasts is controlled by the Andes Mountains, the Pacific and Atlantic oceans, the atmospheric circulation over the Amazon basin and vegetation and soil moisture constrasts*” (Poveda et al. 2000, p. 4). El Niño phenomenon refers to an unusual warming of the Sea Surface Temperature (SST) in the Eastern and Central Tropical Pacific, producing prolonged dry periods and above-normal air temperatures. The opposite conditions are valid during La Niña (Poveda et al. 2000).

Regarding temperature trends, during 1971–2000, it was observed an increase in the average temperature of 0.13 °C per decade, and the predictable multimodels for the air temperature over the same reference period show an increase of 1.4 °C for 2011–2040 and 2.4 °C for 2041–2070. The tendency is directed to the increase of consecutive days with high temperatures and to have more repetitive episodes of extreme temperatures (IDEAM 2014). The effects lead to more droughty conditions and adverse effects for agriculture and livestock. Also, there is an impact on human health. There is a strong relationship between El Niño and malaria and dengue fever outbreaks in Colombia where it presented the increased air temperatures and a reduced precipitation (Poveda et al. 2000). All these effects have an economic and human cost linked by the socioeconomic conditions in the country, where there is a high vulnerability of population and infrastructure to face the new challenges of heat waves.

The Institute of Hydrology, Meteorology and Environmental Studies (IDEAM—Instituto de Hidrología, Meteorología y Estudios Ambientales de Colombia) reports that between 1987 and 2005, the availability of water in the country fell from 60,000 to 40,000 m³/inhabitant/year. This reduction is due to changes in precipitation and temperature, population growth and industry and consumption patterns.

A clear evidence occurred during 2015 during a strong Niño episode. The impacts were highly perceived in all territory: “3985 forest fires affecting more than

150,000 Ha, 318 municipalities suffered water shortages and 120 were in a critical situation, and more than 260,000 agricultural hectares were impacted and prices of food increased dramatically. The rivers presented the lowest level in the last fifteen years” (Arbeláez and Vallejo 2016).

The intensity of the heat wave impacts is not the same in all country, varying due to the great diversity of climates and reliefs. The territory can be divided into three different areas/landscapes that are marked by series of factors such as relief characteristics (mountain, plain, or coastal areas), average rainfall, and soil.

The *Mountain landscape* is formed by the three arms of the Andes mountain system (Cordillera Occidental, Cordillera Central, and Cordillera Oriental), which possesses great climatic variety. It ranges from areas close to sea level to mountains of more than 5000 m. In the high-mountain areas are the strategic ecosystems known as the “paramos” (moorland), important for its capacity to regulate the hydrological cycle in Colombia.

The *Coastal landscape* is the area where the Atlantic and Pacific oceans have an important influence. Atlantic region has a tropical warm climate with temperatures no higher than 30 °C, while Pacific region has a tropical humid climate with rains throughout the year and higher temperatures. The *Plain landscape* is the area where the climate is warm and dry and the dominant vegetation are the savanna and natural pastures.

2.1 Coastal Landscape

The Colombian coastal and insular areas are highly vulnerable to the impacts of climate change. The mean sea level could rise between 2 and 5 mm per year, and it is expected that the average temperature for the year 2040 will increase by 0.9 °C for the coastal area. The annual rainfall for the year 2040 will increase by 10 and 8% for the Pacific coast, while for the Caribbean coast, it is estimated a 14% decrease in rainfall by 2040 (The World Bank Group 2011). According to the reports of IDEAM, there are cities where the temperature has reached 40 °C, as happened in Valledupar and Cartagena. There are areas of the country with high vulnerability, where the social environment and infrastructure are not prepared to deal with extreme changes. This is where the consequences are even more critical. For example, in the department of La Guajira, during 2013–2015, there was no rain at all and dozens of children have died of thirst and malnutrition (El Espectador 2015a, b).

Future trends, based on estimates of precipitation and temperature, show that the weather would move from a semi-humid climate (current condition) to a semi-arid one and a reduction of 30% of the average runoff in the main watersheds of the region is estimated. A current case occurs with the diminution of the water levels of Magdalena, Aracataca, and Ranchería rivers, according to the hydrologist María Constanza Rosero.

These abrupt changes in temperature also affect other systems than cities and rivers. Coral reef areas suffer from this temperature variation. Prolonged exposure of coral reefs to high temperatures can cause irreversible damage like whitening with loss of color, subsequent death, and loss of environmental services (IDEAM 2011a, b, c).

2.2 *Mountain Landscape*

The main negative effects for this region will be on water availability and agriculture, as well as on temperature increase, where it is expected that the average temperature for the year 2040 will increase by 0.9 °C and an increase in average precipitation of 9% by the year under consideration (El Espectador 2015a, b).

In the high-mountain areas, where there are moorlands ecosystems, the increase of the temperature induces the displacement of agricultural and livestock activities in a higher altitudes and as consequence these ecosystems have a tendency to disappear. In the last 10 years, several studies on the moorlands show that strong increases in the day-temperature have occurred, close to one degree centigrade per decade, while, for those located at a lower altitude above sea level, the increments were between 0.3 and 0.6 °C per decade (IDEAM 2011a, b, c). The strong increases in temperature will cause a decrease in glacier coverages with negative effects on the availability of water for those populations that depend on these systems. The snowy mountains like Ruiz, Santa Isabel, and Tolima are sources of water that will be affected (Ministerio de Ambiente 2017). Another effect is in the agriculture. The extreme hydroclimatic events directly influences food security, rising food prices will lead to reduce access to food for certain segments of the population (Krellenberg et al. 2014). This region has also the highest population density, favoring urban heat areas. These areas with high average temperatures for long periods of the year feel the effects of heat waves in a more intensive way.

2.3 *Plain Landscape*

The continuous process of deterioration and deforestation and soil degradation, due to bad agricultural practices and lack of adequate management land use that characterize this region, makes to increase the effects of heat wave. As happened 4 years ago with the strong heat wave in Casanare, many animals died of dehydration (IGAC 2015). In February 2017, the area has supported temperatures of 2 °C above the average registered for that period of the year, and it was declared a red alert, due to high temperatures. Emergency agencies had constantly monitored the area to avoid forest fires (El Tiempo 2017). On the other hand, considering future trends, it is expected that the average temperature for the year 2040 will increase by 0.9 °C, with

a reduction in precipitation by 2.5%. This future scenario contributes to desertification processes, altering agricultural practices and increasing the water conflicts especially during the dry seasons.

3 Adaptation Strategies and Actions to the Heat Waves

Knowing the effects and the challenges that the country must face, Colombia is striving to come out with solutions in the short and long terms in order to meet the needs from the wide range of heat waves risks as one of the effects of climate change.

There are several approaches to address those challenges, based on the environmental, economic, and social reality in Colombia and the review and analysis of the available literature. The strategies and actions can be classified in three categories as Economic-Financial, Social, and Physical. Economic-Financial strategies hinge the progress of the other two. These ones are related to policies and national/international agreements. Physical strategies involve intervention in the territory, improving the environment, the neighborhoods, or buildings. They can be classified on national/regional or local/punctual scale, depending on the field of action. Social strategies complement the other two and are directed to awareness, communication, and behavioral changes.

3.1 Economic-Financial Strategies

Colombia needs to increase and improve public and private resources to finance adaptations strategies and increase resilience in the territory.

The National Plan for Adaptation to Climate Change (PNACC-Plan Nacional de Adaptación de Cambio Climático) is part of the political and institutional strategies of the country. In order to coordinate and follow up on climate change initiatives, the National Climate Change System (SISCLIMA—Sistema Nacional de Cambio Climático) was created. It is an intersectoral tool based on the participation of public and private actors. This system is already in operation, and it brings together key stakeholders and the country's most important decision making on climate change.

Ratifying this national policy on climate change, Colombia, like others Latin American countries, along with the majority of the international community, signed the Paris Agreement on Climate Change on December 12, 2015. This agreed to join forces to ensure that the increase in average temperatures would not exceed 1.5 °C (The world Bank 2016).

Four actions of the financial strategic lines of SISCLIMA are highlighted as follows:

- (a) *Pay rate for air emissions*: In Colombia, by law, who pollute the air must pay. However, there is a lack of regulation, such as establishing a calculation methodology.
- (b) *Rights Emission market*: Buy and sell emission rights certificates according to sector mitigation targets
- (c) *Green bonds*: Resources to finance projects that have an environmental and climatic impact
- (d) *Soft loans for financing mitigation and adaptation projects to climate change*: The banks put funds into mitigation projects (which must have emission reduction commitments) and in adaptation projects (they must have baseline studies that evaluate the indicators they want to change) (Rudas et al. 2016).

All components enclosed in the National Government initiative seek to push the country to meet its environmental international goals.

3.2 *Social Strategies*

The main social actions to support Colombia to the climate change effects are to improve the meteorological information and the communication system. Also strengthening of institutions, and set up the inclusion of the community, public and private sectors on the design of heat wave-climate adaptation policies are adapted to the regional and local contexts.

The IDEAM through the updating and acquisition of equipment has progressed to conduct research related to heat waves, allowing to represent the behavior of the climate and to project the territory toward the future.

Also, the country has been technically strengthened knowledge in the installation and operation of marine stations; to follow up the coral reefs and provide recommendations for ecosystem management.

As part of the communication strategy, the IDEAM Web site offers information related to alarms on hydrometeorological conditions and their level of threat. The National Unit for Disaster Risk Management (Unidad Nacional para la Gestión del Riesgo de Desastres UNGRD) develops protocols for dry seasons that include climate predictions, risk scenarios, intervention lines, recommendation, and response services by sector, and estimated budget, among others.

Another measure with a human health impact aims to control and monitor the incidence and outbreak of malaria and dengue, as one of the effects associated with the increase in temperature. The measure consists of the integration of three complementary actions. The first is to implement a prediction model based on climatic, biological, and socioeconomic variables. The second is to create an early warning system for the supervision and control of these diseases. The last step is to implement prevention measures in the most affected areas (United Nations 2013).

The government proposes within its strategic lines of climate change, the strengthening of the management capacity of the actors and sectors involved, as well as the development of mechanisms of articulation between them. A specific case of strengthening institutions and inclusion of actors is occurred in the Macizo Colombiano, which is the most important water reservoir in Colombia. A project is aimed to improve the coordination capacity among stakeholders. As a result, 900 families received direct support to establish food security plots as measures to adapt to climate change. Besides, organizations and families participated actively in training processes and formed leaders with a great appropriation of the work done (IDEAM 2011a, b, c).

3.3 Physical Strategies

The physical measures described below are being implemented at national and local levels and were designed for adaptation to climate change purpose but contain elements that incorporate measures to reduce the effects of the heat wave. The actions range from national/regional scale initiatives such as *green areas* and *mobility* and local/punctual initiatives like *green roofs* and *bioclimatic housing*.

Regarding national/regional scale initiatives, particularly green areas, Colombia is dealing with *expanding green areas* and *protected areas*.

To satisfy one of the objectives of the national law on land use, “determining free spaces for public parks and green areas, in proportion to the collective needs”, several cities have started with their green space expansion programs. The synergistic benefits of this strategy are the recovery of public green space, the reduction of noise, heat wave, and pollution, and the connectivity of the city among others.

The city of Palmira has the project “parks and green zones strategic”. Areas with greater public space deficit have been prioritized to create parks and green areas. This project proposed to generate shade spaces with large leaves vegetation in different parks of the city. Medellín launched “Parques del río”, the largest city green project parallel to the Medellín River (see Fig. 1). There will be 327.5 ha to be intervened on both sides of the Medellín River from south to north. In Barranquilla, a modern corridor is projected along the river bank with the



Fig. 1 Expanding Green areas. Parques del Río de Medellín and Agroturístico Parque Ronda del Sinú in Montería. Source: <http://www.eltiempo.com/archivo/documento/CMS-14870880>

construction of a linear park, sports areas, and green areas. Monteria has the “Agroturístico Parque Ronda del Sinú” project which converted 3 km² into a green corridor. The Cali River, that passes through the urban area of Cali city, was recovered by building a 3-km linear park, which will have pedestrian and bicycle paths as well as gardens. The Magdalena River in its passage through Barrancabermeja city (Santander) has changed with the construction of roads, bicycle, and footpaths (El Tiempo 2014).

An adaptation measure for the impacts on marine and coastal ecosystems due to temperature increase is the implementation of marine protected areas such as the Seaflower Biosphere Reserve on San Andres island and the Isla Fuerte, corales del Rosario, and San Bernardo island. This action is expected to increase resilient capacity to climate change impacts (United Nations 2013).

The coastal city Cartagena has proposed mitigation and adaptation alternatives to respond to the events of drought and heat waves. The measure of adaptation is the plan of arborization, with fruit trees that can survive the high temperatures that are currently present in the city. As a mitigation measure, the construction of shadow corridors in strategic locations of the city, including the peri-urban areas (El Universal 2017).

Talking about *mobility solutions*, the National Government has been working to promote and encourage the use of bicycles as an alternative mean of transport, through different strategies to integrate non-motorized vehicles with public transport systems. In 2015, four agreements were signed for the Public Bicycle Pilot Systems with cities located in the coastal and insular area. This national cycle project is a synergistic action that helps to improve mobility in cities and air quality and indirectly helps to mitigate the effects of high temperatures. A local example is the integrated mass transportation system METRO in Medellin, which operates through electricity and it communicates Medellín with its entire metropolitan area. This solution not only accounts for heat wave mitigation, but also triggered positive effects on better mobility, good air quality, and better quality of life. In 2011, the Metro avoids to emit into the atmosphere 183,000 tons of CO₂ with its electric system. The Metro is an articulated and integrated system of the territory that seeks to build the transport network, considering the physical, tariff, operational, and institutional integration.

Regarding individual/punctual initiatives, green roofs are developed to reduce the heat island phenomenon in cities. At the national level, the *green roofing system* is being implemented; however, there is a lack of diffusion of the system and incentive measures that drive this construction system. The pioneer cities are Bogota and Medellin (see Fig. 2). The capital city has 32,000 m² of green roofs and 1100 m² of vertical gardens. Some of these green roofs have been developed in vulnerable sectors and poor neighborhoods, where vegetables are planted to guarantee food security to their inhabitants (Semana 2011). In Bogota, there are at least 30,000 ha with capacity to be adapted for the use of green roofs, in order to continue the heat wave regulation capacity (Alejandra Grillo Calderón-El Tiempo 2011). In the case of Medellin city, the Engineering Building of the Eafit



Fig. 2 Examples of green roofs. Novartis building in Bogota, one of the pioneers of the green roofs (Source: Secretaría Distrital de Ambiente de Bogota) and EPM Building Medellin

University, EMP Building, Ruta N, and Isagen implemented green buildings, solution that combines landscaping and use of spaces.

A synergistic strategy of adapting to the heat wave, improving energy efficiency and comfort, is the new tendency to use the bioclimatic criteria in the designs of building. In the Caribbean and Pacific Coast some projects were developed in which houses with bioclimatic characteristics were built. The bioclimatic houses have low energy consumption, and they are adapted to the conditions of the zones in which they are located, in order to achieve a synergy that can generate well-being to its inhabitants (Red de desarrollo sostenible-RDS 2014). The bioclimatic houses are in Guajira, Cartagena, Urabá-Antioquia, Necoclí, Sopetran-Antioquia, and Unguía-Chocó. These projects integrated the ancestral knowledge, traditional materials, and contemporary techniques. Thanks to the type of ventilation, a permanent aeration is maintained and the hot air is removed (Universidad Nacional de Colombia 2011).

A local heat wave mitigation strategy was adopted in the Zoo of Medellin. Due to the increase of temperature in February 2017, the Zoo developed a strategy “Wild Freshness”, providing the animals controlled baths, extra pools in the habitats, and fruit ice cream as an alternative to mitigate the stress caused by the strong temperatures of the city (TeleMedellin 2017).

4 Conclusions

The climate situation in Colombia expects an increase in the average temperature by 0.9 °C by the year 2040, causing more droughts and more negative effects in agriculture, health, and water availability. Those effects are directly related to the resilience capacity of the territory, having areas more vulnerable than others to face the new challenges of the climate change.

Due the high variability in the territory, the effects differ by geographic area.

It is expected an increase of annual rainfall by 10 and 8% for the islands and Pacific coast, respectively, and a decrease by 14% for the Caribbean coast, all of this by the year 2040. These changes in precipitation and temperature patterns will be felt more intense in the coral reefs, on health and agriculture.

In the mountain region, it is expected an increase in the average precipitation of 9% by 2040. For this geographic area, the shifting climate patterns will cause negative impacts on moorlands, ice melting, and agriculture.

Finally, the plain landscape, with an expected reduction in precipitation of 2.5% by 2040 and the increase in temperature, will cause fires and negative effects on agriculture.

All those impacts should be addressed efficiently by means of integrated national and regional strategies well implemented at the local level. On the one hand, Colombia has recently begun to elaborate some of these big strategies, and on the other has started to coordinate and integrate locally those measures that in the past were designed to address environmental pollution issues or energy efficiency targets. The ability of adaptation strategies and actions to be sufficiently effective requires that in the coming years, there will be a considerable commitment at national, regional, and local levels to achieve synergies with the most mature environmental and energy strategies.

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Part V
Managing the Agro-urban System and the
Food-Energy-Water Nexus

Social–Ecological Implications of the Quinoa Market Teleconnections: Intervention Criteria on the Southern Bolivian Altiplano

Guido Minucci

Abstract During the last decades, emerging global commodity chains have been re-shaping local growth and shrinkage processes, by linking far away consumers and producers. Regional transformations are complex and long-term phenomenon lead by the interplay of forces acting from and at different scales. This paper explores the teleconnections' local implications embedded within the Southern Bolivian Altiplano transition, from being a remote rural area of subsistence farming to a global leading quinoa cropping market driven territory. The essay identifies lessons that are likely to be relevant for increasing adaptive capacity, fostering sustainability solutions, avoiding unsustainability lock-ins by the relationship between cereal market at the national scale, an uncontrolled growth of a specific crop (quinoa) and community actions in the Southern Bolivian Altiplano.

1 Introduction

The unprecedented dimension of the global urbanization rate is not only increasing the exposure of cities to environmental and climatic threats but also threatening the planetary sustainability (Elmqvist et al. 2013). Global environmental change is related to the management decisions taken at different scales, and it is crucial to understand the connection of urban regions to globally dispersed areas where production and exploitation of natural resources take place (Erb et al 2009). The velocity and number of global interconnections, between plant production (e.g., food and bio-energy supply.) and the places where resources are consumed, are rising at a speed never seen before and are modifying the traditional view of conceptualizing and tackling the rural–urban nexus and environmental changes (Seitzinger et al 2012; Cramer 2002). The virtual shrinking of distances between places, strengthening connectivity between distant locations, and growing separation between places of consumption and production are emerging topics in

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“telecoupled” human–natural systems (Erb et al 2009; Seto et al 2012). However, the study and understanding of such telecoupled dynamics is a very recent field that need methods and metrics in order to assess unaccounted implications nested within such cross-scale effects. Indeed emerging complexities around local responses and adaptations to exogenous drivers of change are unclear cocktails of opportunities and threats, related to new connections, new dependencies and potential trade-offs among systems’ capacities and status, placed at different scales (Chelleri et al 2015; Lauer et al 2013). Certain shocks and situations can create opportunities for communities to leverage globalization in favor of increasing adaptive capacity, while at the same time certain inherent capacities might be eroded, such as ecological knowledge and flexible social institutions (Young et al 2006).

2 The Quinoa Golden Age: From Subsistent Food to Precious Global Commodity

Quinoa, a grain-like crop farmed primarily for its edible seeds, has been one of the main ingredients at the base of the Andean farmers’ diet for thousands of years. The Andean people called quinoa “The gold of the Incas,” however it soon turned into the food for the natives (“*la comida de los indios*”) and its cultivation was relegated to isolated areas, and spread only among small indigenous communities. Despite, nowadays the role and strategies to cultivate quinoa have changed completely since this crop became a product sold globally. The inception of such revolution can be dated in 1986 when FAO defined quinoa as a strategic food for the Andean region and numerous articles were published on the national and international press about quinoa as a highly nutritious food. These articles indirectly caused great interest in organic food demand across the USA, Canada, Europe, Israel, and Brazil. The United Nations recognized the importance of quinoa and declared 2013 “The International Year of Quinoa.” Bolivia is the second largest producer after Peru and accounted for 38% of the global production in 2015. However, in 2016, the harvest in Bolivia and Peru was greatly affected by the climate effects of the phenomenon el Niño. In Bolivia, drought and dust storms caused their production to decrease by 22% from 90,000 to 69,000 tons (*Ministerio de Desarrollo Rural y Tierras, Reporte 22.08.2016*).

2.1 Case Study Area

The Southern Bolivian Altiplano is an extensive plateau located at an altitude that ranges from 3600 to 4100 meters above sea level. The climatic conditions are harsh, because of hydro-meteorological extremes such as frosts, hail, floods, and drought. Between 2003 and 2010, three drought events hit this area affecting the economy

and agriculture with a loss of different types of crops such as quinoa, potato. (UGRP 2010). In 2016, a strong drought event strongly affects the communities and the economy of those living in this area.

This paper focuses on the municipality of Tomave, which belongs to the Potosi Department. Tomave is inhabited by 12,764 people who live sprawled along 102 communities, occupying an area of 7965 km². The main economic activities are agriculture, breeding livestock, and llamas, which represent the largest cattle (47.800 units) in the province. The municipality of Tomave is placed nearby the salt desert area, which is the main area of quinoa production, already the object of numerous studies on the effects of quinoa cultivation (PIEB 2010), and because of the emerging quinoa intensive agricultural activity among its communities, it has been chosen as a case study for this research. The communities selected to be included in the analysis shared the following characteristics: (1) an emerging pattern of quinoa mono-cropping growth; (2) increasing water scarcity rates; (3) ecological degradation change and; (4) social tensions induced by the mono-cropping transition.

3 Main Transformations in the Study Area

This section focuses on (1) the impacts of quinoa in term of land uses, as mono-cropping and biodiversity reduction, (2) its relationship with cattle breeding growth, and finally (3) the implications for communities' habits change and emerging conflicts.

Implications of quinoa fields' sprawl on land uses. Traditionally, the cultivation of quinoa was aimed at auto-consumption (Lidema 2008), and the whole production process was conducted manually according to well-defined practices. One of these was to leave lands uncultivated for long periods (around one year) for storing water in the soil, restoring soil fertility after harvest, and reducing the probability of diseases (Joffre and Acho 2008). In recent year, the market-dominated agricultural regimes pushed producers to move from cropping in the hilly territories to the plains (Sillitoe 2002), where at the expenses of the earlier covered by vegetation areas, farmers can cultivate larger plots thanks to the mechanized production system. A mapping exercise carried out in 2012 gives evidence on a sharp growth of plots dedicated to quinoa mono-cropping compared with 2010 and 2008 (see Chelleri et al 2016). Therefore, the current trends in the land use change in the municipality of Tomave are likely to trigger land degradation, jeopardizing future livelihood opportunities. Indeed, the land use changes oriented toward the implementation of quinoa intensive mono-cropping has environmental consequences. Reduction in biodiversity, an increase in the vulnerability of the ecosystem which became more prone to the occurrence of pests and diseases affecting farmer's economy and resilience to future shocks (e.g., drought events) by either forcing farmers to use pesticides, which might be expensive, or threaten the

yield are some effects. Linked to the latter, a reduction in the yield is already underway (Heran 2011) since farmers cultivate their land more intensively so that they do not leave the land fallow longer like before and use tractor with disc harrows favoring soil erosion.

The unaccounted growth of cattle breeding. The relationship between quinoa, llamas, and humans has deep roots in the past. Llamas used to take on an important role since they were considered as a significant economic resource (e.g., wool and leather used by textile industries), for the communities, and the meat was used for consumption only when llamas became too old to be sold. Nowadays llamas perform a key role in the quinoa cropping system, where llamas' manure is extensively used to fertilize quinoa fields. In spite of this, there are signals of rupture in the relationship between quinoa–llama–humans. The enlargement of the cultivated plots and the consequent expansion of the agricultural frontier are determining a decrease in the fodder availability (Félix and Villa 2009), which has two main consequences as noticed during the fieldworks. On one hand, llamas seeking food have started to access to the quinoa fields and “bofedales” (natural wetlands). Bofedales are ecosystems rich in vegetation, biodiversity, and water resources storage in the region. These areas are fragile ecosystems due to their ecological characteristics and have been recently increasingly threatened due to cattle overgrazing.

Changes in communities' habits and emerging conflicts. The quinoa breakout in the market has not only generated changes in the land use but also transformations in the social habits. As shown by the results of the European-project “Integración productiva de camélidos y quinua en Tomave (Potosí),” an increase in the farmers' annual income has been transformed in savings or used to enhance the quality of life (e.g., improvements in-house quality and purchase of more and better food), to support kids education (e.g., boarding school fees), or to increase farmers capacity to buy quinoa seeds more resistant to pests and cattle allowing farmers to access to additional labor (Vargas Ramirez 2012). On the contrary, community solidarity and participation in agricultural activities through reciprocal assistance (called *Ayni*) and communal work in agriculture (called *Minka*) as practices of community cohesion defined by the traditional community norms are disappearing provoking a loss in the social capital. A further emerging conflict concerns the growing movements of people from the urban settlements to the rural areas during the quinoa's seeding and harvesting phases. The dynamics of this phenomenon are not easily traceable in an official manner due to the method used to collect data concerning the internal migration, which currently monitors only on three criteria (birthplace, place of residence of the last five years, and place of residence) (see Martin 2012). People, who left their native communities without having abandoned their lands, are known as *residentes*, while people remaining in the communities are known as *estantes*. Different authors (Félix and Villa 2009; Vassas Toral 2011) have already emphasized that this phenomenon is undermining, jointly with land dispossessions, traditional indigenous norms system. Indeed, according to the workshops' results, *estantes* were complaining about foreigners (*residentes*) avoiding their communal duties (i.e., cleaning irrigation water channels) and neglecting *Ayni* and *Minka* norms while speculating on communities' lands.

4 Adaptation Measures in the Area of Tomave

Different local and international actors are working for avoiding unsustainability lock-ins and increase adaptive capacity in the municipality of Tomave (Table 1). We classify the strategies of action undertaken by the different actors to tackle the described problems as managerial, technological, policy-related, and behavioral (Table 2).

Managerial measures include farm and land management, such as organic quinoa cultivation, water management, organic manure, crop diversification, multi-species herds. In this sense, the main actions are focusing on: (1) producing quinoa in a more sustainable manner incorporating ancestral agro-ecological techniques in the cropping system, building protected plots with different species in its interior as: planting of vegetables (i.e., carrots, potatoes) and quinoa, avoiding the use of chemical fertilizer; and (2) enhancing the access to water for irrigation in the communities as well as building new (micro) irrigation systems.

Technological measures include breeding strategies, such as genetic selection, livestock food improvement. An example is given by the activity of the Social Research and Legal Advice Potosí association (ISALP) together with international organizations and academic partners, has been working in the area focusing on strengthening the breeding management in every aspect, such as forage quality improvements, sanitary checks, genetic enhancement.

Policy-related options include institutional and policy plans. Concerning this, national actors such as given by the Foundation of Education for Development (FAUTAPO) in collaboration with the National Service of Meteorology and Hydrology (SENAMHI) and the Technical Committee on Strengthening Quinoa (COMPASUR) have implemented an early warning system (EWS) in the Potosí district in 2011. These actors have started to release information to support the crop production, mainly quinoa in various municipalities of the Potosí district. The EWS integrates expert knowledge (i.e., use of weather-monitoring stations) and local knowledge (i.e., forty-three bio-indicators divided in three main categories: (1) vegetation; (2) animals; (3) climate and stars). FAUTAPO and COMPASUR set terms of a monthly meeting among municipal governments, farmers, and technicians in each involved municipalities in the project in order to carry out a local report-describing forecast and related recommendations for the sustainable cultivation of quinoa and other crops. The dissemination of such report is realized through municipal technicians, quinoa producers associations', local communication media (radios and TV channels), and posters monthly delivery to community authorities.

Concerning the modifications in the market, within the project “Integración productiva de camélidos y quinua en Tomave” funded by the European Union, the international NGO ACRA has been working on fostering women associations and facilitating information exchange between associations and involving tailors about clothes and mattresses production in order to diversify family's accesses to (local

Table 1 List of national and international organizations working in the municipality of Tomave (source: Author)

Funding Institution	Name of the project	Lines of action the project	Time
SOLIDAGRO, Belgium	Programa de Desarrollo para la Seguridad Alimentaria en Bolivia dentro del Programa 2014–2016 “Alimento para el Futuro”	Rural development, natural resources, and climate change	2014–2016
DKA Austria	Fortalecimiento de la Base Productiva para la Seguridad Alimentaria Ayllu Yura	Rural development, natural resources, and climate change	2013–2017
Embajada Real de los Países Bajos	Programa de Complejo Productivo (Quinoa, Camélidos y Turismo Rural) en el Altiplano Sur de Bolivia	Rural development, natural resources, and climate change	2009–2014
The Danish International Development Agency (Danida)	Programa de Apoyo al Desarrollo Sostenible, la Gestión Ambiental y el Manejo de los Recursos Naturales	Rural development, natural resources, and climate change	2006–2010
Fao Bolivia	Alerta Temprana	Rural development, natural resources, and climate change	2009–2013
Associazione di Cooperazione Rurale in Africa e America Latina (ACRA)	Campe sinos unidos	Rural development, natural resources, and climate change	2008–2013
	Quinoa, l’oro delle Ande		2013–2015
	Agricoltura familiare		2014–2015
	Pastori Andini		2014–2017
Castellvisolidari - España	Implementación de huertos orgánicos con participación de mujeres del Ayllu QullanaYura, municipio de Tomave	Rural development, natural resources, and climate change	Sept.–Dec. 2015
Apoyo Solidario Menno Stanik	Diversificación productiva familiar, repoblamiento frutícola en 12 comunidades de los Ayllus de Yura y Jucumani	Rural development, natural resources, and climate change	Aug.–Dec. 2015
Servicio Rotestante de Desarrollo Alemana, Fonfosc - Unitas	Capacitación de promotores comunitarios en agricultura sostenible y seguridad alimentaria	Rural and agricultural development: training. Gender: women’s rights. Human rights and social participation: Economic, social and cultural rights	2015
Manos Unidas	Consolidación de la producción y transformación de ganado camélido en tres Ayllus del Municipio de Tomave del Departamento de Potosí	Rural development, natural resources, and climate change	2015

(continued)

Table 1 (continued)

Funding Institution	Name of the project	Lines of action the project	Time
Mundo Nuevo	Promoviendo la Seguridad Alimentaria Nutricional desde lo Local	Rural development, natural resources, and climate change	2009–2010
Investigación Social y Asesoramiento Legal (ISALP)	Gestión Territorial Indígena en los Ayllus de Tomave. Manejo de Vicuñas (<i>Vicugna vicugna</i>).	Rural development, natural resources, and climate change	2010–2011
	Apoyo a la Producción y Comercialización de Ganado Camélido en Capacitación y Producción del ganado Camélido en tres Ayllus del Municipio de Tomave (Fase I e II)		2010–2012
FAUTAPO	Apoyo a la Producción Agrícola del Municipio de Tomave	Rural development, natural resources, and climate change	2014

and regional) market. In addition, the creation of women associations and the related necessity to meet to work together is contributing to develop a common space for social integration and collaborative learning.

Behavioral measures are linked to cultural patterns based on social collaboration, e.g., friendly collaboration, common vision, or are market-based, such as labeling system and information exchange. With reference to this, an example is given by the training program activated by the organization *Manos Unidas* focusing on strengthening capacities of the local facilitators with reference to the whole live-stock management system, who are now actively participating in the communities and ayllus, leading campaigns of animal health, and promoting the improvement of livestock management. Focusing on social collaboration and community culture, an example is given by the activity carried out by the author together with the ONG ACRA team. With reference to this, during 2 years of discontinuous field-work, the author with the Ong team has conducted a series of workshops with nine communities belonging to the municipality of Tomave (namely El Asiento, Ventilla, Suntura, Tomave, Chiutaca, Uracaya, San Pedro de Opoco, Jachioco, and Sivingani). The workshops consisted of participatory mapping exercises and discussions addressing the main environmental concerns induced from the quinoa revolution (soil erosion, over-expansion of agricultural land). Community members (on average 25 participants per workshop) were divided in three groups and to each of them were asked both to draw their territory (e.g., the spatial distribution of the quinoa fields) and to fill tables with information about the livestock and its evolution. The older people were asked to draw their territory showing how it was ten

Table 2 Adaptation strategies applied in the municipality of Tomave (source: Author)

Category	Sub-category	Adaptation practices
Managerial	Farm management	Water management (irrigation)
		Organic manure
		Native seeds management
		Improving seeds
		Organic insecticides
		Soil and nutrient management
		Crop diversification
		Multispecies herds
		Livestock sanitary inspections
		Integration crop-livestock
Technological	Land management	Control land degradation (soil erosion, etc.)
		Avoid deforestation
		Windbreak plantation
Technological	Livestock management	Genetic selection
		High-yield breeding
		Improving forage quality
Policy related	Institutional and policy plans	Early warning schemes
		Community risk management plan
	Market	Fair market access
		Diversification
		Certified slaughterhouse
Behavioral (culture)	Social collaboration	Labeling products
		Culture retrieving
		Common vision
		Friends-family collaboration

years ago, adults were asked to draw the present situation, and the younger people were asked to show how they imagine their lands in the future—five–ten years. Once finished to draw, the different groups had to explain what they drew to all the others. As results from the maps drawn during the scenario building exercises, which show how the land use has changed from the past (Fig. 1a) to the present situation (Fig. 1b) and the transformation in the future (Fig. 1c) of the same territory through the younger generation standpoint (Fig. 1). There is a general willingness, especially within the younger generations to enlarge the agricultural frontier only by applying more organic agriculture methods, to guarantee water availability by increasing the protection or restoring bofedales in order to be able to provide supplemental irrigation to their crops when needed.

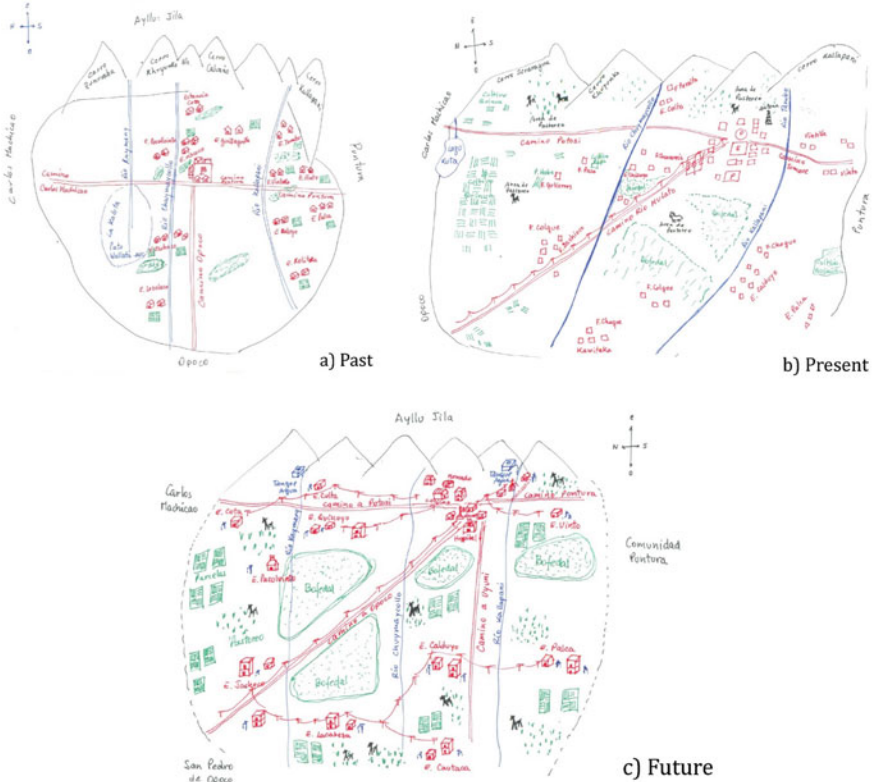


Fig. 1 Description of the territory belonging to the indigenous community of Jachioco: **a** Past; **b** Present; **c** Future (source: Author)

5 Challenges and Opportunities for Adaptive Capacity of Local Communities

The current quinoa golden age is shaping a complex and long-term regional transition. This transition shows the emerging trade-offs among systems’ decreasing exposure to determined threats and increasing exposures to new, different, or unexpected ones describing the complexity of the real-world dynamics. In this context, various organizations are applying different adaptation measures to face such dynamics and trying to avoid unsustainability lock-ins caused by the inter-relations between cereal market, an uncontrolled growth of a specific crop (quinoa) and community actions.

In looking at the adaptation strategies applied by the different organizations working in the area of Tomave, we can identify solutions that provide potential win-win strategies for adaptation. Likewise, we can identify trade-off situations.

Generally, strategies described under the managerial category do not need of high investments since they depend more on adequate policy incentives or institutional environment facilitating changes in management. For instance, avoiding deforestation is a very important strategy to mitigate and adapt to climate change since in adaptation terms it would guarantee a higher protection to quinoa field crops contributing to reduce soil removal by winds action, while providing other resources (e.g., bush food, medical plants) to livestock keepers, which can buffer climate variations by diversifying income. On this line, it is worth noting how the adaptive capacity of agricultural systems is reliant upon the value recognized to inherent characteristics of the system and the crops they provide. The high value of quinoa permits a wider range of adaptive strategies for quinoa cultivation than would be feasible for lower value crops. As shown by the meetings with the nine communities, value of quinoa is not neither constant nor ubiquitous, but shaped by culture and values whose evolution will affect the capacity and incentives to improve the resilience of the system.

Concerning policy-related measures, the case of the early warning system together with the current improvements in the irrigation system may buffer farmers from dealing with climatic and hydrological variability. On one hand, past droughts have prompted adaptive capacity building including the production of knowledge (e.g., bio-indicators) which has been mixed with an expert-based knowledge resulting in a high confidence and trust by the local communities in the alert system.

On the other hand, instead, actors' actions targeting on building irrigation infrastructure without enhancing managerial capacity and strengthening ties to government or other external sources of information and funding are unlikely to assure long-term adaptation. Moreover, an irrigation system with good infrastructure can fail to function effectively when the social capital is lacking. This shown how the different adaptation actions can be considered as originating from local traditional knowledge that encourages endogenous adaptation and to be easier to implement, others necessitate exogenous knowledge and more inputs to be implemented. For instance, technological-based actions aiming at improving breeds and the related management cycle to obtain animals that are more efficient seems to offer promising outcomes in adaptation terms. However, such measures results to be highly dependent on external knowledges and competences. Moreover, they need of a high control of the system in order to reduce future potential vulnerability.

In opposition to earlier measures, options focusing on cultural changes are relatively difficult to succeed in the short-term and even more when the social capital is being eroded by the lack of interest in collective actions as in the case of the community works in Tomave. Local contexts and conditions influence the effectiveness (or lack thereof) of adaptive capacity building efforts, therefore the social collaboration actions put in place by the various organizations are key in such context. In line with this, the organizations working in the municipality of Tomave can potentially foster community adaptive capacity by building flexibility into institutions, and providing spaces for collective learning. However, a main issue is

related to the fact that the different projects and the actions of the different actors working in the municipality of Tomave are not coordinated among them. Higher flexibility may be good in the short-term, but flexibility prompting to uncoordinated action can hamper adaptation in the long-term (Hill and Allan 2013). Hence, there is the necessity to move from individual (e.g., a single organization) level flexibility to collaborative flexibility through supra-local coordination mechanisms as governmental institutions.

In this context, it is still difficult to know whether the different adaptation options applied by the various actors and the related adaptive capacity building processes will be sufficient to allow the communities living in the municipality of Tomave to face environmental, climate, and market-policy changes in the future. It is necessary indeed to remember that adaptation to a variable context, as the one shown in this paper is an ongoing process, because vulnerabilities and impacts are changing over time. In other words, some types of adaptation have proved to be suitable in the past or at present, may turn into inappropriate or inadequate in the future and vice versa. Besides, the multifaceted enchainned effects of each adaptive measure on social–ecological vulnerabilities and other community resilience attributes pose serious questions challenging what should be regarded as “positive” adaptation and to whom. Indeed, as already Mulligan et al. underscore that the concept of community resilience itself brings to light ethical issues about who is part of, or excluded from, the community, and why (Mulligan et al. 2016). In the case study chosen for this paper, the different changes in habits, behaviors, and communities’ values undoubtedly exposed these political and operational challenges.

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Socio-Environmental Effects of Large-Scale Land Acquisition in Mozambique

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Abstract The growing global demand for food, fibers, and biofuels and the consequently, increasing prices of agricultural products have made investments in agriculture a priority for some governments and corporations. Since 2008, about 50 million ha of arable land have been purchased or leased worldwide, with an alarming and unprecedented increase in the number of land negotiations. When land acquisitions occur disregarding the rights of former land users and the socio-environmental impacts of these investments, they are often termed “land grabs.” Not only do large-scale land acquisitions (LSLAs) entail the purchase of fertile land but also the appropriation of land-based resources, such as water, with potential effects on the local population and the environment. Recently, a number of studies and reports have documented the process of LSLAs, while the associated effects on land and water resource availability to local communities have remained poorly investigated. Here, we develop an in-depth analysis of each land deal from the standpoint of land fertility, water scarcity, distance from roads, rivers, and villages. We focus on the case of Mozambique, a country affected by intense large-scale land acquisition, malnourishment, and demographic growth. Results show that, presently, LSLA in Mozambique covers an area of about 2 million hectares that account for roughly 30% of the currently cultivated land. Water resources appropriated through LSLAs are estimated around 39 billion $\text{m}^3 \text{y}^{-1}$, including 31 billion $\text{m}^3 \text{y}^{-1}$ for rainfed agriculture (green water) and a potential use

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of 8 billion $\text{m}^3 \text{y}^{-1}$ of water for irrigation (blue water), which corresponds to about 8 times the blue water currently used for agriculture across the country. The majority of land deals (29 out of 51) target fertile land and/or land with easy access to water resources and infrastructures.

1 Introduction

In recent years, a surge of large-scale land acquisitions (LSLAs) has been observed worldwide, particularly in Africa (German et al. 2013, Schoneveld 2014; Chiarelli et al. 2016). These land acquisitions allow countries and corporations to have access to land and water resources, thereby enhancing food, fiber, and bioenergy production (D'Odorico and Rulli 2013, 2014). Both a global growth of food demand and a decrease in supply have led corporations and governments to seek opportunities to increase agricultural production by putting under their plow land that was (arguably) considered to be largely underutilized (i.e., with low crop yields or even uncultivated). The International Land Coalition (ILC 2011) defines LSLAs as *land grabs* when they occur without transparent contracts and informed consent of land users, or disregarding the social, economic, and environmental impacts.

LSLAs are often driven by a need for agricultural land. However, in many cases, the absence of adequate freshwater resources in the investors' country is also a major causal factor (Bossio et al. 2012; Woodhouse 2012; Rulli et al. 2013; Antonelli et al. 2015). Despite the extent of the LSLA phenomenon and its implications on environment and societies, only a few scientific analyses have attempted a quantitative assessment of the environmental consequences of these land investments, especially at the regional and global scales (e.g., Anseeuw et al. 2012; Rulli et al. 2013). The lack of access to reliable data is often a major limitation to research on this phenomenon. Data sets on land deals usually provide invaluable country-specific information on the number of land deals, the spatial extent of the grabbed land, and the dominant crops (Grain 2008; Land Matrix 2017). Here, we evaluate the socio-environmental implications of land acquisitions in Mozambique, one of the African countries most affected by this phenomenon.

Mozambique is a country with a low gross domestic product GDP [116th on 186 (World Bank 2016)], a high rate (29.7%) of malnourishment (FAO 2013). The local diet exhibits an average food supply of 2283 calories (2178 cal from the plant and 105 cal from animal products), mostly based on cassava and maize (30 and 20% of the average calorie supply, respectively) (FAO 2013). Food supply is mainly produced domestically, while only 7% of the food is imported (mostly wheat and rice). Nearly 90% of domestic food supply comes from smallholder farms (Graeb et al. 2016) where agriculture is typically practiced following traditional methods, that use limited levels of technology, irrigation, and fertilizers inputs (Rose and Carrilho 2012; Jayne et al. 2010).

Land tenure is for the most part not based on private property (law 19 of 1997) (Artur and Hilhorst 2014). After an initial post-independence period of collectivization of rural areas, the Government of Mozambique now follows a more liberal and market-oriented development model by creating a mechanism of acquisition of new land rights for private investments. Under the general conditions of a weak and deficient centralized land administration, lack of transparency, and considerable opportunism, large tracts of land have been acquired by investors for agribusiness, forestry, or mining (FAO 2002; Davis et al. 2015).

The Ministry of Agriculture has estimated that around the year 2009 in Mozambique there was about 15 million ha of available arable land (Deininger and Byerlee 2012). New reports have documented a reduction in available land for large-scale economic activities to 7 million ha, including 3.8 million ha for agriculture, both for food and biofuels (INE 2011; Nhantumbo and Salomão 2010). Thus, Mozambique is attracting foreign investments that are expanding the cultivated areas at an unprecedented rate. In 2006, the government of Mozambique established an agency—the Agriculture Promotion Centre (CEPAGRI)—to promote large-scale foreign investment in the country’s agricultural sector (<http://www.cepagri.gov.mz/>). Since 2007 more than 100 land deals have been signed in Mozambique, covering an area bigger than 1.9 million ha (Land Matrix 2017). Local farmers are often displaced by foreign investors and land concessions (Borras et al. 2011; Hall 2011; Hartley et al. 2016). Despite the shutdown of CEPAGRI in October 2016, Mozambique is still the target of major land investments (<https://foodtank.com/news/2016/10/land-grab-update-mozambique-africa-still-in-the-crosshairs/>). Land investments entail not only the acquisition of fertile land but also the appropriation of land-based resources, such as water (Rulli et al. 2013) and food production, with a potential effect on local populations (Davis et al. 2014a, b; Rulli and D’Odorico 2014; Dell’Angelo et al. 2016). In fact, the loss of access to agricultural land—the main source of rural livelihoods for a population of smallholder farmers—may induce people displacement, as it happened to about 7000 people in the Limpopo National Park (Lunstrum 2016).

In this work, we quantify the impact of LSLA on the local population by evaluating the potentially associated losses of per capita water and income in areas affected by LSLAs. This analysis provides some metrics to determine to what extent LSLAs may act as a driver of people displacement.

2 Methods

Data on large-scale land acquisitions were taken from the Land Matrix (Land Matrix 2017), which reports for each deal the name of the investor, the intended use (i.e., for food crops, energy production, industry), the size of contract and production areas, and, in case of agricultural use, the harvested crops, and location of the acquired land. Land acquisition data are by nature incomplete and unprecise because some land deals may remain unreported, government records may not keep

up with such a fast-moving phenomenon, while some of the other sources of information can be unreliable. Nevertheless, the Land Matrix documents the source and evaluates the reliability of its data entries.

Due to lack of precise information on the geographic position of land deals, every land deal in Mozambique is here mapped as a piece of land with a circular shape with size reflecting the magnitude of the contract area, and with a buffer around the location provided by the Land Matrix data set.

In this chapter, we estimate the effects of LSLAs on natural resources and populations living within each of the target areas.

2.1 Crop Water Requirement and Actual Use

Water used for crop production was assessed by studying plant water needs. Crop evapotranspiration represents the water vapor flux from the land surface and the plant stomata (small cavities beneath the plant leaves through which plants exchange water vapor and CO₂) to the atmosphere; it depends on climate parameters and crop growth stage. Crop water requirement (CWR) represents the total amount of water used to grow plants and can be divided into green water (GW) (i.e., rainwater that contributes to root-zone soil moisture and is taken up by plants) and blue water (BW) (i.e., water provided by irrigation). Plants may be grown in optimal conditions using irrigation water to meet the evaporative demand of the atmosphere; this allows plants to keep their stomata open, thereby maximizing photosynthetic carbon uptake and plant growth. Alternatively, in water limited conditions, plants close the stomata, thus reducing the evapotranspiration rate (i.e., their water losses) and their productivity, thereby decreasing crop yields. In this study, we evaluate CWR, GW, and BW following the method by Rulli and D'Odorico (2013) and Chiarelli et al. (2016). Crop water use is evaluated through a daily soil–water balance based on the FAO model CROPWAT 8.0 (Allen et al. 1998), with soil data from the Harmonized World Soil Database (HWSD) (FAO/IIASA/ISRIC/ISSCAS/JRC 2012), crop parameters and planting date from Chapagain and Hoekstra (2004), and climate data (i.e., rainfall, minimum and maximum temperature, sunshine hours per day, relative humidity, and wind speed) as 1961–1990 averages of data from the closest meteorological station in the CLIMWAT database (FAO 2009).

Maps of water scarcity at 5-arcmin resolution were built to evaluate water availability in the LSLA area. Water scarcity index is defined as the ratio between blue water footprint and blue water availability (Mekonnen and Hoekstra 2016). Blue water footprint was obtained as the sum of three contributions from monthly irrigated agriculture (Passera 2016) and municipal and industrial sectors (Hoekstra et al. 2012). Blue water availability within a grid cell is defined as the sum of runoff that is locally generated and the total water drainage from upstream cells. In this study, 80% of the total runoff is considered allocated as environmental flow requirement (Hoekstra et al. 2011; Richter et al. 2012).

The agricultural suitability of the acquired land was evaluated considering the map by Zabel et al. (2014) that has 30-arcsec resolution. Distance from major rivers and roads was calculated using the Digital Chart of the World (1992), while distances from major cities (i.e., with more than 50,000 inhabitants) were based on the World Cities Atlas (2017).

The effects of LSLA on local food security were assessed using the metric of maize equivalent (Gardi et al. 2015) because maize is the second most important item in the local diet (20% of total average diet) after cassava. Thus, potential production losses were calculated by multiplying LSLA contract areas by the country average maize yield (FAOSTAT 2013; Davis et al. 2014a, b).

Population data were taken from 100-meter-resolution maps of population density from WorldPop (2013) and used to evaluate the number of people living on the acquired land. As a result of LSLAs local populations lose access to land, water and ability to produce food. The per capita average loss of land, water, and food was evaluated for each land deal by dividing the values of the land area, water used for agriculture, and maize equivalent production by the number of people living within each deal's buffer. The value of the crops produced in the acquired land was determined using a reference metric in terms of US \$ for maize equivalent production with the price of 210.68 US dollars per metric ton (www.indexmundi.com), averaged in the last 10 years.

3 Results

According to the Land Matrix (Land Matrix 2017), in Mozambique, about 1.92 million ha of land were acquired with signed contracts, mostly for wood and fiber production (48.7%), forestry (8.7%), and food crop production (8.4%). Less than 3% of contracted area is presently under production, while the Land Matrix (2017) reports a number of intended investments that, if successful, would more than double the current contracted area (126% increase), a scenario that is unlikely to actually take place because many planned deals are canceled or fail before any contract is signed. In 2013, LSLAs covered about 31% of Mozambique's total harvested land (FAOSTAT 2010). Evidence on recent investments shows several cases of conflict between local communities and land investors, suggesting that large-scale investments are not always occurring on virgin or marginal lands but often take place in inhabited areas with good transportation conditions, infrastructures, and soils (Oxfam 2011). To check this for land deals in Mozambique, we investigated the location of land acquired in Mozambique by considering four main land attributes: agricultural suitability, distance from rivers as a proxy of freshwater resources availability for irrigation, and distance from main roads and main cities as a metrics for the proximity to trade market. About 27 out of the 51 analyzed land deals are in areas with an agricultural suitability higher than the country average [score of 49.4, a value including climatic parameters and soil characteristics (Zabel et al. 2014)], and 98% of these land deals are in areas with a score higher than 30

showing that land deals are targeting suitable land for agriculture. The distance from main rivers is on average less than 20 km; the distance from main roads is less than 3 km, and from cities with more than 50,000 inhabitants less than 100 km (Fig. 1; Table 1).

To better evaluate the local impacts of LSLAs on water resource availability, we analyzed the spatially distributed yearly water scarcity. This analysis allows us to investigate to what extent land deals are in areas affected by water stress and determine whether around each land deal there is a sufficient amount of available

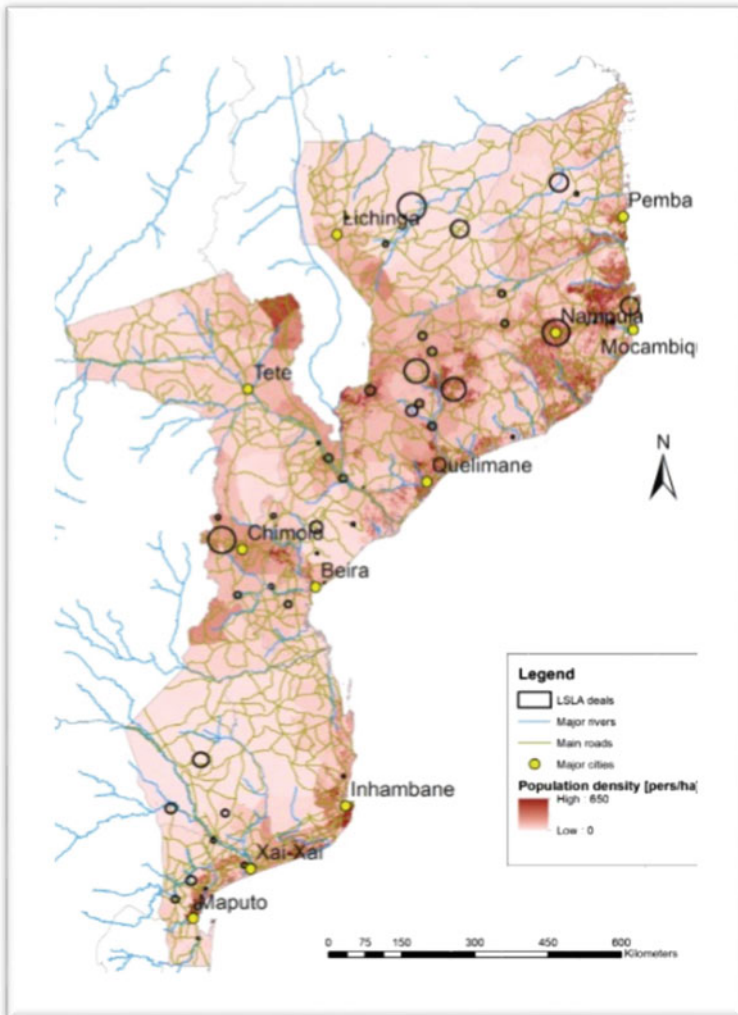


Fig. 1 Land deals in Mozambique reported on map drawing major rivers, main roads, and major cities. Graded pink color represents population density

Table 1 Land deals average agricultural suitability and distances from the main river, main road, and main city

Province	LSLA 10 ³ ha	Average suitability Score	LSLA distance		
			River km	Road km	City km
Cabo Delgado	110	40	18	0	35
Gaza	150	47	30	6	72
Inhambane	2	54	28	1	66
Manica	247	57	30	1	170
Maputo	61	59	27	4	139
Nampula	361	42	21	3	118
Niassa	354	43	7	1	50
Sofala	102	53	8	2	151
Tete	20	64	1	2	92
Zambézia	513	52	28	4	74
Total	1921	50	20	3	104

water to increase crop production (through irrigation). Results show how almost 70% of land deals are located in areas not affected by water scarcity and that only 18 and 12% of LSLAs occurred in regions affected by significant and severe water scarcity, respectively (Fig. 2). Therefore, the fraction of acquired land that is located in water stressed areas is much smaller than the country average of 40%. Regions of Mozambique that are particularly water stressed can be found in the north of the country and in the mountainous area of Gaza and Tete provinces.

The Land Matrix (2017) reports that investors intend to use the land acquired in Mozambique (with a signed contract) for “cash crops,” and crops that are highly water demanding, such as oil palm, tea, and sugarcane. The water required by crops planted in LSLAs is here estimated to be roughly 39 billion m³ year⁻¹, including 8 billion m³ year⁻¹ for irrigation water (i.e., “blue water”) to maximize crop yields. Notice that the total water use for agriculture in Mozambique is of about 19 billion m³ year⁻¹ (Mekonnen and Hoekstra 2016), 99% of which is green water, and 1% blue water.

The most populated LSLA areas are in Nampula and Zambezia provinces (51.6 and 30.4% of province total, respectively), while smaller populations live in the areas targeted by land investors in the Tete, Inhambane, and Cabo Delgado provinces (0.38, 0.34, and 0.24%, respectively) (Table 2). Overall, in the entire country, about 2.45 million people—about 10% of total population—currently live inside LSLA areas. The per capita land used for agriculture is 0.214 ha/cap, and the amount of per capita water used in agriculture for food production is 1030.5 m³/cap year (referred to the year 2000 with a population of 18 million) (Mekonnen and Hoekstra 2016). Population in Mozambique is fast increasing, reaching in 2016 about 28 million people (FAOSTAT 2010).

Mozambique shows malnourishment rate of 25.3% (the year 2015) (FAOSTAT 2010), one of the highest in the world.

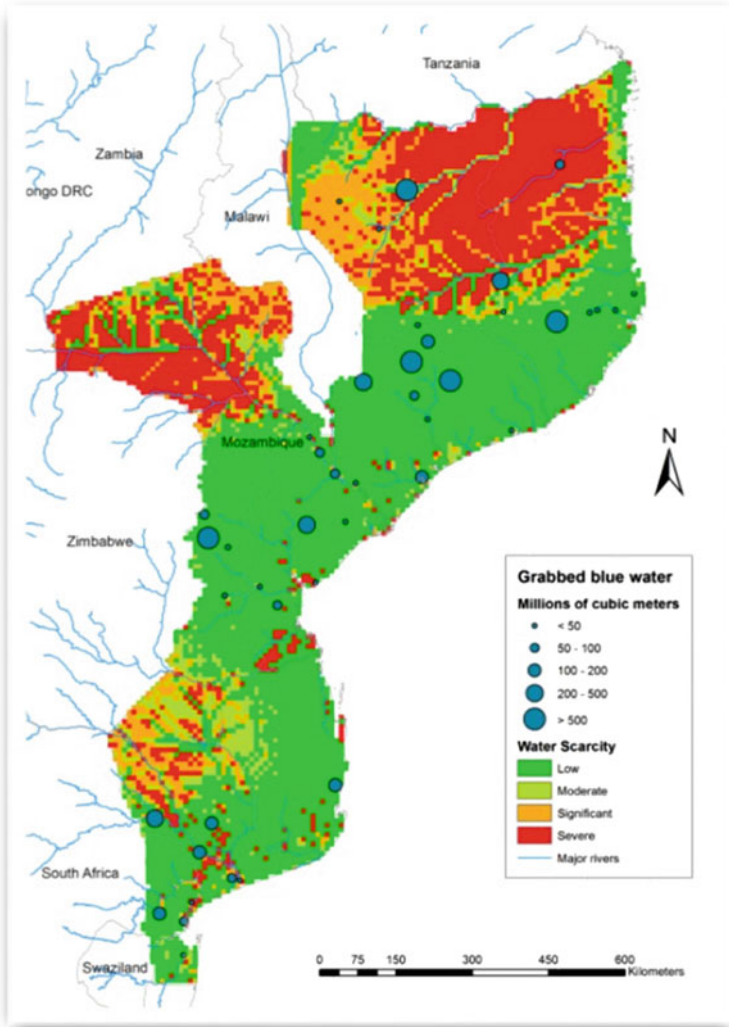


Fig. 2 Grabbed water amount overlaid to yearly average water scarcity map

By cropping the acquired land with maize using the current rate of irrigation and fertilizer inputs, it would be possible to produce about 14.4 million tons of maize per year. In the case of cultivation with modern technology that would allow for the closure of the yield gap maize production in LSLA would be 6 times greater than this value (Mueller et al. 2012). If cereal produced in LSLAs was used to feed Mozambique’s population an amount of food corresponding to 3000 cal/day per capita could be supplied to about 70% of the population, which would result in a substantial reduction of malnutrition in the country.

Table 2 Per capita LSLA impacts on land, water, and economy by province

Province	Num. of deals	LSLA area (ha)	BW (M m ³)	Inhabitants	Land per capita (ha/cap)	Average daily grabbed water per capita (m ³ /cap/day)	Average economic impact (US\$/person/y)
Cabo Delgado	2	110,322	66	5798	19.0	31.0	3008.9
Gaza	7	150,000	1013	82,758	1.8	33.5	286.6
Inhambane	1	2024	121	8402	0.2	39.6	38.1
Manica	4	246,661	1488	225,431	1.1	18.1	173.0
Maputo	5	61,161	192	67,168	0.9	7.8	144.0
Nampula	7	361,054	1011	1,263,943	0.3	2.2	45.2
Niassa	4	354,359	1291	22,495	15.8	157.3	2491.1
Sofala	9	102,240	586	17,533	5.8	91.6	922.1
Tete	1	20,293	82	9236	2.2	24.4	347.5
Zambézia	11	513,081	2186	744,558	0.7	8.0	109.0
Total	51	1,921,194	8037	2,447,322	0.8	9.0	124.1

Our results show that LSLAs are removing from Mozambique about 0.8 ha of land per capita, 9.0 m³/day of water per capita, and 124.1 US \$/year per capita. Therefore, the potential land and water footprints and the average income are reduced accordingly. Of course, this study does not account for possible economic benefits that LSLAs could bring into the region (access to technology, capital, and markets). The major losses per capita occur in the Cabo Delgado and Niassa provinces (Table 2), even if Zambesia is the province with the largest area of acquired land.

4 Discussion and Conclusion

Our results show how LSLAs have the potential to affect both land and water availability to local populations and consequently, reduce food security. The majority of land deals are located in the Northern Region, where climate and soil conditions are more favorable for agriculture than in the South (FAO 2010). Furthermore, LSLA is mainly located in water abundant regions with easy access to the market, because of proximity to road systems and big cities with more than 50,000 inhabitants.

Large investments in agricultural land usually occur around main cities and villages, which limit the ability of rural communities to produce agricultural goods—their main income source—and may induce farmer displacement, internal migrations, and urbanization. Almost 90% of the local population relies on subsistence agriculture from small-scale farming, practised with low inputs of technology, fertilizer, and irrigation (Rose and Carrilho 2012). In response to LSLAs smallholder, farmers often need to move to different lands or to seek a different job (Lunstrum 2015). Even if large-scale land investor provides new employment opportunities to the local population, salaries are often low and inadequate (German et al. 2013).

Interestingly, less than 3% of the signed land deals are currently under production. Several news articles report how local farmers and their communities organize riots to oppose the execution of LSLA projects (<https://www.grain.org/article/entries/5137-the-land-grabbers-of-the-nacala-corridor>). The ProSavana projects represent an example of a great land deal facing population opposition. It consists of 11 million hectares of land, in 19 districts in the Zambezia, Nampula, and Niassa provinces. The project aims at improving agricultural development converting peasant subsistence agriculture into commercial agriculture, to turn the Nacala Corridor into a major breadbasket able to feed the country and produce a surplus for export. However, at the moment, the project has not started since it is facing great resistance from smallhold farmers because it is not clear whether the investors are really interested in improving local economy or in exploiting local resources (Paul and Steinbrecher 2013).

Our estimates of per capita economic impacts of LSLAs may be conservative since the evaluation of potential equivalent maize production was based on average

crop yields currently attained by local farmers, while the production may be expected to increase by 6 times if irrigation, fertilizers, and other inputs are used.

Moreover, this analysis did not include in the count of the number of people affected by LSLAs those living in adjacent areas, who could also be displaced by LSLA because of loss of access to water and other resources or loss of market competitiveness.

Our results show how the local effects of LSLAs depend not only on the area of the acquired land but also on the cultivated crops and location. Even if the majority of LSLAs are devoted to rainfed activities such as logging and fiber production, the impact of cash crops production (i.e., oil palm, sugarcane, and tea) on the blue water demand would be very high compared to the blue water presently used for the irrigation of food cropping. Mozambique is strongly affected by logging to the point that it has been estimated that in 2013 nearly half of the country's timber exports to China were illegal (EIA 2013). While Mozambique's parliament is considering a government proposal to ban logging for at least three months (Pretoria News 2017), no limitation is expected to exist on land acquisition.

LSLAs could also affect food security in Mozambique, a country with a 29% malnutrition rate and where an area equal to almost one-third of total harvested land has been acquired by large-scale land investors. Our results show that the acquired land could produce enough food crops to supply up to 3000 kcal per person per day to 70% of the population.

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The Narrative Structure of the Agro-Urban Metropolitan Territory. The Metropolis as Hypertext for the History of the Twenty-first Century: A Network of Middle Cities as an Operational Topography

Antonella Contin

Abstract *Hypertext* is a set of documents placed in relation to each other using keywords. In the context of the metropolitan discourse, it can be considered as a network of emerging urban epicentres. The reading of a metropolitan territory can take place in a nonlinear way. The citizens' self-consciousness and the ability to move around freely are the backgrounds for the metaphoric transposition of the hypertext concept in the metropolitan dimension. Reversely, to understand the metropolitan issues using the hypertext concept, the individual choices among a wide range of elements placed in relation to each other become significant. The relations of various types of space and nature are managed by a subjective mapping that is constantly updated. In the contemporary urban narrative, especially from the governance perspective, there is a lack of storytelling, to establish a new physical metropolitan paradigm and discourse. To introduce the metropolitan hybrid agro-urban territory to the new metropolitan population requires a process of building a narrative of the territorial identity and citizenship, through a powerful metaphor. The goal of a metropolitan project is to define a space with collective and public dimensions through the new hybrid urban forms that are public, common, entertaining or productive. In order to build this gradient of metropolitan space and define its functional and symbolic values and forms, it is necessary to develop new syntax and grammar for the design.

This text refers to the following proposition:

New narratives are needed urgently to present the necessary cultural, biological, and economic symbiosis of urban and rural spaces. It is important to underline the depth and breadth of the debate that has emerged in every region recently, regarding the need for a broader understanding of the interaction between urban

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and rural spaces in the context of sustainable urbanisation, including the issue of feeding the rapidly urbanising planet. This topic is not adequately addressed in the 2030 Sustainable Development and the New Urban Agenda. The continuous urbanisation of productive rural landscapes is inevitable; however, the developments are usually directed in a way by the policies that follow the economic interests. Examples include various land development, agri-food, and non-agricultural infrastructure projects carried out by a few large corporations that primarily aim at the global market. The narrative of such “inevitable” urbanisation, does not only ignore the dynamic reality of the urban-rural linkages but also dangerously polarise and simplify the complex relation based on outdated definitions of “urban” and “rural” areas. A better understanding and support for the dynamics urban-rural linkages is the key to the sustainable urbanisation and will lead to a secure, nutritious, and resilient food supply. (Strengthening Urban-Rural Linkages Through City Region Food System-CRFS, Foster T., Taguchi M., Santini G., Edwards D., Flanagan K.)

It is the time to establish a new physical paradigm and discourse to define the *agro-urban territory* (Contin and Sbacchi 2008) as the new field of action. It requires a process of building a narrative of the territorial identity and citizenship, through a *powerful metaphor*. (Bernardo Secchi mentioned the metaphor of St. George and the Dragon, where the dragon was the negative city.)

Throughout the history, the salvation of a city is often justified through a story (a myth). In the treaties of the '400, '500, '600, discursive formation, meta-mythical tale and symbolic form provided the value of a foundation. These are the tales of origin that frame the foundation of a new city. Succeeding this tradition, we can construct the narrative of the twenty-first-century metropolis with the following elements: a name of a place, a territorial orographic section, a topographic map and a mental map. This narrative structure allows us to extract the element of the essential DNAs of the territory that provide the stratification of the site. The critical analysis and response will pursue, considering the contemporary situation, and deliver a project with a long-term perspective. The city becomes a *hypertext*.

1 Metropolitan Narrative

1.1 *The City Narrative in the Past*

When talking about the foundation of a city, we follow a typical narrative structure: examine the existing situation critically, analyse the historical text and write a new story. The Myth of a city always has been justifying the new urban figure. The narrative tells the story of the shifts in *figures of space*, depicting the concrete city form over time. As a result, the biography of a city proves that the development of a city would not happen spontaneously but rather with a vision, an idea that was developed in advance.

In the urban narrative discourse, Secchi talks about seven types of urban figures describing the *powerful images to organise the practice of space* (Secchi 1986). The first figure is the *figure of continuity*, i.e. the infinite possibilities of growth and circulation, and the second is the *figure of regularity* that fixes the parameters of balance and imbalance. The third is the *figure of concentration* that defines the boundaries between different fields and defines the *city as a process*, as a sequence of acts, including the legal aspects. The other figures are *the figure of decentralisation*, *the figure of fragments*, *the figure of balance* and *the figure of the body*. Succeeding Secchi's idea, what is, then, the *figure of the agro-urban territory*?

1.2 Comprehensive Urban Narrative Technique for the New Agro-Urban Territory

In the contemporary urban narrative, especially from the governance perspective, there is a lack of storytelling. Following the metaphor of the urban narrative, the agro-urban territory needs the elements such as the characters and the storyboard: Who are the spectators or the citizens, where is the field of action that the citizens occupy and what kind of restrictions and feelings they have? To tell a story, it is mandatory to create a recognisable and characterised space composed of a set and a scene; the "place" must be defined in relation to the surface and the structure of the ground where the city is established and provides an image through a strategic section. We also need to define the possibilities of the relationship between different elements, the tone of the story and the ending. As in literature (Eco 1962, *Finnegans Wake*), every event and urban element exist among all the other elements, taking a particular position. Therefore, the understanding of all "the other elements" in a territory depends on the selection of semantic elements constructing meaning. *The choice of these elements is no longer about categorisation or determinism, but rather about the relationship among them.*

1.3 The Figure of Agro-Urban Territory in a Metropolis: The Evocative Shape of the City's Need

The *figure of the agro-urban territory* represents the transitional space between the urban and the rural areas (Contin and Sbacchi 2008): it is an ecotone where the different set of landscapes with different tonalities coexist. It is, therefore, the location of "the catastrophic discontinuity and change" (Rene Thom) that allows various types of inclusions and exclusions. It is a territorial suture that constrains us taking a critical distance from the traditional tools of architecture and urban discipline. Today, the goal of a metropolitan project is to define a space with collective and public dimensions through the new hybrid urban forms that are public,

common, entertaining or productive. In order to build this *gradient of metropolitan space* and define its functional and symbolic values and forms, it is necessary to develop new syntax and grammar for the design.

To understand how to do this, we can refer to the stories of the twentieth-century cities. The anguish story of a huge city, the dissolution of the “*magical place*”, demonstrates the hope of establishing a different kind of citizens with new behaviours by providing a new dimension of welfare through modern forms.

From these experiences, we can learn that it is essential to give meaning to the shape of a city. It means to represent the *intention of urban design through images and feelings* that accompany it. Today, this specifically refers to the invention of a *dominant metropolitan figure*, which is a new geometry tied to geography, water, topography and new social practices. It allows us to read the territory with new types of maps that are local, yet addressing the metropolitan scale context: The maps support us to practice in places that are far away through recognisable nodes that express the will of meeting the “differences”. They are the critical tools that are necessary, especially when dealing with the abandoned historic centres in medium-sized cities and planning of public open spaces.

1.4 The Role of Agriculture

Returning to the topic of the agro-urban territory, today, it is mandatory that agriculture play a dual role in the metropolitan context: addressing the importance of nutrition, promoting citizens’ well-being, and creating the *renewed signs of affective domesticity* such as the White Mill of Italian pasta brand Barilla. The agricultural area has an advantage over the urban area when talking about a place where there is a strong connection with the collective memory. Nowadays, the agricultural area goes through a mediated transformation that is participatory and engaging. The transformation finds the balance between conservation and transformation to respect what was already living on the territory while planning for the future. The agriculture field is a powerful symbolical place for the mediated transformation that projects a positive horizon for the future life. By contrast, the city goes through conflicts of transformation and finally “*lost its fascination*” as Deleuze (1968) described.

The strength of the agricultural space comes from the section of the landscape: the strong image of the *tectonic of earth* that expresses the energy leading to the creation of “objects” and places with a strong identity. The projects of agricultural spaces that are linked to the hybrid territory of the metropolis become one of the realised and imagined territories of the *metropolitan narrative* and the *metropolitan value communication*, replacing the virtual images of territories distributed almost entirely, by the cinema, the television and information. Today in the agro-urban territories, citizens become “*farmers by choice*”. The agricultural territory bridges any critical distance and embraces the reality and its image that is related to a new

modern futuristic landscape. It is the *physical structure of a new metropolitan reality*.

It is necessary to introduce this agro-urban territory to the new metropolitan population through *stories of inventive imaginations*. These stories can take place in the fringe areas of large conurbations or in the medium-sized cities network, which is the fields of action for heterogeneous multiplicities that are not only related to the measure of size but also in the geography (the deep structure). *These places are characterised by order of distance, not of magnitude*, and they cannot be explored unless the stories are experienced physically on site.

The narrative of the agro-urban territory can be structured as a story of *finding the symbolic signs linked to the image of each element* that responds to the specific geographical location, to the specific sociological dimension and to the place and the sign of the *spirit of time*; and eventually, it will *express a meaning that exceeds the reality*. Rykwert (1988) described a *symbol* as the invisible yet real engine for the *urban enchantment*: knowing the non-exhaustive nature of the relationship between town and countryside allows the enchantment to rise. The city enchantment develops, also, through the awareness of the difficulty in the visual integration of urban and rural that resulted from the *different nature of their ontological status and lifestyle*. This gap needs to be remedied through the agro-urban narrative. According to Gregotti (1966), the figuration of a place is the actual support of the forms of modification produced by the precise construction of any local value. Thus, the figure of each place in a territory constructs the regional scale when combined. It becomes the support for the total built form found in the orography, topography and infrastructure.

On the other hand, it is necessary to define the *precise architectural figures* as a possible *compatibility between history and technology*. It is the new strategy to combine the modern infrastructure with the natural places, as an intermediary between public and technical spaces. With the help of the new technology, the narrative could eventually present a picture of a *contemporary foundation action that links and integrates city fabrics, infrastructure networks and new landscapes*.

1.5 The Proposal: Hypercity 2.0

Hypertext is *a set of documents placed in relation to each other using keywords*. In the context of the metropolitan discourse, it can be considered as a network of emerging *urban epicentres*. Within the metropolitan network, we define these epicentres “centralities”, not nodes, to underline the importance of their role as points of reference that orient our metropolitan experiences physically and symbolically: they act as *symbolic intermediators* (Shane 2005) and *mediators*.

The reading of a *metropolitan territory can take place in a nonlinear way*. The citizens’ self-consciousness and the ability to move around freely, thanks to the dense network of roads and public transportation, are the backgrounds for the metaphoric transposition of the hypertext concept in the metropolitan dimension.

Reversely, *to understand the metropolitan issues using the hypertext concept, the individual choices among a wide range of elements placed in relation to each other become significant. The relations of various types of space and nature are managed by a subjective mapping that is constantly updated.*

The relationship between urban space and technology is becoming inseparable, as the invasion of the virtual dimension in the physical reality increases (Shane 2014). The technology cannot be considered only as “finished” objects, such as *space furniture*, but also as a method to approach the territory and eventually as a mediator of new practices and lifestyles: *public space can be re-imagined with a network of virtual meanings overlapping the reality.* The citizens thus have the freedom of reading and using the space as they wish; in the urban configuration, we can select a set of elements that are reorganised as a system and deliver them through interactive software. With these virtual tools, the all-imaginable paths could take place as new metropolitan “narratives” that intensify networks between public spaces, enriching the city. *The use of new technologies not only in the central and active places but also in the most remote and neglected places promotes self-determination in the urban space and proves the essence of the citizenship itself.*

2 The Metropolitan Experience

2.1 A New Mode of Perception: Reactive Response, Tactile Activity and Constant Work of Making

According to Lynch (1960), the rapid growth of the contemporary metropolis demonstrates that the city shape of the past does not adapt to the new dimension, and *the importance of small individualised impacts related to the geography of places* or their inhabitants and practices is not taken into consideration. These impacts are crucial on the local scale. However, they are minimised by the interventions necessary in the superior scales.

James Corner pointed out a possible solution to this issue. In *Representation and Landscape* (Corner 1992), he suggested identifying, at the beginning of a project, the “inter-textuality between things and not normative modes of perception”. It is “an intuitive approach”, against a system of order and measure. It is common in the landscape discourse, to use the landscape as a medium to ask the observers for an imaginative way to invent a *reactive response*, a *tactile activity* and a *constant work of making*.

However, we need not only to reactivate the relationship between the observer and the landscape, but also, stimulate the citizens’ awareness of the continuous *morphogenesis of the new metropolitan landscape*, both when we interpret and plan a site. We are dealing with the *metropolitan continuous constitutive process*, rather than the knowledge of its morphology that is a formal and static dimension. The abstract rationalisation is necessary to define the new relationships among nets,

territories and landscapes at the metropolitan scale. *It is also essential that the relationships between the ground and the water to be always presented in the local scale.* Geddes talked about the relationship with the valley, in other words, the tectonics of the geography and the environment. The Ground Project of Secchi and Constructed Ground of Pollak (2006) follow this idea of relating to the territory also in the *local scale*.

In order to narrate *the new hybrid territories*, it is necessary to adjust the tools: the *expressive map visualising the thoughts and the vision* behind a project is the key tool for the designers. The map does not only represent the reality but also produces it, *being able to give life to a set of memorable landscapes*. In other words, at the metropolitan scale, *drawing the project as an expressive map* of possible relations among the territory's elements, allows a scales engagement that penetrates our imaginary consciousness of inner space: the inner place of Self (Corner 1992). However, this ability to create the drawing would not be possible if we were not *in the presence of the tangible space of a meaningful architecture*, which reminds us the variety of associations, the characteristics that bring out the *topos* from *spaces*. It is the place directing us to build our possible geography among the places of our lives. *A node of the net, then, becomes the new centrality that orients us and from which we can depart for the great metropolitan crossing through the net.*

2.2 *Interpretative Impact Maps as Tools for the Metropolitan Spaces Reading*

The collagic dimensions of the metropolitan topological experience: the invariable local variations such as metropolitan invariants to safeguard

The metropolitan territories are places of the human experience. According to Lynch (1964), infrastructures tell the history of the territories that they cross. Rogers (1968) argued that spatial variations and temporal intensifications be the designer's mission. Following these ideas, to allow the metropolitan experience in the metropolitan territories, the inhabitants and the planners, even in different ways and times, need to activate the intuition, engaging with the space with *intimacy*. Through this engagement, both the citizen and the designer will have an immediate evidence of the meanings of the place at all the scales that they live, plan and cross (Corner 1992). It brings the necessity of a *training of the constant observation of the inter-textuality among things: the pragmatic consistency of the tools for the metropolitan space reading*.

The green and grey infrastructures and the related new built form types are the principal structural layer of the metropolitan language. Then follows the local territorial signs that are in between, both, the main infrastructural nets and the dense centralities (TOD). These are the corrections in the manuscript of a poet that varies locally within the global territories of the nets. Thus, every element of the territory, even the small ones, and every experience become *a part of the cultural layer and*

its signs. These are the essential elements of metropolitan narrative helping not to lose the values of the various past identities with the new emerging metropolitan identities. Consequently, when describing and narrating the metropolitan places, micro-realities need to be considered in both the scale of the net and the scale of the city fabric. Husserl (1996) explained that the *local invariants of places* are detached by a *method of refined inter-textually reading that allows symbolic transpositions and inter-subjectivities*.

Today, the invariants of local places must be valued again in the new projects dedicated to the overlapping territories of ecotones: the places in between the urban and the rural landscape. The single “variation” in this in-between places allows us to find the precise local condition. *Necessarily, the value of the global dimension of the metropolis can be communicated in comparison to the local alternatives*.

The need for the interpretative maps has emerged from the physical transformations of local places that impact the citizens’ lives. The great infrastructural works developed the awareness of the existence of local variations leading to the transformations. These maps state the range of impact of the metropolitan works on the local scale. *The local variations, consequently, are the metropolitan invariants to safeguard the territory*.

2.3 Metropolitan Mapping Project: Interpretative, Interactive, Composite Images and Mental Maps

Although the citizens’ experience is an essential aspect in the architectural and urban disciplines, it is a challenge to convince the scientific analytical results. There are many cases that the scientific methodology overtakes the discussion, only allowing little chance for the subjective experience to be considered in the urban development. For this reason, together with the narrative structure, we also *propose tools of analytical reading of the metropolitan issue*, for its project and the narrative of the new metropolitan territories and citizens. The complexity of the metropolitan discourse is inevitable; therefore, we need to develop a new methodology to explore the urban experience that includes not only the scientific methods but also the multi-scalar territorial experience. This needs to be implemented to the training for the new generations of designers and citizens.

According to Corner, if a clear inter-textual reading were possible, “the subject would be highly situated in a network of relationships and associations that are perhaps best represented as a geographical map of collagic dimensions at different scales: a topological experience that situates the body in different places and times”. Corner defined these: composite images maps (Corner 2014) and suggested the *practices of photomontage* that allow depicting the conceptual, experiential and temporal dimensions of the nowadays landscape.

Regarding the need to tell the multi-scaling context through a new type of images, Lynch suggested the use of *mental maps overlapping and interrelating to one another*. The mental maps operate in different levels of definition and, therefore, at different city scales. This further developed into the concept of *shifting images* (Lynch 1960):

The shifting image. Rather than a single comprehensive image for the entire environment, there seemed to be sets of images, which more or less overlapped and interrelated. They were typically arranged in a series of levels, roughly by scale of area involved, so that the observer moved as necessary from an image at street level to levels of a neighbourhood, a city or a metropolitan region. This arrangement by levels is a necessity in a vast and complex environment. It imposes an extra burden of organisation on the observer, especially if there is little relation between levels. If a tall building is unmistakable in the city-wide panorama yet unrecognisable from its base, then a chance has been lost to pin together the images at two different levels of the organisation.

Lynch said that images at different scales are pinned together. The pin is the metal fastening and the action of pinning to secure with a pin, a short metal rod, at significant points. Later, Ortiz calls these points as hinge points (2014), the locations that can operate at different levels of the definition of the city.

Within the Landscape discipline, Linda Pollak (2006) wrote, “A site exists at an unlimited number of scales”. This statement is based on the research *The production of space* (Lefebvre 1974). Lefebvre argued that the city manifest itself as a “*space of differences*”, such as “*a voltage range*” rather than a neutral container, from which, according to Pollak, is possible to accomplish a negotiation between different scales of the different disciplines that operate a project. Lefebvre illustrated a diagram of nested scales, in which the overall global scale “G” and the local private scale “P” are mediated by the introduction of a transitional scale “M”; in the diagram, each of these scales is integrated within the others. Pollak suggested that this diagram can be a conceptual design tool capable of supporting the differentiation of the dynamic and multidimensional space, that is the multi-scalar space. This concept explains the metropolitan space that we would like to narrate.

2.4 The Role of the Metropolitan Architecture: Connections Between the Network of Bigness (off-Site Grid) and the Archipelago of the Local Scale Places (in-side Archipelago)

Conceiving a city without citizens is impossible. The incredible amount of urban relationships is, in fact, established through bodies located in the world. The possible stable location of a variable body, though, is only possible by establishing its relation with significant objects—such as cornerstones identifiable on a map—and it can persist only determining the distances among them. This allows the relationship to the persistence of time because the perception of time is about

everyone's relations within objects. Therefore, it is crucial to provide vivid, sensuous and meaningful architectural *objects* and public urban spaces, that, even at the metropolitan scale, allows citizens to connect within their network of both the Bigness of a grid and the local archipelagoes.

Benjamin in his *Berlin Childhood around 1900* (Benjamin 1950) reminds us that our perception inside the huge metropolis will always be a distracted perception, far from the actual experience of the urban reality, because a true experience requires "taking time". It is important to note that the simultaneity of the various layers of territorial experience, including motion and time dimension, needs to be intensified to allow a meaningful and not mechanical experience of the today's "*metropolitan daily crossing*". This experience is realised when the Metropolitan Architecture and the related operation of Metropolitan Acupuncture can create a space denoted through significant signs and notations. These new metropolitan spaces will take into account also the small but important identified impacts—mentioned above—that determine *the typical collagic dimensions of the metropolitan territory*.

2.5 *Urban and Rural Linkage: Territories, Economies, Identities, Memories and Their Oblivion*

The metropolitan hypertext to visualise the semi-lattice structure of the metropolitan city

The typical rural–urban linkage territories of the medium-sized cities networks are places where we can best experience the metropolitan dimension. According to Claude Raffestin (2003), agricultural and urban landscapes take on their value through technical and architectural elements, which qualify them, through the stratification of the relationships between natural and artificial factors. Particularly today, these "in-between" places allow us to get a clearer awareness of the water heritage, or the identity because these are places where the superposition of different landscapes is evident. Furthermore, Raffestin reminds us of the deeper meaning of the word "identity"; "the process of making a population similar" to one another. He emphasised the fact that the identity is a process of dynamic identification passing from a state-sign of what has been considered permanent, to a new state-sign.

Historically, in these liminal territories, identity was built through the projection of the values in the physicality of things: through the gestures of men and their stories, through the images that remained after things, and that the whole nation could interpret and "stage" the collective project derived from a common idea. The common project was represented through myths bearing the traces of primeval intentions. It was a process that went through the forgetting of recent past cultures through the memory of founding myths and archetypes, with the right language to serve as the symbolic mediator, both to communicate the values of the community and to allow the community to continue to share a common sense.

Today, the time of transformation of the society and the territorial identity is faster than building the identity in the traditional sense. How to narrate these territories, then? The question is how to tell the significant stories of the archipelagos of everyday places, trade and movement; the places that are reference points because of their symbolic and material value. They are sites of production representing an invariant of an entire population and the sacred places and places of the communion, which sometimes fundamentalism has now entirely occupied.

The proposed answer is to conceive the city as a metropolitan hypertext. The narrative is referred to a new metropolitan language obtained through the complete visible representation of its complexity. This new language conceptualises the urbanity, aiming to stress the importance of the relational space and its topological representation through interpretative maps. It also means that the way of reading the city is not linear but rather relational.

The hybridisation of the two territories, the urban and the rural, forms a new agro-urban identity and activates the re-identification process of the new territory through new visions narrating the new reality. This narrative will allow the integration in both directions, from local scale to metropolitan scale and vice versa.

The introduction of the concept of hypertext into the metropolitan dimension helps us to understand the necessity of the new language to narrate this new hybrid and stratified territories, the language that takes into account the existence of assets and accumulated identity that cannot be read only from a functional perspective but also from the cultural perspective. Therefore, *not only the morphology of the hybrid territories but also their morphogenesis need to be studied* (Magnaghi 2003).

2.6 How to Interpret and Tell the Value of the Metropolitan Territory

1. Identify the particular point of view to reveal the mining of the Whole Work.

Reading the story of the *metropolitan moving-territory* is not linear. Taking into consideration the Umberto Eco's thought (1962), citizens, as in the Baroque time, feel the need to escape the canonical custom of their time, even when they are facing a new world in movement. Therefore, they have to invent something new, dealing with new practical problems. In a certain sense, Eco tries to bring to completion the idea of an Open Work that is not closed, not made of parts and fragments, but defined by different approaches to analyse and design a new world. "The Open Work—wrote Eco—has infinite aspects and each of it contains the Whole Work and reveals it from a certain perspective. Each point of view gets to reveal the entire Work only if it catches the Work under a very determined aspect, the particular aspect that reveals the whole Work in a new light". It can happen only if the reader identifies the particular point of view to reveal the mining of the Whole Work.

2. *Situate and orientate a body accurately in a place. Build the scene and the set of the citizen's life through a metropolitan architecture project*

With the Getty Spiral, Robert Smithson taught us that the position of a body is a variable determination; *the body position in a certain place gets a body quality*. Therefore, a body situated and orientated in a place can define relations with other bodies: only a certain type of relations determines a *possible system of interactions* with the territory's elements for everybody.

The planned site, therefore, must be a physical identifiable *tangible space* that brings to mind variable associations. Thus, a projected site becomes *the set and the scene of our life* and determines the *value of our possible position* among the elements of the territory, and the strong relative experience orients us to build our own mental geography. Only then, we can narrate a metropolitan experience as a network of relations and associations *determining a topological environment*. This allows our human being, represented by Cartesian coordinates floating into a mathematical space, to be qualified for its geographical position in movement.

Again, returning to Umberto Eco (1962) who claimed that because the phenomena are no longer concatenated with each other—according to a consequent determinism—, it is up to us to voluntarily put ourselves in the middle of an inexhaustible network of relationships (hypertext) and choose our degrees of approach, our meeting place and scale of references, even though we know that our choices are conditioned to our objectives. In fact, we are now simultaneously using a larger amount of possible degrees at different scales to make dynamic, to multiply, and to extend our extreme integrational tools, to meet our enormous desires and possibilities.

3. *Design a unitary vision: a single view of subsets capable of producing a unitary image through territorial elements' mutual relations*

The design of sites and their stories have to take the contemporary situation into account by allowing a single significant view of the different territorial subsets and producing a unitary image through territorial elements' mutual relations. Alexander (1964) called this *semi-lattice structure*. He argued that citizens, who are living the contemporary space of the city and its places of living (*semiosphere*), are transient identities. Therefore, they produce places with their own bodies, which are the result of the integration of territories of the movement, the territories to stay and the sensory experience that they stimulate. Each constructed system, which accepts the oriented variability of the human body, therefore, is a *reversible system*. *It is a nonlinear reading, a hypertext, made of micro-realities, and fluid, that is not the unique relational activities that determine a matrix to think, to meet, in short, to intensify our time*. These new spaces, work like a software inside the hardware consisted of the two grey and green metropolitan main infrastructural matrix.

4. *Determine the emerging space with the new emergent technology*

The inevitable emergence of a *new type of space* and its *physical places* is already written in the reality of new technology. In fact, we can already discuss the

differences of the points emerging from the technological spaces. These differences—even the anthropological ones—that involve profiles, lifestyles, population density, geographical and economic constraints produce repercussions on the figurative composition, the quality of the public space and of the urban organism, which the new green and grey metro-structure will determine on the local scale. We define them as *eco-tonal spaces*, which are the *different tonalities of places*—physical and virtual—places such as those between the urban and rural territories that are the most significant case.

5. *Build a centrality, not a node. The metropolitan monument: a formal device*

Metropolitan Architecture approach allows us to design the metropolitan *architecture projects* that are *geographically determined* by retrieving the territory built by international routes, composed of centres and crossroads. The purpose of our metropolitan projects is to establish the *indicators of environmental values* related to the definition of a centrality. This is not an infrastructural node, which is only a mere point of interconnection in the network that also denotes all the opacity of the underlying shape. *The new metropolitan architecture projects are monuments or formal devices* (Rossi 1966).

Metropolitan Architecture will demonstrate the willingness to realise the re-symbolisation and will manifest the desire to recreate not only the *imagination* but also the *imaginary* to retrieve the architectural form of a syntax value. A project like this re-inserted in a semantic game, even at metropolitan scale, creates a communicative image and common sense for liminal landscapes, now rarely conceptualised and usually neglected.

In the end, with our mobile phone, each of us constitutes a map, its device and its poetry. The observation capacity (the visual issue) reveals the reality that is tactile and guiding. If we agree that the city represents the set and the scene (the city as a theatre) of the human life, we now need to define the personalities of the characters which are acting on stage. The characteristics mean the value of things, their aura, and—according to Rossi—the entire metropolitan system's image is determined by new metropolitan projects.

3 The Role of the Metropolitan Architecture. Final Reflection

3.1 *The Appropriate Set and Scene of the Metropolitan Life and Its Narrative*

According to Shane, we are living in a Meta-City. The term Meta-City, in a wider conspectus, can be assigned to a state of coexistence and co-performance of different and sometimes contradicting, spatial and hyper-spatial systems of orders. The ultimate consequences manifest a complex configuration of multi-characteristic

forces that are, on one hand, coupling as they enable the correlation between these systems and, on the other hand, are disruptive forces by being capable of exerting multidimensional values to each system and altering their initial shape of order. It can explain the use of the term “Meta” prior the “City”, since it is a state rooted in the spatial characteristics of the city that, paradoxically, eludes to follow the rational shape of its physical orders (Shane 2014).

We have to critically face the dilemmas of how to explore the relations between the physical context and the communicative dynamics it contains: to explore the state of the contained semiotic and symbolic values and the containers of such values within each context; to explore their “network of relations” and the performance of their dynamics through an analytical disassembling action; to extract the convergence points in a temporal context; to reassemble them based on a complex entirety in order to enrich the neglected yet effective areas. The final results are meant to act as the new *analytical indicators* that not only help the urban studies to revealing the hidden values of the urban context towards the identification of projectable areas and addressing actions and spatial operations, but also, prior the materiality of the projects, propose the *methodology for re-reading the contemporary urban context through its multidimensional characteristics* (Saffari 2014).

The question is how does the Meta-City converge and interrelate with the urban physical context and what will be the architectural and spatial qualities and values of this process?

We have been dealing with the story of the new metropolis that is like a polyphonic story such as a “*great dialogue*” (Bakhtin 1975). The novelty lies in making the discourse on the integration of urban and rural a whole dialogic structure, in which the characters interact with other characters, the different territories interact with other territories and ideas with other ideas outside of disciplinary boundaries. The dominant fact of the *polyphonic narrative* is the interaction, on the same semantic level, of the representation of the ideas expressed by the different actors. In order to realise the “*great dialogue*” that gives rise to the polyphonic story, the total elimination of the intention of a single discipline is required; in fact, a single discipline cannot address in any way the semantic horizon of the new metropolitan reality.

A theatre, where the story of the each element of the territory take place, is a *word* that has been existing and continued to exist in the perception of the designer: the memory of the daily uses, the particular feelings from the main stories and for the occasional tales that, once pronounced, can bear the traces of the cultural and social backgrounds, and the stratification of main conceptions.

The total removal of the authority from a single discipline is mandatory to get a polyphonic story. The word/element we have to use telling the story of the integration between urban and rural landscapes is an example. We have to follow a critic approach; struggling not only with the present story, but also the stories to come. Therefore, it is important not to give the priority to a single ideology that makes the word/element unstable. Every word/element that we have to use in the narration is active within the high gradient of dialogues, such as an external voice. It cannot be contained in the legal text or the traditional administrative maps.

In the end, the Time, thus, is the main constituent of the story that creates the drama of the metropolitan narrative. In fact, the opposite dialogue of ideas is synchronic. Past, present and future meet in the contemporaneity. However, only the real presence is “*the hic et nunc*”, where the point of reference for the necessary foundation of the “great dialogue” is available.

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Resource Efficiency and Resilience in Sub-Saharan African Cities: Towards Community Metabolism

Maria Chiara Pastore and Eugenio Morello

Abstract The integration of sustainability and resilience strategies is the key in order to achieve successful urban regeneration. The introduction of “community metabolism” as a concept is the thesis of this work. Taking into account resource efficiency as a mayor driver for urban planning projects in combination with the recent concerns of the consequences climate change offers the opportunity to deliver more informed and monitorable actions towards shared targets of urban sustainability. Sub-Saharan African cities represent the appropriate context where to test urgent environmental and social challenges. Recent academic projects supervised by the authors represented the demonstrators for testing community metabolism principles.

1 Addressing the Sustainability of Urban Systems Through the Lens of Urban Metabolism

1.1 Context

The recent attention to material flows in cities can contribute to give a new perspective for tackling urban resilience which is at the centre of this paper. Global policies seem to converge towards a more holistic approach to cooperation and sustainability, to mitigation and adaptation, to the inclusion of developing and developed countries. The New Urban Agenda for an “environmentally sustainable and resilient urban development” (UN Resolution 71/256 2016), released as the main outcome of the Third UN Conference on Housing and Sustainable Urban

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Development (Habitat III) held in 2016 in Quito (in particular paragraph 71), and the Agenda 2030 “Transforming our World” released in late 2015 with the introduction of the 17 Sustainable Development Goals (SDGs) are the main milestones expressing the convergence of several strategies *The United Nations (2015b)*. In particular, the SDGs offer a sound and catchy way to collect different efforts under common indicators. In fact, SDG12 (sustainable consumption and production through circular economy principles in planning) and SDG11 (sustainable cities and communities through a resource efficiency applied to cities) deeply touch the content introduced with this paper and can be linked to different global policies of sustainability, resilience and cooperation. Moreover, other SDGs are involved in the process when we address the water-energy-food nexus and urban metabolism in general, namely SDG2 (zero hunger through local food production), SDG6 (water for all through sustainable management), SDG7 (energy for all through local clean production and savings).

1.2 The Urban Metabolism Concept

Urban metabolism is a metaphor to address resource efficiency in cities. Usually, the concept of metabolism is linked to mitigation strategies, aiming at reducing pressure on natural systems, whereas the term resilience is evoking adaptation strategies in order to address climate change challenges (UNEP 2017). Currently, the two perspectives are converging thanks to a global effort to integrate sustainability, mitigation and adaptation policies into a unique path. Hence, the question is if urban metabolism can also address adaptation strategies. For instance, guaranteeing redundancy (of resources, infrastructure, etc.) is a key strategy to reduce vulnerability and make a system more robust in case of extreme events; this is evidently against the logic of parsimony and the efficient management of resources, as supported by urban metabolism principles. On the other hand, metabolism promotes circular economy values and the closing cycles at the local scale. By saving and reusing resources, metabolism reinforces local ecosystems, in line with resilience objectives.

The scientific attitude to map and quantify resource flows in cities derives from life cycle assessment (LCA) approaches, successfully applied to product design, and more recently to architecture. Material flow analysis (MFA) and ecological footprint (EF) are techniques used to conduct urban metabolism scans of cities. Renovating urban planning towards a more evidence-based, quantitative approach to inform decision is still a long way to go. Nevertheless, recent attention to measuring and quantification in urban planning asks for a new commitment by governments at the international, national and local level in defining targets and key performance indicators to monitor progress and to evaluate the achievements over time. Moreover, the release of the SDGs completely reactivated the international audience to achieve common targets through multi-scalar objectives to be measured through universal indicators valid for all, developing and developed countries.

2 From Urban to Community Metabolism for Approaching Urban Regeneration in sub-Saharan Cities

If empowering local communities has been recognized as a major challenge to achieve sustainable development goals, then we have to scale down metabolism from the urban level to the very local neighbourhood scale. The “community metabolism” concept is introduced in this study. In fact, material flows can be tracked and addressed at different scales. At the urban scale, general considerations about the functioning of a large urban system can emerge; this helps profiling a city at a glance and set the benchmark as compared to other places. Anyway, community metabolism is the scale at which we can take action, assign tasks and responsibilities: tangible effective solutions to tackle energy, food and water issues can be investigated at the local scale. It is the level at which the direct involvement of people can lead to visible outcomes and direct benefits.

Referring to metabolism strategies at the community scale represents both a challenge and an opportunity for sub-Saharan African cities. Firstly, resource flows have to be recognized by public authorities and local stakeholders: in other words, material and energy resources should be mapped and quantified at the local scale if we want to reduce human impact and close cycles according to circular economy principles. Secondly, community planning is the most effective scale for engaging and empowering people to embrace a common challenge and benefit on site from the outcomes of the efforts. Community metabolism is the concept promoted with this contribution and emerging as a result from recent academic works where the authors have been recently involved.

De facto, dealing with metabolism approaches in African cities is not a novel concept in the management of cities and, actually, it has often represented an issue in terms of social and economic exclusion. For instance, the deep segregation of communities and districts both in terms of population types (different income, assets, mobility and energy patterns) and physical form of the neighbourhoods (quality, density and the arrangement of buildings and open areas) has driven to very local-based solutions for managing resources. For instance, self-sufficiency and energy security of richer communities is still today a form of exclusivity to guarantee the functioning and standards that are not guaranteed by local authorities and utilities. On the other side, the management of informal settlements promoted new forms of circular economy based on local partnerships and developed with the help of cooperation programmes.

3 African Sub-Saharan Cities as Demonstrators for Resource-Efficient and Adaptive Regeneration Strategies: Co-evolving Together with Local Resources

The objective of an urban regeneration project in such a context is to define an overall intervention strategy that is based on actions that make cities more resource efficient (sustainable) and prepared and adaptable to new climate conditions (resilient). Hence, the integration of resource efficiency strategies and climate adaptation is at the very core of this approach. The design methodology is based on the definition of strategies and actions with key performance indicators for measuring and monitoring the effectiveness of taken actions.

The first step is the understanding and mapping of material, energy and environmental resources. The complete coverage of several types of networks is not guaranteed by public authorities. This lack was the occasion for pushing technological innovation and skipping the construction of very expensive physical infrastructure. For instance, this was the case for the implementation of a capillary mobile phone coverage network long before the landline in large parts of sub-Saharan Africa. A list of relevant resources and flows for addressing metabolism follows. Some of the resources are already used as part of a circular economy, while others are stuck in conservatory systems, and in need for innovative models.

3.1 Energy

In a continent where energy security is a major challenge, the discontinuous and incomplete coverage of electricity supply represents a major challenge to improve competitiveness for business and societal stability. Energy demand in Africa grew by 45% in the 2000–2012 years (OECD/IEA 2014); energy production is essentially from fossil fuels, 45% from coal (mainly in South Africa); 14% gas (mainly in Nigeria); 17% oil and 22% hydro (OECD/IEA 2014).

Electricity is the major energy demand for domestic and business uses in many cities of sub-Saharan Africa. As the grid supply is often insufficient, unreliable or inaccessible, large-scale private oil-fuelled generators privately supply energy (16 TWh in 2012—OECD/IEA 2014). In cities, where this phenomenon is particularly relevant, both single buildings and entire neighbourhoods are progressively choosing to instal more autonomous forms of energy production as main source of power, or as backup in case of outages, thus anticipating the energy transition paradigm for local communities. In fact, spontaneously, the weakness/unreliability of the network has been an opportunity to switch to other energy production models, promoting bottom-up energy transition projects.

Autonomous small-scale energy grids are not characteristics of a specific income target, as they can be found both in high-income communities as well as in low-income ones, although the typology of technology in use is highly dependent on the amount of the investment. The typology of mini-grid or off-grid generating system depends on multiple variables. If we consider the life cycle, renewable technology systems are far more attractive, but the costs are significantly higher than those required for a diesel generator. Generators provide power upon request, but the ordinary costs are subjected to fuel costs, which may vary substantially. Availability of fuel is another constraint (OECD/IEA 2014).

Small-scale energy productions are already reality for many communities: solar power through photovoltaic panels, biomass power from bio-digesters and geothermal and wind-power generation are successfully used for community projects like common kitchens.

Connecting people through grid and off-grid systems enhances the improvement in the quality of life and entrepreneurship. Nevertheless, careful consideration needs to be taken while considering off-grid systems boosted by private management. Energy autonomy, either informal or privately driven, can become a form of exclusion for those who are not in physical proximity or cannot afford initial investments. Richer communities reinforce the spirit of gated communities, whereas poorer communities activate local power and cooperation models, which are not always at the advantage of everyone.

If, at the community level, off-grid and mini-grid systems are already examples of possible sustainable way of spreading energy, and possibly, non-fossil energy, at the building level, promoting energy savings of the building stock, is not perceived as a relevant strategy to reduce the imbalance between energy demand and consumption. Western building typologies, choices of material and poor roof insulation, just to name three aspects, highly affect the energy performance, both in high- and medium-income housing and in the informal settlements. Richer people compensate the low performance of buildings through mechanical climatization, whereas poorer people never reach minimum levels of indoor comfort and are thus forced to live outside houses most of the time. In short, the house becomes a shelter and not a place to inhabit.

3.2 Mobility

Solar energy is a discontinuous form of energy, and the big challenge in the near future will be developing convenient technologies for the storage of the surplus production when needed, especially in the case of Africa, where sending back the energy to the grid is not a solution.

The energy consumption in the transport sector has increased by 4% per year since 2000 (OECD/IEA 2014). Today, this sector is largely underdeveloped and relies on vehicles, but the affordability of transport services is still a big issue. Buses and tracks, typically using diesels, characterize the road transport in sub-Saharan

Africa. At the moment, vehicle efficiency and use of clean energy have not been a major focus of policy, also because Japan and Europe are the main suppliers of vehicles in Africa, but the progressive increase in vehicle ownership will impact on energy consumption and environmental pollution.

Hence, the nexus energy transport represents a great challenge, as the shift towards non-fossil fuel could be applied to the mobility sector.

3.3 Food

Local food production can represent another promising challenge to promote virtuous circular economy. Increase land value and progressive occupation of lands, either by formal and informal settlements, are challenging urban and periurban agriculture, hence local food production. Moreover, even if the tradition of allotment gardens is still in place, the rising middle class identifies this practice as something that represents an overcome condition, like most of the practices related to circular economy. Hence, cultural and societal values are crucial in order to enable a truly effective paradigm shift.

The identification of spaces devoted to urban agriculture is essential to promote local production, circular economy and job opportunities.

For instance, regaining riverside surfaces for urban agriculture could be an effective way to rethink flexible and temporary uses for the riverbanks while rehabilitating the nearby areas. An example of this approach was applied to the Mzimbazi River case study, in Dar es Salaam, Tanzania, by Viktoria Pavlova during her final thesis project (2016). Her work explored future scenarios for the rehabilitation of areas affected by increasing flooding phenomena generated by climate change

The riverbanks and the flooding areas inside the city have been occupied by low-income populations looking for a very accessible place close to the city centre. People are used to settle down for a short period until the river flows in and washes away the shelters. Local food production could be one of the activities to encourage on fertile terrains along rivers in order to promote renaturalization of riverbanks and at the same time reconsidering the relation between the city, the river and the inhabitants, while reducing the risk. The thesis promoted novel values into an urban regeneration strategy that took into account the efficient use of resources (urban metabolism) and resilience principles (adaptation to climate change).

3.4 Water

Access to water is another hot topic where community metabolism could help. According to the statistics that were issued after the conclusion of the Millennium Development Goals in 2015, sub-Saharan Africa has the lowest

coverage for both water and sanitation, and in fact it did not meet the target for drinking water, which was met at the global level (UNICEF and WHO 2015a; Pastore 2017).

Similar to the energy discourse, the structural lack of a primary network enhances the use of different technologies; off-site and on-site water provision and discharge usually coexist and work in combination, serving the same areas and often reaching the same users (Pastore 2017). As the recent report by WHO and UNICEF shows, urban pipes account for 33% of coverage for water, while 54% of the African urban population receives water from a public tap or standpipe, tube well or borehole, protected dug well, protected spring, or rainwater, (WHO and UNICEF 2015b). As for the sanitation system, the piped sewerage system serves around 9% of households, and the Joint Monitoring Programme (JMP) report, which shows no substantial change, tends to confirm that this data is still reliable (Collignon and Vézina 2000, p. 5) (UNICEF and WHO 2015a) in (Pastore 2017).

Off-grid solutions, such as safe rainwater harvesting, water saving measures and implementation of safe domestic wastewater systems, can process water locally through more sustainable purification systems at the community level, spread the use of safer water and sanitation facilities and eventually avoid the construction of large technical systems, more expensive and sometime difficult to maintain in the long run.

3.5 *Waste*

Last but not least, waste is the most visible component of urban metabolism studies. Reducing waste production and re-circulate most of it as a valuable resource into a more efficient chain is an urgent concern and a significant cost for sub-Saharan African cities. The amount of urban waste produced and the difficulty at managing it properly requires urgent responses. This challenge also offers tremendous green job opportunities because of the intrinsic material value of garbage items. Education to waste separation requires a strong cultural paradigm shift, but this can be accelerated by introducing community-led waste management systems and forms of local responsibility.

The cohabitation of people with waste inside the Kibera slum, in Nairobi, Kenya, was the starting point to promote the “New Life to Plastic” project, an urban regeneration strategy that relies on the concept of implementing a more capillary and community-driven collection and separation of garbage and turn wasted plastic into an opportunity to generate local business for women and at the same time improving urban quality (Maione 2016).

4 Considerations

Urban regeneration processes can be an opportunity to introduce community metabolism approaches in relation to urban resilience at the appropriate and most efficient scale of action. In fact, right at the community scale, novel topics emerging from recent international policies can be easily implemented because material and energy resources are made visible and affect directly people lifestyles. If local communities take responsibility in the management of locally produced material flows, they can take advantage and generate virtuous circular economy opportunities.

Sub-Saharan Africa, which is under demographic transition to urban environments, and where demand for building material, food, energy and water rises, and where inequality is rising, should be the country where community metabolism is introduced, in order to promote sustainable and equitable urbanization.

No conflicting aspects between mitigation and adaptation strategies seem to reduce the hypothesis of integrating resource efficiency and resilience approaches at the scale of community planning and urban regeneration.

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Part VI
The International Workshop
“Transforming Johannesburg”.
A Multi-disciplinary Action Research on
Collaborative Approaches to
Socio-ecological Urban Development in
Informal Areas

The International Workshop “Transforming Johannesburg: Reshaping Socio-Ecological Landscapes Through Collaborative Practices”

Costanza La Mantia

Abstract This chapter presents both the premises and the general outcomes of an International Planning and Design workshop held in Johannesburg from September 12–26, 2015. The workshop was organized as a partnership between the Department of Architecture and Urban Studies—DASu from Politecnico di Milano (Italy) and the Wits City Institute and the Centre for Built Environment Studies from the University of the Witwatersrand (South Africa). Starting from an existing engagement between scholars from the University of the Witwatersrand, and the Kya Sands Community in Johannesburg, the two universities decided to mobilize resources and expertise and organize a two-week collaborative upgrading workshop in Johannesburg. The workshop, framed as a laboratory for technical and social learning, was open to international postgraduate students and young professionals willing to challenge their knowledge in a trans- and multidisciplinary setting. By framing design both as an exploratory and exemplification tool—able to foster negotiations and collaborations while triggering creativity—the workshop aimed at responsively rooting and contextualizing solutions in the community. Through the exploration of experimental collaborative design and planning methodologies, the workshop explored a holistic, incremental, and integrative development strategy for the settlement.

1 The Rationale: The Need for an Integrated Socio-ecological Focus in Urban Development Approaches for Johannesburg

From a sustainable resource use perspective, the past and recent housing developments in South Africa’s cities were generally undertaken in an extremely unsustainable way. As the urban poor were located further and further outside of the city

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by both apartheid and post-apartheid policies, no provision was made for the fact that water and energy resources in cities are facing depletion, and that infrastructural systems are overloaded (Behrens and Wilkinson 2003). Massive urban sprawl and the destruction of potentially productive land, low numbers of housing units per kilometer of infrastructure line (energy, water, sanitation, storm-water drainage, roads, rail, etc.), rising levels of waste output, and increasing levels of energy and material use characterize the patterns of housing delivery across South Africa in the last twenty or more years (Thompson-Smeddle and Roux 2010).

Johannesburg's economic and spatial fragmentation—largely along racial lines—has given rise to informal settlements along apartheid-era buffer zones at the outskirts of the city, perpetuating a landscape shaped by deep inequalities. While characterized by the absence of basic services and serious environmental risks, these settlements are also highly adaptive and resilient communities exhibiting alternative, bottom-up practices (SACN 2014). As the inactivity or slowness of the state in responding to the people's needs (and risks) represents an implicit unwillingness to engage people's agency, inhabitants of informal settlements pave their own roads with permeable material, practice environmental remediation to mitigate flood risk by planting reeds and trees along riverfronts and on wetlands land, build alternative, natural drainage systems, and set up community gardens to collectively produce food and support the settlements' livelihood. These transformative, often collective practices underline an alternative production of urban space. As such they need to be recognized and respected, by building on them rather than disrupt them as often happens in formal upgrading processes.

Currently, the city of Johannesburg faces twin challenges of massively expanding the size of its formal housing stock to meet the needs of the poor, while simultaneously responding to demands of middle-class markets (Thompson-Smeddle and Hender 2010). In this scenario, it is vital to remain within accepted ecological limits with respect to energy, water, landfill space, sewage disposal, food supplies, and biodiversity, while providing better life and new opportunities to the most disadvantaged people. These issues speak to the need to reverse the processes of socio-ecological degradation of South African cities, especially where those conflicts worsen each other, as manifested clearly in informal areas. One of the main goals of this approach re-thinks urban infrastructure in a nature-sound way (ecological and alternative sanitation, off-the-grid power supply, water harvesting and recycling, etc.) framing developmental concerns holistically as an inclusive process of incremental access to the city and its benefits.

This goal can be achieved by linking spatial and livelihood strategies, human well-being, sustainable settlements, and alternative and informal economies in an integrated manner. Contrasting this scenario, though, institutions still address informal settlement upgrading in a compartmentalized way, framing the response as the provision of basic services and housing—rarely in situ—failing to address the complex economic, socio-spatial, and ecological challenges that are at the root of the phenomena and its complexity (Fig 1).

The rationale of the workshop stressed the links between social and ecological concerns, based on the belief that any kind of development must be informed by the



Fig. 1 A small self-built shop shows how human agency transforms the settlement by seeking economic opportunities while putting care in the shaping of the settlement

assumption that we cannot disjoint human activities and ecological cycles. The workshop sought to provide the participants with support and guidance in expanding their expertise in the field of *socio-ecological urbanism* through the active experimentation of collaborative approaches to planning and design for informal areas upgrading, and by working in interdisciplinary teams around distinct but interrelated thematic focuses.

2 A Brief Portrait of the Kya Sands Informal Settlement and Its Community

Kya Sands is located in northwestern Johannesburg, with an estimated population of approximately 16,000 in 2009¹ and a more recent estimation of about 34,000 people in 2015.² The settlement was established in the late 1980s by workers in the adjacent (and now closed) Randburg Landfill site (Weakley 2013). Since then, Kya

¹Professional Mobile Mapping, 2009.

²Personal interview to Carla Lee Kamp, CEO of Life Tree NGO (previously Judah Africa NPO), 18/09/2015.

Sands has grown steadily and now occupies about 25 Ha (0.25 Km²) of private and government-owned land, attracting residents who are seeking economic opportunities in the bordering middle-class residential and industrial areas. Some residents moved to the settlement through existing social connections in order to access recyclable waste from the landfill and sell it (Weakley 2013).

Many residents practice recycling at the individual level to generate income, while it is a fail-safe for others when not employed, or in-between jobs (Weakley 2013). This involves the repurposing of illegally dumped construction rubble: people collect bricks, clean them, and sell them for reuse to improve dwellings. Additionally, some bricks are manufactured within the settlement; as a result, more and more residents are using bricks to consolidate/upgrade their dwellings, supporting a perception of security (ibid). Similarly, at the individual level, residents use rubble and reclaimed bricks to pave walkways within their stands, both to define and to make safer the circulation, as well as to bring aesthetic and landscape value to their property and the settlement. Worth noting is that the paving materials are usually arranged in a pattern that allows permeation of runoff on the pathway, contributing to a general sustainable storm-water management practices.

Homes in the settlement are built close together, from reused materials such as wood and plastic. Mostly, heating, lighting, and cooking are done using open flames, posing a significant threat to the residents, and the settlement has suffered a number of devastating fires in the past. The risk of flooding is high, especially due to the Kya Sands stream that cuts through the settlement. Industrial chemicals in the stream's water are visible to residents, and occasional foaming and discoloration have also been recorded (ibid). Meanwhile, inadequately maintained toilets create an unpleasant odor and leak liquid sewage, posing a serious health risk. Drainage in the settlement is very poor: in addition to the absence of storm-water provisions, standpipes installed by the city administration were not accompanied by drainage systems and often leak. Acting as de facto storm sewers, many of the dirt roads are eroded. Furthermore, trash continues to be illegally dumped in the settlement, as residents charge trucks a lower fee than the normal landfill discharge fee—and then separate the dumped materials to feed different recycling activities. This practice is a double-edged sword, as it does produce income and opportunity for some, but endangers health and pollutes the landscape across the settlement as a whole.

Starting in 2007, several municipal interventions have been aimed at gradually improving the basic services, but results are poor, being mostly “short-term interventions” with promises for yet-to-be-delivered “long-term interventions.”³ Any municipal proposed long-term interventions have included relocation of the settlement, citing, amongst other reasons, that the settlement is partly on privately owned land, and that land is contaminated as a result of it being next to the landfill (City of Johannesburg 2007).

³Short-term interventions sought to respond to poor living conditions and included some service provision and “emergency relocations”. Services delivered included communal standpipes, ventilated pit latrines, scattered mast-lighting, a cleanup of rubbish and rubble in the area, and the implementation of a regular refuse removal service (City of Johannesburg 2007).

Kya Sands residents have taken it upon themselves to address issues related to the river flowing through their community. Bridges are made from wood scraps, but during the wet season, these realized bridges are usually washed away, preventing people from carrying out any daily activities. However, in further attempts to prevent flood threats, residents have channeled water to the dumpsites, diminishing the risk of flooding at the households level but creating potential ecological and public health hazards. Also, as an attempt to manage the storm-water and leaks from the common taps, some residents have installed makeshift drainage systems around their own houses, diverting the water into the river and generally ameliorating the walkways around the settlement.

Residents have started to use different forms of energy as a response to the absence of electricity provision, with some dwellings showcasing small solar panels used to charge cell phones as a paid service for other residents. Small-scale individual farming provides food, while decorative planting contributes to the management of runoff. Some residents, aware that the absence of planting along the river banks exacerbates soil instability and flood risk, have started to plant small trees, reeds, and other vegetation along the river, with the intention of stabilizing the soil and contrast erosion.

Most of these practices have a beneficial socio-environmental impact on the settlement, showing the nature of the social relationships between individuals and social groups, and how these are mediated by and structured through processes of ecological change (Heynen et al. 2006). When and where these practices fail, the reason mostly lies in the lack of a structured support to people’s initiative, underlining their most likely precarious nature. Some of the most interesting counter practices, including bottom-up environmental and sustainable development processes, formed the specific focus of the workshop, by exploring how design and planning can engage informality in responding to the challenges mentioned above (Fig. 2).



Fig. 2 Participants exploring the Kya Sands settlement in small groups

3 Workshop Structure and Objectives

The workshop was intentionally addressed to young professionals with experience and maturity who were willing to tackle new challenges, be integrative, and open-minded in their approach to problem solving. The City of Johannesburg sponsored 3 municipal officials to take part in the workshop as part of an internal capacity building and innovation programme. Also a municipal officer from Kampala, interested in developing a more holistic understanding and approach toward the issue of inclusive and sustainable urban development for her work on informal areas upgrading in Uganda, joined the workshop, together with young professionals from Italy, Germany, South Africa, Nigeria, Russia, and Australia. Participants acquired a wide range of practical and conceptual skills allowing them to develop holistic, interdisciplinary, collaborative, and innovative approaches to sustainable and collaborative urbanism and design, and how to apply this knowledge in a practical manner to solve complex problems in a collaborative way. They had the chance to gain a deep and articulated understanding of *socio-ecological urbanism* principles as applied to informal areas upgrading, working with the community by linking environmental knowledge, technical expertise, and socio-cultural awareness aspects to collaborative design and planning practice.

As the methodological goal of the workshop was to exemplify how integrative and collaborative strategies can generate synergies between alternative economies, social empowerment, and urban transformations, ultimately the workshop aimed at collaboratively developing an incremental and integrative upgrading strategy for the Kya Sands settlement, while supporting the Kya Sands disadvantaged community advocating for in situ-upgrading. In so doing, the workshop addressed parallel theoretical, methodological, and ethical concerns by framing the area as one of the possible experimental sites for piloting much-needed strategic socio-spatial transformations in Johannesburg.

The complexity of the general task was explored through five thematic work streams, defining richly articulated areas of work, which—while being quite defined in goals and scope—presents numerous overlaps. Participants were distributed in teams accordingly with the work streams focus. However, while each work stream was coupled with a precise working group, a general integration amongst the streams/issues and the work of the relative groups was pursued through moments of general reporting, crosscutting work integration and general collaboration and coordination between tutors and participants. The five work streams (WS) and relative groups were defined as follows.

3.1 Rethinking Infrastructure: Urban Landscaping for Alternative Services Provision and Ecological Remediation

This work stream focused on the different ways to supply urban services (water, sanitation, energy, waste management, storm-water drainage, etc.), considering them as part of a complex ecosystem environment, and locally analyzing the site conditions, the settlement’s typology, existing facilities already on site, and existing alternative practices, linking people adaptive behaviors, and ingenuity with ecological understanding and technical know-how. This perspective builds on the view that people form the infrastructure of a platform providing for and reproducing life in African cities (Simone 2004). Adding the “nature” component and seeking a definition of a new kind of socio-ecological infrastructure shaped the interaction of people and nature. The goal was to understand and build propositional strategies able to parallel address multiple challenges, by working through landscape approaches, and linking basic service provision to other community dynamics and issues (e.g., livelihood, education, safety and health). The different challenges related to the location of services, the importance of the different factors impinging the choice of the service, and the different contexts that the final users need to face in order to receive the service were also objectives of the work stream.

3.2 Eco-Incremental Housing: Typologies and Systems for an Integrated Approach to Upgrading

This work stream focused on exploring a series of housing typologies and relative incremental construction strategies, as well as designing a context-appropriate housing delivery system with the goal of identifying and supporting a process of incremental housing construction to be undertaken by poor households through an enabling approach. The perspective is that incremental housing solutions represent an important exercise of empowerment and culture-based development, and when coupled with self-construction mechanism, they can also become engines for the up-skilling of part of the community and the creation of job opportunities.

Starting from the assumption that sustainable housing practices are not just about buildings’ sustainability, this work stream also embraced socio-economic empowerment and cultural identity, reframing sustainability through a broader lens of institutional support and resource efficiency mechanisms. Following this perspective, sustainable housing practice must balance the technical aspects of constructing housing with the critical need for appropriate, decent, and affordable shelter delivered in a co-evolutionary process between empowered participants, engaging with government, understanding and utilizing appropriate technologies and moving away from the conventional one-size-fits-all approach to housing delivery. The target of this work stream was therefore the exploration of a series of

typologies able to respond to different resident needs, and address the numerous socio-cultural differences emerged during the fieldwork, with the goal of identifying a suitable set of typologies and systems fitting the specific settlement conditions.

3.3 Placemaking: Public Spaces Between Community Services, Economic Opportunities, and Leisure

This work stream engaged the concept of placemaking through public space. While public space is vital in the construction of the urban environment, where municipalities struggle economically, investment in public spaces is often seen as a nonessential response. The workshop perspective on this matter was that a small investment in quality public space has the potential to deliver a manifold return to the city. By strengthening the social fabric, providing economic opportunity, and supporting citizens' well-being, public space can be the right socio-spatial device for optimizing resources and enrich communities both socially and economically. Streets, in particular, are a vital part of the public realm, providing a place where merchants can sell their wares, children can play, and people can stop to talk and interact; structuring the social and spatial fabric of the city, especially in informal settlements, where quality public spaces can be substantially lacking (therefore increasing tension and stress for people who live in crowded and inadequate conditions), a systematic approach to collaborative and strategic public space design can generate multiple benefits. Because of limited resources and the many challenges and needs, public space in socio-economically disadvantaged communities must be able to holistically combine multiple uses, linking different activities to a general community development agenda (e.g., sports facilities, cultural uses, economic opportunities, and a variety of social and ecological services that are much needed by people in vulnerable and under-served communities). Within the same rationale, and starting from a thorough understanding of existing kinds of public space and relative uses in Kya Sands, this work stream aimed at orienting any public space agenda toward integrated community development projects and processes, setting placemaking practices around public space as an active socio-spatial device able to both responding to immediate needs and to trigger strategic and systemic change in the settlement.

3.4 Designing the Engine of Development: Alternative Economies, Livelihood Generation, and Community Up-Skilling

This work stream addressed the need for sustaining any development process through suitable economic strategies able to both support the incremental upgrading and provide new opportunities for socio-economic improvement, creating alternative

livelihood sources and job opportunities. The first assumption underpinning this work stream concerns an inclusionary take on informal economies. The informal economy—forming a large part of the economies of many developing and transitioning countries—comprises 42% of value-add in Africa, providing employment and income for many who lose or cannot find work in the formal economy, especially women, young people, and other individuals from disadvantaged groups (Mamman et al. 2015). By seeing different economies as complementary, what emerges is a practical “continuum” between informality and formality, with formalization being a gradual process. When this gradual process does not happen, often formalization results in unintended negative consequences (e.g., fracturing of local livelihood and survival strategies including social networks). Understanding informality and working with and not against it, while designing creative, sustainable livelihood strategies by leveraging both on traditional and alternative economies was therefore the main goal of this work stream. The intention was to develop a people-centered approach to economic development by integrating different economies to a wider and phased settlement upgrading strategy, concretizing the approach in a series of physical and/or non-physical projects.

3.5 Governance for Collaborative Upgrading: Planning a Multistakeholder Strategy from Policy Making to Tactical Management

This work stream focused on the analysis of different stakeholders already in place in the Kya Sands Settlements, and finding others that might be involved in an integrated upgrading process. The work stream interpreted *governance* as the set of policies, functions, responsibilities, and procedures that an entity establishes to guide and direct how it is going to achieve its goals, as well as a process of decision-making and the designing of the procedures by which those decisions are implemented. The basic assumption being that holistic, incremental upgrading requires coordinating the resources and capabilities of the beneficiaries with those of the different levels of government and the civil society. While councilors, municipal officials, and their contractual agents need to adopt a new way of recognizing opportunities for residential development, private sector and community-based organizations need to regain trust and feel supported and empowered by the institutions in order to expedite and facilitate sustainable community development processes. Within this framework, one goal was to design a platform for collaborative engagement of different actors in the upgrading process; identifying tasks, roles and responsibilities in line with actual policy and programmes for informal settlements upgrading in South Africa. Another goal of this stream was then to work out different priorities with the community, and to discuss the opportunities and next steps in order to reach the target together with all involved actors; maximizing the different contributions within a collaborative and integrative development framework.



Fig. 3 Community consultation around understanding of the contextual conditions and challenges for the residents

At the end of the two weeks, the resulting projects from the five working groups overlapped to constitute a sort of *Strategic Masterplan* for the incremental upgrading of Kya Sands informal settlement, intended as the synergic sum of the strategic projects emerging from the five work streams (Fig. 3).

4 Description of the Workshop Rollout

An intensive two-week programme helped guide participants across the multiple issues called into question by the workshop, structuring the two weeks as a progressive and guided work plan articulated between theory and practice by alternating seminars sessions and fieldwork. Frontal teaching modules, in the form of two days of seminars, built a series of theoretical and case-specific knowledge, complementing the acquisition of practical skills through an application-based learning practice by working hands-on in the settlement. An introductory day set the scene for the first week of exploratory field work by portraying Johannesburg urban history, the Kya Sands settlement, and other important contextual and preparatory knowledge, including the state of South African policies targeting informal areas upgrading. After the initial day, participants started to work both in the field and at the University of the Witwatersrand, where they were allocated appropriate spaces for performing the work. Several different interactions with the

community happened, both structured—as community meetings and focus groups—and unstructured ones—as shadowing, participatory mapping sessions and informal interviews.

The close of the first week of work, coinciding with a site analysis performed by each group following their thematic focuses, was then concluded with a presentation of the findings to the community, and an interaction around the understanding of the settlements issues and aspirations. The work of the groups was then complemented with another day of seminars, where participants were presented pertinent case studies and specific technical knowledge supporting the development of the search for ad hoc strategies and projects for Kya Sands (Fig. 4).

In the process, participants discovered a series of obstacles due to the particularly multifaceted issue of “fragmentation” in South Africa. Beyond the spatial fragmentation, the groups had to uncover and deal with a deep fragmentation of interests as well—both within the community and more generally amongst the different stakeholders involved, including the City of Johannesburg. From the perspective of an institutional response, compartmentalized approaches to the transformation of city became apparent, particularly toward informal settlement upgrading, as witnessed by the well-known RDP⁴ mechanism: an approach that continues to pervade the mindset of municipality officials, notwithstanding the progressive shift of focus in the national programmes requiring integrative and participatory approaches (Huchzermeyer 2009). The various City departments often operate in an uncoordinated manner, either due to overlapping—if not conflicting—mandates or due to a general lack of communication. The result being that when institutions intervene, projects often proceed outside a logical sequence and lack synergistic integration. This represents both a waste of economic resources as well as an exacerbation of the distrust dividing residents’ needs and aspirations from the institutional capacity to effectively respond.

This scenario still constitutes a conundrum. The solution would require a deep change of attitude toward more flexible, integrated, participatory, and context-specific approaches; a solution that is made infeasible both by the current fragmentation of the institutional landscape, and by the lack of a strong design focus. Government interventions are shaped by institutions around numeric targets rather than around principles such as spatial quality, context-specific responses, and integrated and collaborative approaches. In order to visualize, plan, and design interventions able to leverage all the necessary realms that could make sustainable change, a different method is definitely needed, and the workshop wanted to push the City to experiment in these areas.

⁴The *Reconstruction and Development Programme* (RDP) is a South African socio-economic policy framework implemented by the African National Congress (ANC) government of Nelson Mandela in 1994. Critics of the RDP point to poor housing quality as the chief problem being faced. Critics also note that new housing schemes are often dreary in their planning and layout—to the extent that they often strongly resemble the en masse bleak building programmes of the Apartheid government during the 1950s and 1960s.



Fig. 4 Discussion after Monty Narsoo's presentations during one of the two seminar days at the University of the Witwatersrand

5 Some Reflections on the Workshop's Impact and Achievements

Some important achievements of the workshop, however, were accomplished on the ground. One of major achievement was the construction of an honest dialogue amongst the different stakeholders: essential prerequisite of any collaboration. This process, not without issues, was started and facilitated amongst the involved stakeholders through the workshop, building a solid basis for a long-term collaborative engagement (Fig. 5). In order to be really meaningful, this needs to be brought forward, and the hope is that the City will step in more proactively in this regard. In fact, although the collaboration with the city was mostly framed as a training exercise for the three delegates participating in the workshop—there has been a significant impact.

By engaging the city officials in experimentation with integrated approaches, we realized that a changing mindset on integrated participatory upgrading was happening amongst the participants, unveiling the importance of bringing different interests together and negotiating around common aspirations. At the end of the workshop, there was a verbal commitment from the City's side to consider and evaluate the chances of further developing some of the strategies identified during the workshop. This commitment is coming to a more solid outcome. Recent news as of May 2017 is that City transformation is researching experimental housing solutions and integrated incremental upgrading strategies for Kya Sands, starting



Fig. 5 Workshop closure meeting in which the groups presented the final results for the five streams to the Kya Sands community and the other involved stakeholders

from the ideas emerged from the workshop.⁵ We hope this commitment to go further and to be able to witness how the City will enact the emerged strategies and transform them into real projects, pushing for this kind of experimentation toward integrated socio-ecological focus and participatory approaches to become the new praxis.

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Engaging the Informal and Formal in an Expanded Notion of Urban Infrastructure: How Healing Human and Ecological Networks Could Lead to a More Equitable City

Alessandro Frigerio and Kristen Kornienko

Abstract This chapter reviews the processes and findings from the alternative infrastructure work stream within the larger international, trans-disciplinary workshop *Transforming Johannesburg: Reshaping Socio-ecological Landscapes Through Collaborative Practices* (12–25 September 2015). The five parallel work streams making up the workshop (rethinking infrastructure, eco-incremental housing, place making, alternative economics and governance for collaborating upgrading) aimed at producing a master plan for the in situ upgrading of Kya Sands informal settlement in Johannesburg, South Africa. The *Rethinking Infrastructure* work stream focused on service provision through cross-examining the connections between different scales and different systems: the local and the regional scales, and the human and natural systems. After initial site visits, the group chose to concentrate on the concerns of water (drinking, waste, storm and river) and waste management. Inputs from data collection, Kya Sands Residents, City officials and external experts, were explored through the lens of dialogue and debate and distilled into three pragmatic regenerative strategies towards settlement upgrading. The chapter is constructed as both an account of and a reflection on the specific results and experiences of this work stream.

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1 Introduction

This chapter reflects on the research process and output of the *Rethinking Infrastructure: Urban Landscaping for Alternative Services Provision and Ecological Remediation* work stream within the workshop *Transforming Johannesburg: Reshaping Socio-ecological Landscapes Through Collaborative Practices*. The Workshop took place in Kya Sands Informal Settlement and at the University of the Witwatersrand in Johannesburg, South Africa and aimed at producing a master plan for the in situ upgrading of Kya Sands informal settlement. It both built on existing engagements within the community by students and staff from local Schools of Architecture and Planning, basic service implementation by the City of Johannesburg, and the residents own grassroots efforts; and acknowledged that there are no easy and simple solutions to address the complex issues in Kya Sands.

The Rethinking Infrastructure work-stream group was made up of: a resident from Kya Sands; Johannesburg planning professionals; four postgraduate students from South Africa, Europe and the Middle East; and two Expert Tutors in Architecture/Urbanism and Landscape Architecture/Urbanism from Europe and Canada/South Africa; and a Co-tutor in Architecture/Ecological Remediation from Nigeria. The group members gathered in Johannesburg for a period of two weeks bringing such varied backgrounds and interests as sculpture, architecture, urban planning, ecology, photography, sociology and geography. The group's focus was to reimagine the ways in which basic urban service provision (drinking water, sanitation, waste management and storm water drainage) could mimic and/or coexist with the site's human and natural systems as part of an upgrading process.

Two critical points made during the Workshop's opening lectures served to further shape this focus and the group's practical way forward. Huchzermeyer (2015) posed a key question: *should informality be addressed with normative practices?* She framed this question by placing rights and integration side by side within the larger dialogue of a democratic Right to the City (Lefebvre 1991). By pointing out that the courts have often intervened when evictions to marginalized areas were attempted, she underlined the de facto value of rights. In post-apartheid South Africa, the pivotal Constitutional Court decision on socio-economic rights as it relates to housing the poor, the Grootboom case, "required [the State] to reasonably implement a programme that at a minimum provides for those living in intolerable or crisis situations" (Wickeri 2004: iii). Huchzermeyer went on to suggest that together these (rights and integration) have the socio-spatial potential of a shift away from a city dominated by capitalism towards one dominated by a response to use. It was here with the idea of *use* that our group was to later find a foothold for our study.

Later in the day, Wafer (2015) proposed a crucial urban dynamic: infrastructure as the connection between everyday life and power. With this observation, he presented a mechanism to a way forward within the South African context: the connecting of infrastructure with what it means to be a post apartheid city. Finding

the relationship between these two contributions helped to reframe the group's discussion around shared roles (resident and state), perceived value of service provision and basic needs, thus broadening our thinking around *how* to provide basic services infrastructure, *who* would provide that infrastructure and *why* we should consider an alternative approach. Recognizing that existing and potential connections between everyday life and infrastructure needs/provision could be a potential countermeasure to the conformed mindset of more traditional service provision became key of the group's thinking.

Insights from both the community and the context were essential in shaping our ongoing thinking and in articulating any design response. To this end, the group's initial effort focused on understanding and mapping Kya Sands community concerns and existing residents' practices as well as existing conditions. We then elaborated on the findings with the goal of designing interventions rooted in a feasible scenario. This forced the group to grapple with rethinking both what infrastructure means and how it can be provided, and at the same time how does this fit into an in situ upgrading process. The group members (together with some Kya Sands residents) then formulated a series of "what if" scenarios combining the residents' desires and aspirations with technical knowledge and the group members' design and planning skills.

2 Existing Conditions: Waste and Water Systems in Kya Sands

Kya Sands informal settlement (pop. 16,000) is located in the north-eastern suburbs of Johannesburg (Adegun 2016). As shown in Fig. 1, it is adjacent to an industrial area to the west, Bloubostrand middle-/upper-class residential suburbs to the north and east, and the closed and covered former Randburg Landfill to the south. Many of the residents work as gardeners, house cleaners and child minders in the suburbs; as piece workers in local industry; participate in recycling efforts; or are unemployed (SA unemployment rate 26.5%, Statistics South Africa 2017). As a community, it is bisected by the Kya Sand Spruit (or North Riding Stream) and its wetland posing health and safety risks to the residents. These risks are made worse by the steep slopes leading down to the river on which the shacks are built.

The research group's initial process began with a site visit to Kya Sands informal settlement followed by a review of the group's initial impressions. These included: substantial household garbage throughout the community (on the ground, in overflowing bins, blocking drainage canals, polluting the stream, in huge piles, filling in the wetland and so on); lack of garbage/waste removal; continued dumping of outside household and commercial waste as well as construction rubble



Fig. 1 Map of Kya Sand Informal Settlement and its context, note the significant differences in the development densities (elaboration by the authors)

despite the landfill site closure; lack of basic services; river as a potential community asset; residents' agency to use what they have; competition for space; residents' struggles in their daily lives; the agencies of the residents (forming leadership committees, organizing cleanups, knowing their basic rights, engaging with local officials and NGOs); residents' mobility; leaking water taps and run-off; extreme topography and the settlement's unique character. Our impressions were further distilled through discussions with Kya Sands residents and two main focuses emerged: water and waste.

In interviews with residents, primarily our questions centred around: How do people feel about the river, what negatives and positives does it contribute to the living environment of the settlement? What do people feel about the waste dumping, how does it impact their daily lives and what are the informal livelihood practices surrounding this? Further research techniques included multiple site visits, extensive multi-scalar mapping of context and existing conditions, group and inter-group process maps and discussions, dialogues/interviews with various stakeholders, town hall style meetings and expert inputs on alternative infrastructure methodologies. Our research method and approach were strongly influenced by the group's discussions with urban ethnographer Marianella Sclavi and her principles in *Art of Listening and Possible Worlds* (Sclavi 2003). This approach proved to be particularly helpful in bringing the diverse stakeholders together and in opening the door to a deeper understanding of the complex social systems and the relative power dynamics within the community. From the research finding, the group compiled a list of the community's assets and concerns/liabilities around water and

waste, then extending the mental and physical mapping to different scales of influence and interdependencies.¹

Water The river's water had visible pollution (primarily garbage), and its banks were severely eroded. The extensive wetland had been largely filled in with waste dumping and few of the wetland plants (e.g. reeds) had survived. Many cases of severely leaking city-provided water taps were documented across the community creating run-off and further erosion of the slopes and riverbanks. Household grey water was also dumped into channels leading to the river. We were told that during the rainy season these channels are overrun by storm water. In addition, our interviewees, and more recently the SABC (Mekuto 2016), voiced outrage at both the health risk and the lack of dignity due to the inadequate state and number of toilets in Kya Sands, this increased our concerns that underground leaching could reach the river. Moreover, it must be noted that larger scale mapping showed much more significant pollutants being dumped into the river upstream by upholstery manufacturers, primarily industrial dies (Fig. 2).

The residents' deepest felt concerns related to the river were around the lack of safe crossing points, seasonal flooding and toxic pollution from the upstream industrial area. Crossing the river was described as a critical circulation link for most of the community, such as children going to school and adults going to work. These groups often chose to make high-risk crossings rather than to take the longer and/or more expensive alternative route around and across the road bridge. A precarious bridge built by residents did exist; there was a 2 ZAR (0.20 US\$) toll per crossing, except for school children. Residents repeatedly expressed a strong desire that a proper pedestrian bridge be provided by the City. At the time of the Workshop, the City had done many studies (Impact Assessment, Geotechnical Report and Proposal for Construction) and made many promises; and while at that time no construction had begun, it has been reported that a bridge was built in 2016. Overall interview responses reflected the river as a liability, and our suggestion of its potential as an asset was met with much scepticism (Fig. 3).

Waste Both dumping from outside the community and accumulation from within the community were a significant issue facing the residents. Despite the closing of the Randburg Landfill in 2010 (DoARD 2010), there continued to be extensive dumping. Group members observed multiple trucks and vans unloading all descriptions of waste. While much of this was gone through for possible items of value and/or reuse, there were seemingly continuous small-scale fires burning

¹Globally large cities develop most often in areas with an abundant nearby water source, instead the discovery of vast gold reserves in the nineteenth century brought settlers to the high veld landscape that is now Johannesburg. Regionally, at 1753 m (5751 ft) elevation, it is a highpoint; as a result, the City has no local water source (Floodmap.net 2014) and so all water used is either collected through surface water catchment systems (rain run-off) or comes from the Vaal Dam (with a hydrographic catchment area of 38,505 km²) fed by the Lesotho Highlands Water Project—the largest water project in Africa (Rand Water Foundation n.d.). Consequently, the value of the local stream/river systems making up the drainage basin cannot be overlooked, thus making the focus on the Kya Sand Spruit (or North Riding Stream), what may seem a relatively unimportant tributary in other environments, fundamental to our work.



Fig. 2 Mapping and interviews in Kya Sand, group member engagements within Kya Sands and with its residents (photos by the authors, 09.2015)



Fig. 3 Informal crossing points on the Kya Sand Spruit constructed by residents (photos by the authors, 09.2015)

unwanted debris. Residents reported constant fumes and smoke causing a spectrum of health-related issues from unpleasant odours to eye irritations to respiratory illness (e.g. asthma), particularly in children. Children playing in the garbage dumps were a common sight. These dumps were localized and controlled by small but locally powerful groups within the community. The community leadership reported that this creates social rifts as a result of the residents' loyalties to one or other of these groups. Word from the City's waste management service provider, PIKITUP, was that such dumping is illegal, yet it seemed to go on unaddressed by local governance or police.

The waste accumulation generated by the community was also a significant problem. The community leadership spoke of ongoing efforts to have the settlement serviced by PIKITUP, with mixed results. To this end, efforts had been made to demarcate specific areas where residents could deposit their household waste near the periphery of the settlement to facilitate pick up, again this effort had met mixed success. In a further effort, the residents and leadership were attempting to establish a coop system with local waste management. The settlement's de facto reality is widespread general litter and debris. That said, the majority of residents were observed to keep their shack and stand swept tidily (Fig. 4).



Fig. 4 Illegal dumping sites and waste accumulation within the Kya Sands community (photos by the authors, 09.2015)

3 Discussion on Findings

Throughout the workshop group members looked for existing strategies within the community as well as those relating to the human and natural systems within its suburban context. Integrated with this process, the research data were reflected on largely through methods of dialogue and debate (Sclavi 2003) around the community's assets and concerns/liabilities. At times, we felt that our input was not from a large enough body of the Kya Sands residents, and in particular were concerned whether we were hearing from the most vulnerable voices (largely women). Despite this, complex relationships within the water and waste systems emerged: on the one hand were the everyday health and wellness needs and on the other were livelihood efforts. It became clear that while the compromised state of the river's wetlands, as a result of illegal waste dumping, was inhibiting the natural filtration processes and worsening the effects of seasonal flooding and erosion; at the same time many of the residents eked out livings as a result of that dumping.

Also contributing to the erosion were the severely leaking community taps; however, at the same time these taps proved to build social capacity as public gathering spaces and provided adequate potable water. The erosion was further compounded by the lack of an overall drainage system for household grey water, urban waste water and storm water. This run-off impacts both the human (social and physical) and natural systems (slope and riparian) of the area. The residents have attempted to address this over time by digging channels down the steep slopes to the river. These channels were also used for disposing of household grey water and ineffectively to direct storm water. The building and maintenance of the channels (largely garbage cleanout) represented one of the residents' ongoing infrastructure efforts, which included a "formal" schedule assigning clean-up duties to residents living in the adjacent shacks. The observed results were mixed, on the one hand areas of standing putrid water were minimized, on the other the water from the settlement, and all that it carried with it, drained largely unfiltered into river. The issue of riverbank erosion, on the other hand, went largely unaddressed by the community members.

In its existing state, the river itself posed health risks to the community members, and it was perceived as spatially divisive. As discussed above, we found that it impacted both circulation and safety within Kya Sands and beyond. The residents justifiably stated that because the Kya Sand Spruit (North Riding Stream) has seasonal flooding and flash flooding events, their primary need was a safe and dependable way to cross this river. Beyond this localized need, we explored the potential relationship between the river and larger scale circulation. Findings showed that an informal trail system paralleled the river through the old landfill site connecting the settlement to the arterial route Malibongwe Drive and its taxi (bus) stand and that these trails were not only used by Kya Sands residents.

The waste dumping proved a difficult dichotomy. On the one hand, it provided building materials for the residents, consequently many of the dwellings showed a

much higher level of consolidation than seen in other informal settlements around Johannesburg. This in turn created a sense of identity through the creative reuse of these materials and a pride of place. Yet on the other hand, toxic fumes and thick smoke rose from the dumping sites day and night. Outsiders delivering the waste leave residents feeling vulnerable to crime. Rats were evident everywhere and carry disease. Wetlands were being filled in with rubble and thus make the community more vulnerable to flooding. And finally, the dumping has created a socio-economic hierarchy within the community that benefits the few who receive payments, at the health costs of the rest of the residents. On balance, this practice was viewed to be tearing apart at the social fabric of the settlement.

4 Response: Three Pragmatic Strategies

Infrastructure in its traditional form is an institutional ordering of the city that all too often widens the gap between the haves and the have-nots, in Johannesburg this further entrenches the city's tragic standing as the highest rate of inequality in the world (Harrison 2015). This type of infrastructural ordering is also all too often propelled by the notion that basic services should be driven by profit. In contrast to this, we began to give credence to a shifted notion of infrastructure, one viewed as a socio-technical assemblage reflecting how the city is used by its residents (Simone 2004; McFarlane 2011; Pieterse and Simone 2013) took on real meaning. As we walked Kya Sands's streets, paths and river; as we talked amongst the community leadership and residents we began to see how rethinking infrastructure could be a source of hope and an agent of empowerment in the hands of the everyday users, a dynamic seen in other local upgrading efforts (Kornienko 2017). And we began to see how it could make inroads to a more egalitarian connection between everyday life and infrastructure. To this end, we outlined three main strategies rooted in residents' existing everyday practices to improve their community (Fig. 5).

The first strategy is twofold, building a relationship with the City of Johannesburg in order to control the dumping of construction/hazardous waste in

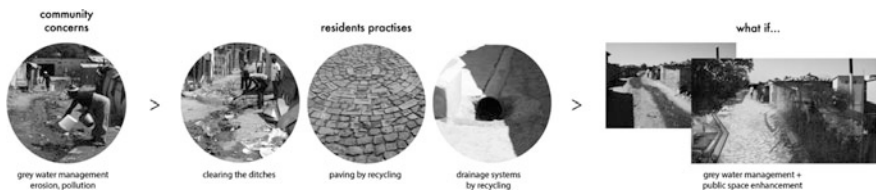


Fig. 5 Example of the proposed methodology: matching community concerns and existing resident practices to improve infrastructure and spatial quality setting locally fitted socio-ecological patterns (photos by the authors, 09.2015)

the settlement; and promoting the reuse and recycle practices of usable materials aiming at providing viable building blocks to the residents while at the same time reducing landfill waste. The reuse/resale of bricks, concrete rip-rap and other materials would in fact support two already existing community practices: the paving of streets and walkways in Kya Sands, thus improving both dignity and public health within the settlement; and the structural consolidation of dwellings, decreasing the residents' vulnerability to fire and major weather events.

The second strategy focuses on a system of drainage canals aimed at collecting water from leaking water tap, household grey water, urban run-off and storm events. These canals would gravity feed constructed wetlands able to filter pollutants from the water before it enters the river thus mimicking the functionality of the local but compromised natural systems. In addition, this strategy would support the residents' current practice of systematically cleaning the garbage from the ditches in front of the shacks. And finally, as the residents' relationship to the river improves, so too could their perception of the river's role and function within their community. Stokman (2013), as a visiting expert to the workshop, suggested that such a plan could be rolled out through systematic small pilot projects, initially with the main intent of illustrating an alternative principle and educating the stakeholders rather than "solving a problem".

The third strategy builds on Johannesburg's *Corridors of Freedom*, "the City of Johannesburg's spatial programme aimed at re-stitching Johannesburg into one united metropolis", thus moving away from patterns of fragmentation (CoJ 2016: par. 1); and on such work as Storie's (2014) proposal that Johannesburg's spatial development be directed by its natural form in an effort to heal the fragmented ecological networks. In line with this, is a system of linear parks that follow the river and stream systems in the Johannesburg region, explicitly linking local and citywide scales through eco-infrastructure networks. Again this supports local residents fledgling trail system. Critical to our strategy is her statement that "flood plain delineation in itself does not preclude development from taking place in these zones" (ibid: 143). Additionally, in support of the residents' appeals for a pedestrian bridge, the group mapped the commercial areas of the community and the predominant circulation routes in order to suggest a viable location for the construction of a bridge, which would in turn encourage business opportunities shaped by the understanding that as the foot traffic increases between local residential areas, schools and the adjacent industrial park all the parties would benefit.

These three socio-economic and ecological strategies combined would produce a networked system of interventions centred on the river. The regenerative open spaces would be a visible shift in spatial patterns at different scales: within the settlement, between Kya Sands and the adjacent neighbourhoods, and connecting the Kya Sands locale to the city at large. As such, it could become a robust civic armature for the settlement's gradual upgrading through the establishment of key partnerships between residents and other relevant stakeholders (Fig. 6).



Fig. 6 Map of strategic actions (elaboration by the authors, 09.2015)

5 Reflections: Expanding the Notions of Urban Infrastructure and the “Service”-Learning Paradigm

Undertaking the task of rethinking infrastructure meant investigating possible different and more holistic approaches to urban development, of which infrastructure is just one element; and at the same time asking what this could mean for in situ upgrading of informal settlements in South Africa. It could contribute to a shift away from the Country’s more typical paradigm of formalization: demolition and rebuilding or forced eviction and relocation (Huchzermeyer 2011). As testimony, Kya Sands’s residents live in a state of “limbo” having been told that they will be relocated (Qukula 2016). Such a shift could mean looking for a more progressive incremental framework for upgrading that is in line with both the Enhanced People’s Housing Process (EHPH) (DoHS 2009a) and the Upgrading of Informal Settlements Programme (UISP) (DoHS 2009b); neither of which to date have been applied to in situ upgrading in Johannesburg (Huchzermeyer et al. 2014).

It could also mean a shift in thinking about infrastructure, a shift away from top-down, large-scale, high-cost projects to a paradigm that includes multiple strategies from varying stakeholders and a greater sensitivity to the City’s fragile high veld (grassland) environment. Such an approach could combine “formal” and “informal” practices, something more akin to Simone’s (2004: 408) expanded notion of infrastructure “the ability of residents to engage complex combinations of objects, spaces, persons, and practices...[becoming] a platform providing for and reproducing life in the city”. In the context of Kya Sands, such an infrastructure shift could imply a multi-scalar approach to the involvement with the residents for understanding how these services are and could be supplied to and/or by them; a potential for which there is already policy in place, the EHPH “provides for a

process in which beneficiaries actively participate in decision-making over the housing process and housing product and make a contribution” (DoHS 2009a: 9).

Thus, rethinking infrastructure opens a needed reconsideration of the meaning of public/collective/commons as labels of shared values. From the bottom, investing in infrastructure could be a way to push for and provide de facto tenure security, while at the same time improving living conditions. From the top, allowing diverse upgrading dynamics and exploring community involvement for service provision could be a step towards more inclusive and efficient policies for rights recognition (both human and environmental). Implementing such aims would require a deep understanding of the community and a re-imagining of the way we think about infrastructure. Rather than mass utilities provided by the state, we turn towards the notion of service provision as an integral part of the human and natural systems of the site. It means reconsidering the residents’ role in determining the spatial configuration of the settlement, of various livelihood practices, of the character and quality of the community’s open spaces, and of the River’s seasonal flood patterns.

This shifted perspective of what infrastructure could be, led to exploring the capacities of existing informal efforts to become a platform for alternative infrastructure strategies. What are the existing practices in Kya Sands? And, while buy-in from the residents and grassroots efforts are put forward as the foundation for this approach, it is also critical to recognize the necessity of infrastructure support and/or partnering from the State. And here again, we can look to support from existing South African housing policy: “The main aim of the EPHP Programme is to deliver better human settlement outcomes (at household and at the community level) based on community contribution, partnerships and the leveraging of additional resources through partnerships” (DoHS 2009a: 13). Assuming an inclusive perspective towards informal processes could integrate physical operations on continuous infrastructural systems and neighbourhood spaces with informal/formal gradient patterns; and critically it could support sustainable implementation and stewardship (Gouverneur 2014; Frigerio 2015).

Lastly, in rethinking possible infrastructure for the informal community of Kya Sands, it is worth noting Adegun’s (2016: 214) contention rooted in his local long-term study:

careful assessment of the relationship between those living in informal settlements and green infrastructure — their interaction with natural ecosystems — should influence the approach to informal settlement interventions... It is only by considering and building on, rather than eliminating beneficial aspects of this relationship and interaction, that intervention in and for informal settlements can truly work towards principles related to justice for the disadvantaged and marginalised as well as a sustainable environment.

In line with this perspective, we tried to develop an inclusive attitude through the operations of urban metabolism (maintenance, substitution, transformation) to help in stabilizing and strengthening the existing positive physical and social assets in Kya Sands.

Also worth reflection, are two critical concerns which arose during the course of the workshop: first, did we adequately understanding the complex dynamics within

the community?; and second, who benefits from this workshop paradigm? We feel it is critical to raise these questions for in looking back at the Workshop process, it must be acknowledged that at times there were serious concerns of insufficient input from the community, that the power dynamics within the community itself and between the community and the local NGO were not well enough understood, and that there were residents who were not pleased by our presence. The very criticality lays in the vulnerability of the population involved, in the sensitive and often fragile relationships that exist amongst groups within that population and between that population and local government. As part of a short-term visiting research project, we must consider the very real potential to interfere with and damage those relationships, as well as the good will of the communities.

For the second concern, we draw on Oldfield's (2008: 270) work in South Africa with a similar service-learning/NGO/informal community structure (albeit a longer duration project) and her contention that: "As service-learning projects are premised on building relationships with communities and crossing university-community boundaries, this assumption [that communities benefit] calls for scrutiny". As she and others point out, and we observed, there is benefit to students learning first-hand the realities of socio-spatial inequality and the struggles of everyday life in such vulnerable populations (Butin 2003; Michell and Rautenbach 2005).

In addition, important relationships between academics, technocrats, city workers and shack dwellers were formed which helped to shed light on the dynamics of urban development at this very local level, and there is evidence that these relationships have carried forward to other unrelated projects. As to the benefit to the Kya Sands community, those residents who worked with us were welcomed into our group, listened to and appreciated for their local skills and knowledge; and the Workshop findings were presented to the community. In more general terms, it can be said that throughout this workshop process a city-community dichotomy emerged as a crucial issue when exploring alternative practices for urban infrastructure, and so we suggest there is a need for expanding this debate, as well as for "Re-imagining 'Service'" in this paradigm of service-learning (Oldfield 2008: 283).

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Eco-Incremental Housing: Researching Typologies and Systems in Pursuit of a Community-Based Approach to Housing Upgrades in Informal Contexts

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Abstract This paper examines the socio-spatial contexts of the Kya Sands informal settlement, documents existing housing typologies, and proposes in situ, user-focused housing designs. Through constituent interviews and field research, the designs aim to be responsive to resident desires, needs, and capacities. Goals for the project include a more efficient, in situ delivery system that allows residents to remain in their homes and customize their self-built structure. The research-design team, made up of faculty and students from Politecnico di Milano (Italy), Thomas Jefferson University (United States), the University of the Witwatersrand (South Africa), and City of Johannesburg planning officials, embraced the self-built ingenuity of residents in solving immediate design problems with local resources while recognizing the support government can provide. Following extensive research on the processes of incrementality, from tectonic to social and economic dynamics, the group developed incremental design solutions buildable by residents, to be supported by governmental intervention.

1 Introduction

Design solutions that more accurately reflect the in situ incremental processes of informality may provide a solution to the housing challenges plaguing South Africa. The right to “adequate housing” in South Africa is assured by the federal constitution, and “*The state must take reasonable legislative and other measures, within its available resources, to achieve the progressive realisation of this right.*” (Constitution of the Republic of South Africa 1996). Yet this ambitious right is an immense challenge the government struggles to realize. A 2013 government report suggests (Financial and Fiscal Commission 2013): “*South Africa has an estimated deficit of over two million housing units.*”

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Governmental interventions are hampered by the scale of demand, as well as on the ground complexities that conflict with written policy. While the government has achieved significant gains since the establishment of the Constitution in 1996, the challenge is currently overwhelming. The outcome is best summarized in a 2007 report, which states (Ovens et al. 2007): *“The current housing finance challenge in developing countries is a double one in the sense that adequate shelter which is built formally is often unaffordable, while informally built housing is affordable but often inadequate.”*

In the Kya Sands informal settlement on the periphery of Johannesburg, the overtaxed settlement of roughly 16,000 residents grows in an extralegal manner; with settlement residents building housing that is “affordable but often inadequate” (Weakley 2012). The result of government inaction is a bottom-up, in situ, incremental development process, where local residents take upon themselves the built environment challenges government does not. Residents are challenged with overcrowding, minimal sanitary infrastructure, and lack of material, social, and financial resources.

Homes are self-built, urban design, and maintenance is “ad hoc,” sparse existing governmental interventions such as portable toilets and water tap stands are managed by community members. Despite its lack of formal economy, government structure, and construction processes, the settlement endures and evolves through ground-up, incremental processes. This research examines the incremental housing methods found in Kya Sands and proposes in situ design solutions responsive to the informal processes of the settlement.

2 Intentions: Framing the Research

For 17 days in September, 2015, a collaborative research team including academics from the University of the Witwatersrand (South Africa), Politecnico di Milano (Italia), and Thomas Jefferson University (USA); City of Johannesburg government officials and urban design professionals collaborated with Kya Sands residents to examine the socioeconomic, cultural, and built contexts of the Kya Sands informal settlement.

The research teams were divided into five work streams examining infrastructure, housing, public spaces, alternative economies, and local governance. This paper documents the intentions, methods, findings, design proposal, and conclusions of the work stream titled *“Eco-Incremental Housing: Typologies and Systems for an Integrated Approach to Upgrading.”* The members of the Eco-Incremental Housing group were charged with (La Mantia 2018) *“detecting a series of housing typologies and relative incremental construction strategies... with the goal of identifying and supporting a process of incremental housing construction to be undertaken by local households through an enabling approach.”* The group examined these informal, incremental processes, particularly in the process of

housing development, and developed a housing design methodology that attempts to respond to the needs, desires, and capacities of local residents.

The primary intentions of the project were twofold. First, the group would conduct on-site resident-focused research on the processes of incrementality informing housing development in the settlement. Second, they would apply these findings to a design proposal reflective of an *in situ*, incremental housing solution. How do residents dwell in such contexts? How were their dwellings developed? How is housing constructed *in situ*? Using what materials and construction methods? What kinds of typological variation exist? Finally, how may we as designers develop improved incremental housing design concepts born of incremental processes, and responsive to the different users needs?

With this in mind, the group developed a series of structured goals for its research:

- To define “incrementality” relative to housing in Kya Sands
- To understand the varying and nuanced housing typologies in the informal settlement.
- To examine housing processes such as:
 - occupancy type (owner vs. renter)
 - builder
 - materials and methods
 - water, sanitation, and electrical infrastructure
 - adaptability and adaptation of dwelling over time
- To design a speculative, appropriate housing type responsive to resident desires, needs, and capacities.
- To design an *in situ* delivery system that allows residents to remain in their homes and customize their self-built structure.

3 Research Methods: Participatory Site Analysis in Informal Contexts

To respond to the task, the research was articulated through three main lenses:

Urban Spatial Conditions

In collaboration with local community representatives, the team examined varying spatial contexts in the settlement around circulation networks (primary, secondary and tertiary, vehicular and pedestrian). The research was conducted at multiple scales using varying media. At the broad scale, the team used Google Earth documents to examine growth in the settlement, studying patterns of formal circulation, and direction of growth. At the district scale, the team loosely mapped residential areas by hand, coming to understand less formal means of scale and circulation, and the relationship of residents to their urban environment. Through photo-documentation and sketching that led to digital collage (Fig. 1), the team



Fig. 1 Digital collage examining urban spatial contexts

examined spatial relationships of residences, shared outdoor spaces, and commercial corridors, coming to understand the spatial gradients from private to public condition. At the private scale, the team examined the relationship of users to their houses, including the indoor–outdoor relationships that shape daily life in the settlement. At the public scale, the team examined privacy boundaries, coming to understand the intricate layers of privacy that persist in high-density urban contexts.

Housing typologies and incremental processes of assembly

Next, the group examined typical housing typologies within each context. Photo-documenting entire subsets of neighborhoods, the team began to distill the range of housing types found in the settlement. While many varying types were found, four of the most common types were researched, including courtyard, street edge, “mixed use” (residences with commercial components), and “unique” anomalies (including multistory residences). Sketching the multiple variables associated with each type by hand, the group learned the tectonic methodologies and processes of construction; wall, roof, and opening assemblies; and access to infrastructure. Sketching also revealed the formal complexities of housing in such contexts, where clusters of one-room structures create private outdoor space for residents.

Qualitative Resident Interviews

Finally, the group conducted qualitative interviews with residents, studying residents rational for living in Kya Sands, whether they owned or rented the property, if the building is self-built, or built by others, and the manner in which the dwelling evolved over time. The group also examined the perspective of the residents regarding governmental intervention, inquiring on residents’ perspectives of local and city leadership, and whether they have been positively or negatively impacted by government housing policies. While these interviews were not quantitative surveys, they did provide the team with perspectives that would help shape the in situ design intentions of the process.

4 Research Findings: Understanding Users, Cataloging Typologies

An informal settlement is by nature in an ever-evolving process of incrementality, where from the ground up, there is a direct relationship between the user and the process: Buildings are self-built, economies are self-evolving, politics are self-informed, and spatial strategies are implemented by local constituents. Each informal settlement is different, with varying social, political, economic, and spatial forces shaping the pattern of development. In Kya Sands, the research group defined “incrementality” as *a method of development born of the opportunities and capabilities of local residents*.

Housing incrementality in Kya Sands is defined as a progression from less to more durable structures. A resident may build an initial home with no foundation, where walls and roofs are built from rigid or soft panels, such as salvaged plywood, road-signs, billboards, or plastic or fabric sheeting. Over time, the resident may accumulate bricks or other structural materials for walls, and may gather roofing tiles or corrugated metal sheets to improve roof durability. The materials are stored on site until, incrementally, users, friends, or local contractors may build one wall or portion of wall at a time. A durable structure with capacities protection from elements, increased security and ventilation, and proper sanitation, water, and power, may eventually emerge.

Formal government solutions to the development of proper housing sit in stark contrast to the incrementality found in Kya Sands. The South African government has thoughtfully researched, developed, and deployed multiple strategies of public housing in such settlements, but have yet to find a successful model. Research has found the government systems problems include corruption, improperly sized houses, poor materials, and lack of stakeholders’ involvement, to name a few (Manomano et al. 2016). On-site research corroborates these concerns.¹

Public and private urban landscapes shape resident’s relationship to their built environment. While many people in northern contexts spend the majority of their time indoors, and go outdoors as a supplement to daily life, the team found the opposite in Kya Sands. Residents spend the majority of their time outdoors, going indoors only when necessary. As a result, the gradient from public to private environments is meticulously managed. More public-facing residences may face primary and secondary circulation routes, while developing a small spatial boundary at the front door: a well swept stoop, or neatly maintained fenced garden. Residents may sit in the shade beneath a roof overhang or well-placed tree.

Public–private boundaries in Kya Sands are subtle in their materiality, yet strong in their spatial language. A well-positioned clothesline or pile of building materials

¹“Residents Perspective” Personal interview. 21 Sept. 2015.

keeps the general public at bay. In more private residences, a one-room residence at a street edge may have no windows on the public side, yet may open to the interior courtyard with an open door and window. Two single-room residences may form a relatively long, compressed, and narrow corridor that leads to such a courtyard. And even within the courtyard, the placement of doors and windows creates privacy edges, each maintained by individual residents while shared by the group.

In each housing typology found in the settlement, incrementality plays a significant role in the development of resident's homes. Related findings include a range of socio-spatial tectonics responsive to the user:

- *Housing type: Courtyard Residence*

Just off a major vehicular road through the settlement and along a pedestrian corridor, one finds a narrow passage (0.80 m) leading to a 3 m by 4 m courtyard shaded by a mango tree. In one of the five one-room residences that front the courtyard lives a single elderly woman. Three years ago, she moved from the northern border region of Venda, a five-hour drive from Johannesburg, to be closer to her adult children. Of her four neighbors, three are also from Venda. She sublets her single room and does not know the landlord. Her friendly neighbors are helping her build a slightly larger (3 m × 6 m) residence that also fronts the courtyard. The foundation and masonry walls are built with bricks and CMU block recovered from the dump. She is saving money to purchase corrugated metal roofing, windows, and doors. She will be moving from a dark, windowless structure built of plywood panels and tarped plastic roof to a more secure brick structure with corrugated metal roof, two windows, and locking door. There is a government-provided toilet in the courtyard and water stand in the pedestrian corridor.

- *Housing type: Street-edge Residence*

On a secondary, residential scale vehicular road sits a free-standing two-bedroom flat. The 20+year old woman and her child moved to the settlement from rural contexts. She studies at a college nearby and currently works in a retail shop. She took over the self-built plywood structure and has since rebuilt the front wall with brick masonry. She has started replacing the remaining perimeter walls, but waits for more funding and materials. The roof is corrugated metal with a large plastic tarp covering. She acknowledges the tarp is a fire hazard, but it is waterproof. She assures us she will not start a fire. Window and door openings are metal with glazing. There is a government-provided toilet at the rear of the house and running water inside.

- *Housing type: Storefront Residence*

On the primary vehicular route connecting the settlement entrance to the dump sits a storefront residence with three bedrooms in the rear. The "storefront" is a 2 m deep × 4 m wide space with multiple seating options around a small cooking fire.

A Mozambican woman, her close friend, and her daughter live in the residence. Neighbors suggest it is an informal *shebeen* (which she coyly denies for legal reasons). The woman moved here from Mozambique 10 years ago as the settlement was forming. She has relocated and rebuilt homes in the settlement multiple times following shack fires, among other reasons. The structure is built of scrap materials including plywood panel, framing lumber, plastic sheets, and plastic roofing tarp. There are no windows, doors are plywood sheets holes drilled for a chain lock. A government-provided toilet has been incorporated into the structure, and a water stand is found on the street edge nearby.

• *Housing type: 2-story/Anomalous Residence*

Atypical to the majority of the residential typologies, a two-story residence is found on a narrow pedestrian corridor. The 50-year old resident is a builder in the region and moved to Kya Sands for proximity to work. He built the structure himself. He used primarily building materials collected from the dump, including masonry blocks, windows, and doors, and corrugated metal roofing. A water stand is located in front, and public toilets are found beside the house (Fig. 2).

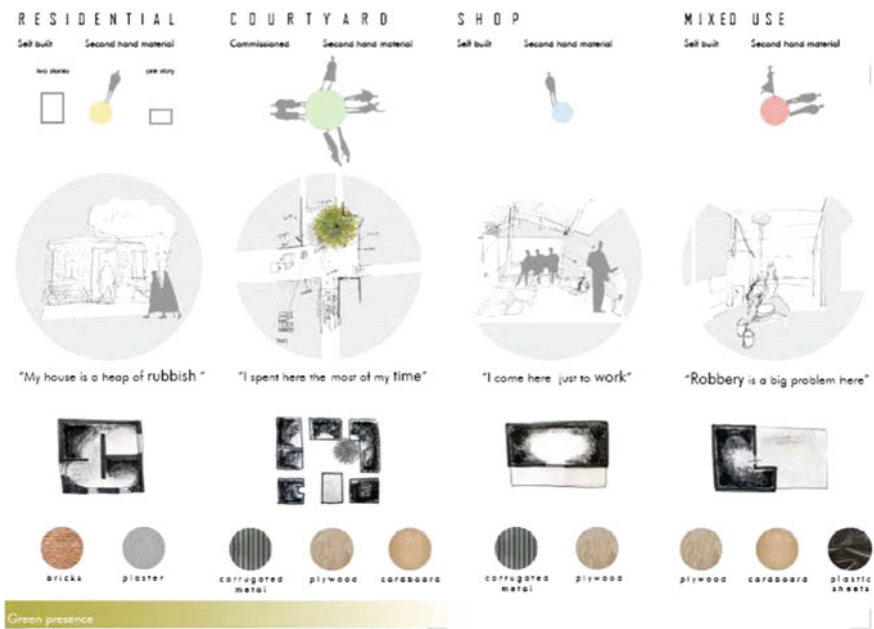


Fig. 2 Analysis of program, user experience, context, form, materiality, lighting, and outdoors space

5 Design Intentions: Understanding Scales, Types, Programs, and Tectonics

With respect to both residents' perspectives and governmental strategies,² the group used their research findings to develop a list of topical characteristics found in each housing type. The characteristics of housing incrementality naturally evolve over time, specific to tectonic, cultural, and economic contexts. In order to develop a design brief, the group had to first understand these processes and then determine a manner in which to proceed with a theoretical design proposal. The group also speculated upon the scale and role government may play in such interventions.

- Urban Spatial Typology and Size:
 - Courtyard residence (12 m²)
 - Street-edge residence (20 m²)
 - Storefront (12 m²)
 - Two-story residence (28 m²)
- Construction/tectonic type:
 - wall structure: plywood/ad hoc panel/brick/masonry
 - roof structure: plywood/plastic tarp-waterproof membrane, corrugated metal
 - openings: plywood door, metal doors, and windows
- Builder:
 - Self-built
 - Community built
 - Rental
 - Government
- Incrementality:
 - Newly built—full house construction, delayed by cost, material availability
 - Phased construction—delayed by cost, material availability
 - Government—delayed but service delivery, budget.

The group also reflected on the role government may play in any future interventions, including:

- Site and Services: Government develops site and provides infrastructural services
- Site, Services, and Materials: Similar to above, but also providing materials for construction
- Complete Development: Government develops site and builds dwelling.

²“Government Officials Perspective” Personal interview. 21 Sept. 2015.

Following the groups' research on the processes of housing incrementality (tectonic, social and economic), the group developed a proposed incremental design brief, reflective of local contexts, and in recognition of governmental intentions. From this brief, the group developed a single example housing type that serves residents and confronts incongruities in the current system. Rather than a top-down-type government strategy, the group proposed a sustainable, community supportive, self-built human settlement.

Aspects of the design brief include:

- *In situ development*: the design should allow residents to remain in their structure as new improvements are executed.
- *Context-responsive building scale*: The group examined typical housing size in the settlement, compared it to typical government housing size, and considered the needs of the individual with the civic needs of public space. 16.8 m² is determined to be the ideal residence size. Given the density of the settlement, this necessitates a two-story design scheme.
- *Incremental development*: The design proposal should be phased over time in response to user capacity and demand, and self-built by local citizens with governmental oversight.
- *User comfort and environmental performance*: The design should increase daylighting and ventilation in the residence while capturing rainwater for use in washing, at minimum, or potable water with filtration.
- *Infrastructure and services*: The design should provide infrastructure for running water and dedicated toilet and bathing facilities.
- *Healthy building assemblies*: The design should reduce flammable materials and exposure to toxic materials, replacing such with masonry, masonry-reinforced concrete, metal windows, doors and roofs, and other such non-toxic materials.
- *Incremental adaptability*: The design should allow long-term modification by the user, including additions necessitated by increased family size and rental opportunity.
- *Culturally responsive/individually adaptive*: The design should allow for modification by the user, including cultural expression (Fig. 2).

6 Design Methods: Typology, Materials, and Design

Over the course of ten days, the design team worked in an off-site studio, distilling research outcomes into emerging design concepts for in situ housing development. This process was challenging, as altruistic students and pragmatic, policy-rich Johannesburg city officials often disagreed on appropriate design goals. Challenges the group considered included issues of “adequacy,” such as the appropriateness of shared bedrooms, shared washing and toilet facilities, the square meterage of housing, and general tolerances of users. Most challenging, perhaps, was the

challenge of in situ construction, where residents would remain on site while new housing was developed around or above them.

In pursuit of genuinely responsive design methodologies, the team returned to the site to review these concepts with community participants who shared insights into on-site realities. User standards of “adequacy” in such contexts often differ greatly from what a government official may consider appropriate. These types of discussions were applied to the design proposals, which were then revised and presented to the community at a final community presentation on site.

Considering these design methods, the group chose a courtyard housing cluster as a typology to develop. The courtyard was the most common of the researched types found, and most users appreciated the type for its controlled entry and private outdoor space. As established in the brief and in recognition of the settlement density, a two-story courtyard structure was chosen to be developed, with the goal of in situ development, built by local builders and users, that would increase “adequacy” at relatively the same degree of expenditure as a government built structure. Aspects of the design concept include:

- *Stair and Sanitation Module*

The first step in the design proposal is a prefabricated stair and sanitation module. The module could be fabricated in steel and wood by local craftspeople, or by more formalized industry funded by government. The module can be installed adjacent an existent dwelling, or form the basis of new construction. It includes a small toilet chamber, at staircase to a future second floor.

- *Structural Frame + Second-Floor Construction*

The second step in the design intervention is a new structural frame and ring-beam, surrounding an existing dwelling, and forming the frame for a second-floor deck, while allowing an existing residence to remain intact. Incrementally, second-floor construction can begin while first-floor residents remain in situ.

- *First-Floor Renovation*

After the second-floor construction is complete, the first-floor residents could move upstairs. At that time, the first-floor assemblies could be replaced as materials become available. Corrugated metal roofing and metal windows and doors complete the formal structure. Clerestory windows provide security and ventilation. Rainwater is harvested from the single pitch roof. Upon completion, residents would achieve a suitable residence of 16.8 m² with individualized sanitary services and sustainable building performance.

This adaptable design concept is one that could be employed by residents, local builders, or city professionals, and incrementally evolves over time as material and labor resources allow (Fig. 3).



Fig. 3 Plan studies of existing (*left*) and proposed (*right*) courtyard evolution

7 Reflections on the Experience and Design Outcomes

Working directly with residents revealed unanticipated complexities of life in an informal settlement. Through close observation, the team observed a functioning, highly efficient system; yet a system utterly challenged by external forces including resource availability, population growth, and the tenuous relationship between the informal individual and the government. Collaborating with community members in their homes and urban environment, students and tutors alike were struck by the ingenuity of builders and resilience of residents, and the utterly direct relationship between contextual problem and design solution. The team learned that residents in such contexts do work to maintain their built environment, most often in the best way possible. Walking streets are clean, front stoops are tidy, and homes are maintained. The outcomes of this urban maintenance may be unfamiliar to people accustomed to more developed contexts, but the human behavioral processes are similar. Thus, as designers, the team no doubt learned the challenges of designing in such a context, where their design process requires a similar degree of adaptability and ingenuity to the users they serve.

Working in a collaborative and diverse design team brought an insightful perspective to the design collaboration. Design students were struck by the diligence and good intentions of the City of Johannesburg officials, and any preconceptions about governmental malaise or indifference to the challenge of informal settlements were quickly dispelled. The officials brought the perspective of scale to the conversation, asking “*While initial design solutions may work successfully in one context, could they apply to others? Could the design solution scale to a national policy?*” Meanwhile, the designers in the group were challenged by the uncertain of the role of the architect in these processes, for example, how does an outside designer engage when so much of the housing stock is self-built?

The government officials in the group were impressed by the diligence of the designer to research thoroughly the context before developing a design solution and

came to understand the value of rich user-engagement in the process of housing informality. While government officials were well versed in policy and strategy at the city or national scale, the opportunity to deeply engage local residents and discuss their perspectives one to one was a meaningful experience for each party. For the officials, the energetic designers also revealed new perspectives around design alternatives.

This research's outcomes examined, relatively exclusively, the perspective of Kya Sands residents and the contexts in which they dwell. It found residents very latently frustrated with their living condition. On the ground, residents struggle with security, uncertainty of the longevity of their housing, and housing inadequacy. More philosophically, they struggle to understand the government plays in their lives, both positively and negatively; and genuinely, their place in the world. Life in informality is a life indeterminate, and the emotional toll this indeterminacy plays in one's life is significant (Fig. 4).

Focusing on incremental design, the goal was to merge an in situ approach with what in the future may be a part of (Ovens et al. 2007) *“a paradigmatic shift on urban land use needs to be defined that will frame the various reforms that are required to make urban land work better for the poor. This should include both a value-based position, an understanding of what tools are available to manage land differently and an empirically informed understanding of the status quo.”* The group did not examine government housing data, this project goal was not a comparative study, but a research on methods and approaches for innovating the field of housing in formal areas upgrading in South Africa. In this perspective, the research examined issues on the ground and developed a ground-up approach.



Fig. 4 In situ interviews with Kya Sands residents

Suggested further research might compare detailed construction strategies and costs of government housing models, considering skilled and unskilled labor, site-specific materiality, seeking nexus points between these variables and the skill sets of local residents. A model may be set into place that capitalizes on local capacities, develops residents' satisfaction and government strategies, and delivers culturally appropriate and responsive housing at a satisfactory cost to the local and national governments.

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Appendix

Workshop Organization, Participants and Final Boards of the Work-Streams Groups



Concept Development, Organization and Management

Costanza La Mantia, *University of the Witwatersrand, Johannesburg, South Africa*

Paola Bellaviti, *Politecnico di Milano, Milan, Italy*

Organizational support and Logistic assistance

Paola Piscitelli, *Università IUAV di Venezia, Venice, Italy*

Partnering Organizations

Department of Architecture and Urban Studies—DAStU / Laboratory of International Cooperation, *Politecnico di Milano, Milan, Italy*

Centre for Urbanism and Built Environment Studies—CUBES, *University of the Witwatersrand, Johannesburg, South Africa*

South African Research Chair in Spatial Analysis and City Planning—SARChi, *University of the Witwatersrand, Johannesburg, South Africa*

Wits City Institute—WCI, *University of the Witwatersrand, Johannesburg, South Africa*

Integrated Urbanism and Sustainable Design *University of Stuttgart and Ain Shams University (Cairo)*

Judah Africa NPO

Experts/Guest Speakers

1st Seminars Session

Phil Harrison, *University of the Witwatersrand*

Marie Huchzermeyer *University of the Witwatersrand*

Alex Wafer, *University of the Witwatersrand*

Monty Narsoo, *Governance Consultant to the South African National Department of Human Settlement (NDHS)*

Alessandro Frigerio, *Politecnico di Milano*

Muyiwa Adegun, *University of Witwatersrand*

Carla-Lee Kamp, *Judah Africa NPO*

2nd Seminars Session

Costanza La Mantia and Garret Ganter, *University of the Witwatersrand, Bantu Design and Research*

Christopher Harnish, *Philadelphia University*

Antje Stokman, *Stuttgart University*

Mohamed Salheen, *Ain Shams University (Cairo)*

Roberto Rocco, *Technical University Delft*

Marianella Sclavi, *Politecnico di Milano* (Fig. A.1).



Fig. A.1 Tutors of the Workshop at University of the Witwatersrand

Work-Streams Group Composition

WS1—Rethinking Infrastructure:

Expert Tutors:

Kristen Kornienko, *University of the Witwatersrand*

Alessandro Frigerio, *Politecnico di Milano*

Antje Stokman (support), *Stuttgart University*

Co-Tutors:

Muyiwa Adegun, *University of the Witwatersrand*

Nomsa Mahanyele, *Resident and Representative from the Kya Sands community*

Participants:

Sara Maani, Tatyana Perkova, *Politecnico di Milano*

Seiko Manyaka, Thandlwenkosi Mthembu, *University of the Witwatersrand*

Nkosiyezwe Lafulela, *City of Johannesburg*

WS2—Eco-incremental Housing:

Expert Tutors:

Christopher Harnish, *Philadelphia University*

Gian Luca Brunetti, *Politecnico di Milano*

Co-Tutors:

Diane Harvanitakis, *South African National Department of Housing (DHS)*

Participants:

Philemon Papi Buthelezi, Lawrence Chuene Koinate, *City of Johannesburg*

Alessia Guardo, *Università di Catania, Italy*

Anna Orlando, *Politecnico di Genova, Italy*

Thomas Svaldi, *Università di Trento, Italy*

WS3—Place Making:**Expert Tutors:**

Costanza La Mantia, *University of the Witwatersrand, Bantu Design and Research*

Paola Bellaviti, *Politecnico di Milano*

Co-Tutors:

Jhono Bennet, *University of Johannesburg; ItoI—Agency of Engagement*

Participants:

Bethany Mann, *University of New South Wales*

Ester Nakibuuka, *Kampala Capital City Authority*

Claudia Taurini, *Politecnico di Milano*

Alberto Collet, *Università IUAV di Venezia, Italy*

WS4—Designing the Engine of Development:**Expert Tutors:**

Garret Gantner, *University of the Witwatersrand; Bantu Design and Research*

Monty Narsoo, *Governance Consultant to the South African National Department of Human Settlement (NDHS)*

Mohamed Salheen (support), *Ain Shams University (Cairo)*

Co-Tutors:

Blanca Calvo, *CORK/South African Shack Dwellers International Alliance; I to I—Agency of Engagement*

Motebang Matsela, *University of Johannesburg*

Participants:

Flavia Cataldi, *Politecnico di Milano*

Arianna Ponzi, *Università La Sapienza di Roma, Italy*

Olusegun Ogunleye, *University College London*

WS5—Governance for Collaborative Upgrading: Expert Tutors:

Roberto Rocco, *Technical University Delft*
Marianella Sclavi, *Politecnico di Milano*

Co-Tutors:

Paola Piscitelli, *Università IUAV di Venezia, Italy*
Thabo Moutang, *Resident and Youth Leader from the Kya Sands community*

connecting the city
water: fresh water sources + grey water discharge

river
rain
drinking
grey
black

protect
conserve
use
remediate
re-use
recharge

recycling centre
bridge
grey water management
sewage treatment
waste management centre

ecological corridor of freedom
river park, cycle path, wetlands
protection and erosion prevention

ecological renovation

imagining joburg's riparian system...

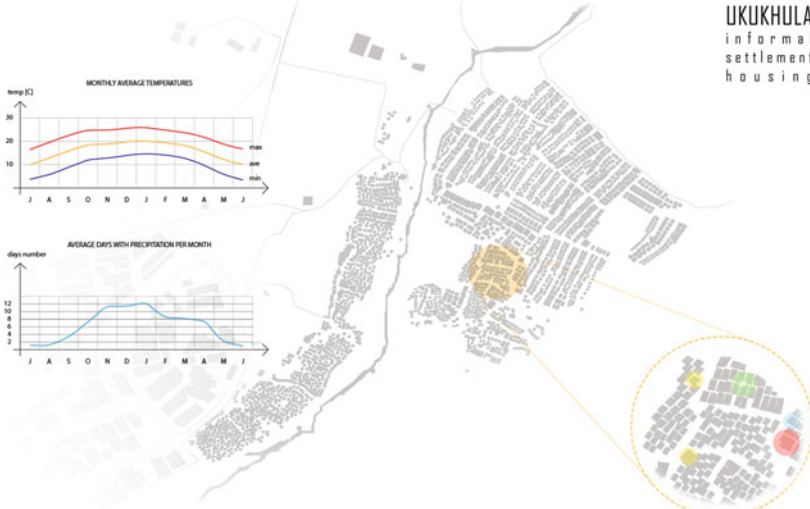
connecting the city's people, fragments and attractions through inclusive circulation systems buses, walking and biking trails

connecting the city
corridors of freedom + eco corridors

water/waste



UKUKHULA
informal
settlement
housing



RESIDENTIAL

Self built Second hand material



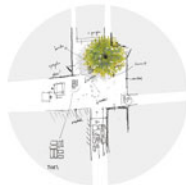
"My house is a heap of rubbish"



bricks plaster

COURTYARD

Commissioned Second hand material



"I spent here the most of my time"



corrugated metal plywood cardboard

SHOP

Self built Second hand material



"I come here just to work"



corrugated metal plywood

MIXED USE

Self built Second hand material

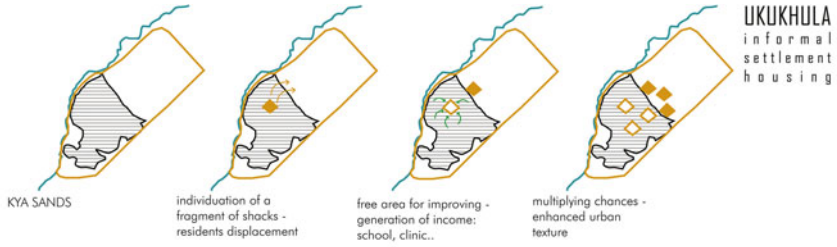


"Robbery is a big problem here"

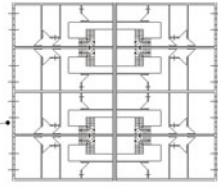
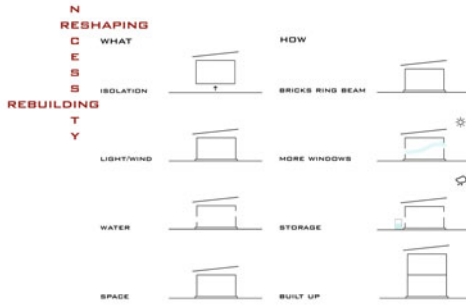


plywood cardboard plastic sheets

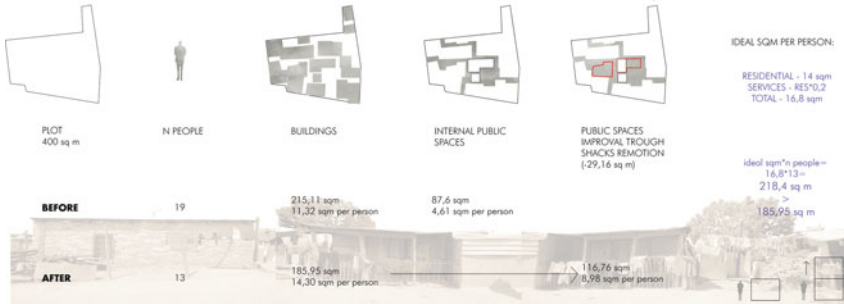
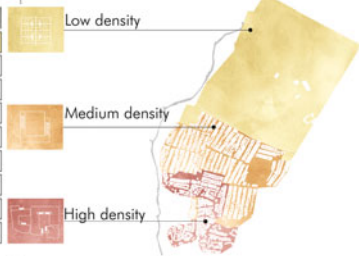
Green presence



UKUKHULA
informal
settlement
housing



masterplanning	incrementability --> services/infills (schools, hospitals, public space)		
density	High density (1.x)	Medium density (1.x)	Low density (1.x)
builder	self	paid builder	government
site location	in situ/incremental	in situ/substitution	green field
type-function	residential + shop	residential	residential
type	courtyard	linear	new terraced houses
services	TBD: transitional strategies		individual service
materiality	TBD: transitional strategies		compliant formality
opportunity	builder/paid		rental
impact	TBD	TBD	TBD



UKUKHULA informal settlement housing

space implementation through selected shacks removal

FUNCTIONAL ANALYSIS
shops residential

MATERIAL ANALYSIS
bricks metal and cardboard

CONCEPTUAL STRATEGY

PLAN STUDIES
study of the visual field within the courtyard
Visual Field

PLAN of the existing shacks
TOP VIEW of the existing shacks

SECTION of the existing one storey courtyard
SECTION of the two storey courtyard

PLAN of the ground floor in the new configuration
PLAN of the first floor in the new configuration
TOP VIEW of the new configuration

study of vehicular and pedestrian fluxes
Possible just by people
Possible by cars
Possible by trucks

PHASE I actual situation
PHASE II positioning of the stair and sanitation module either near a metal cardboard shack or a brick one
PHASE III construction of the second floor over the brick one

STAIR AND SANITATION MODULE FOR SHACKS UPGRADE
Proposed stairway
Proposed sanitation
Proposed second floor

study of people distribution in the courtyard
Private configuration
Public configuration

internal views and suggestions of the courtyard
exploded view drawing of the staircase and sanitation module
Public area for people to meet and relax

references

FRAMEWORK

What is

PUBLIC SPACE

What does PUBLIC SPACE allow?

COMMON

SHARED

SEMI-PUBLIC

PARTNERSHIP

INDIVIDUAL

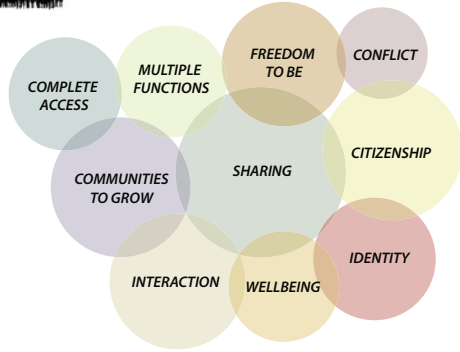
Mapping



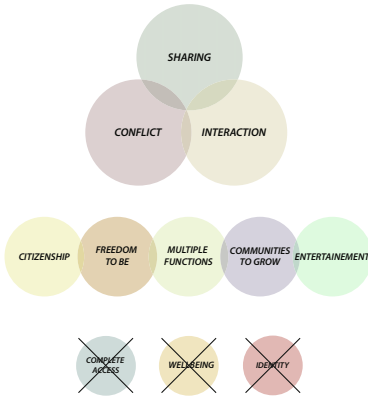
Analysing



Talking



What the Community answered



WHERE DO YOU SPEND TIME WITH YOUR FRIENDS?	WHERE DO YOUR CHILDREN PLAY?	WHERE DO YOU MEET FOR COMMUNITY EVENTS?
<p>"We don't have friends here. We go outside the Sands just to get our baked products"</p> <p>"My friends are in my hometown. I'm busy just to work for my children. I don't have time to hang out"</p> <p>"I don't hang out very much. I'm a father and I prefer to stay at home with my children. If I want to see my friends I go to Montecasinos"</p> <p>"Sometimes during the week I go to a park in the South. And over the weekend I go to CosmoCity"</p> <p>"I meet my friends in their houses. I don't feel safe here at night"</p>	<p>"Our friends with children let them play near the house and sometimes they take them to Woodbourne"</p> <p>"In the house or near it. I keep them where I can see them"</p> <p>"They stay at home with their mother"</p> <p>"They play near the house and sometimes at our friends house and at school"</p> <p>"I don't want my children to grow up in such a place. I see other people's children playing in the streets and in garbage areas"</p>	<p>"We usually go the Community Center (gymnasium)"</p> <p>"At the Community Center"</p> <p>"We meet at the football pitch and have many football matches"</p> <p>"We meet at the Community Center"</p> <p>"At the football field"</p>



OBSERVATIONS macro conditions



- shopping
- water based
- drinking
- gardening
- clothes washing / drying
- playing
- talking
- smoking
- meeting
- sorting
- eating
- hair styling
- gathering
- sitting
- access points
- kindergarten
- primary roads
- secondary roads
- main roads
- taxi stops
- soccer
- activity nodes

micro conditions



STRATEGY



INTERFACE SPACES
Where different publics meet

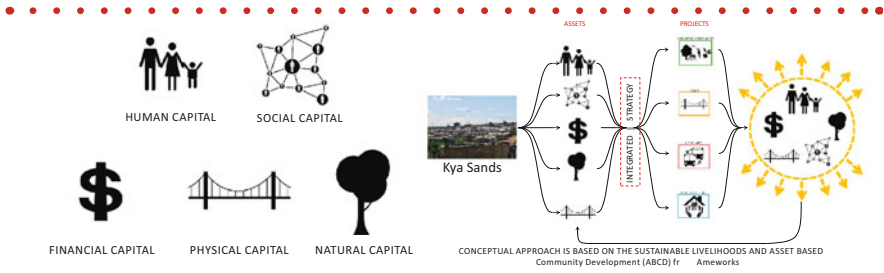






















COMMON SPACES
Where people of Kya Sands share space equally



NODE SPACES
Where people share space around business or other activities



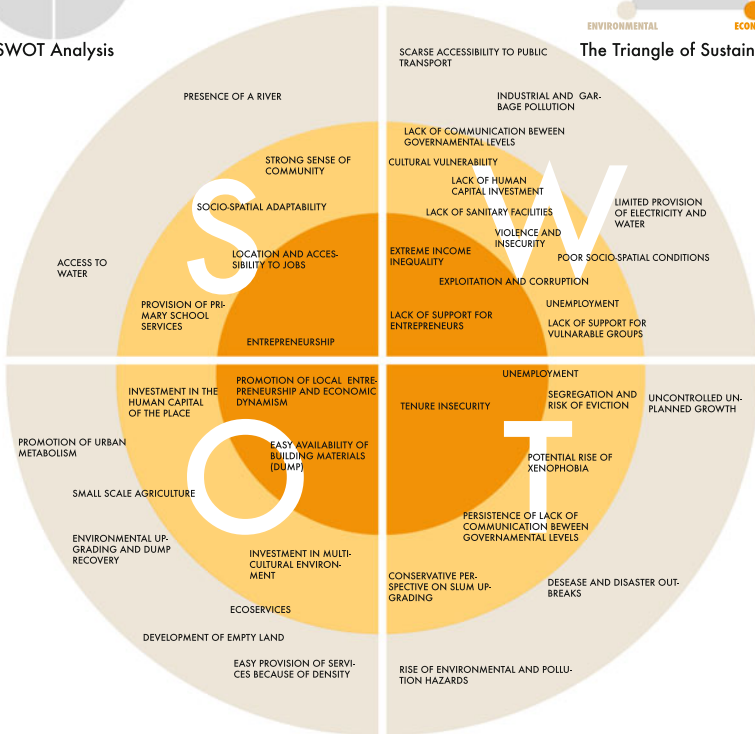


PROJECT	PRIORITY	STAKEHOLDERS
<p>PARK/MARKET/PUBLIC SPACES</p> 	<p>SHORT TERM MEDIUM TERM LONG TERM</p>	<ul style="list-style-type: none">  GOVERNMENT <ul style="list-style-type: none"> CITY PARKS DEPARTMENT OF SMALL BUSINESS DEVELOPMENT JDA EPWP CWP  COMMUNITY <ul style="list-style-type: none"> COMMUNITY LEADERS PUBLIC  NGO/CBO <ul style="list-style-type: none"> JUDAH AFRICA ETC.  UNIONS <ul style="list-style-type: none"> ACHIB ETC.
.....		
<p>BRIDGE</p> 	<p>SHORT TERM MEDIUM TERM LONG TERM</p>	<ul style="list-style-type: none">  GOVERNMENT <ul style="list-style-type: none"> JRA PUBLIC WORKS JDA EPWP CWP  COMMUNITY <ul style="list-style-type: none"> COMMUNITY LEADERS PUBLIC (SKILLED ARTISANS)  NGO/CBO <ul style="list-style-type: none"> VOLUNTEER TO PROVIDE TECHNICAL EXPERTISE
.....		
<p>INTERCHANGE</p> 	<p>SHORT TERM MEDIUM TERM LONG TERM</p>	<ul style="list-style-type: none">  GOVERNMENT <ul style="list-style-type: none"> JRA PUBLIC WORKS JDA JOZI @ WORKS  COMMUNITY <ul style="list-style-type: none"> COMMUNITY LEADERS PUBLIC  TAXI ASSOCIATIONS <ul style="list-style-type: none"> TAXI ASSOCIATIONS  UNIONS <ul style="list-style-type: none"> THE SOUTH AFRICAN TRANSPORT
.....		
<p>MULTI-PURPOSE CENTRE</p> 	<p>SHORT TERM MEDIUM TERM LONG TERM</p>	<ul style="list-style-type: none">  GOVERNMENT <ul style="list-style-type: none"> JOHANNESBURG CITY POWER CITY PARKS DEPARTMENT OF SMALL BUSINESS DEVELOPMENT JDA EPWP CWP  COMMUNITY <ul style="list-style-type: none"> COMMUNITY LEADERS PUBLIC  TELE-COMMUNICATION <ul style="list-style-type: none"> INTERNET CONNECTIVITY  NGO/CBO <ul style="list-style-type: none"> JUDAH AFRICA  PRIVATE SECTOR <ul style="list-style-type: none"> SOURROUNDING INDUSTRIES ETC.

STRATEGIES

	<p>Management of parks and public open spaces Environmental conservation and maintenance Supports development of small scale businesses Facilitate area-based developments</p>	<ul style="list-style-type: none"> o Recycling • Color coded bins • At the market • Houses • Possible rank • Implemented by cooperative • Skills on job training o Communication • Joint project steering comity (community and government) o Waste water • Recycle waste water for vegetable gardens • Skills on job training
<hr style="border: 1px dashed red;"/>		
	<p>Skills development</p>	
	<p>Community based employment to supplement livelihood strategies Conceptualisation Implementation maintenance</p>	
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	<p>Construction and/or maintenance of roads Public Works</p>	<ul style="list-style-type: none"> o Recycling • Use recycled material from the dump • Skills on job training
	<p>Community based employment to supplement livelihood strategies Conceptualisation, Implementation, Maintenance</p>	
	<p>Conceptualisation, Planning, Design, Implementation coordination</p>	
<hr style="border: 1px dashed red;"/>		
	<p>Construction and/or maintenance of roads Public Works</p>	<ul style="list-style-type: none"> o Taxi facility • To be improved based on need and desirability • Land mark structure • Allocate land area for the taxi facility o Recycling • Marked bins • Implemented by cooperative • Skills on job training o Entrepreneurship • Locate in Interchange area uses incompatible with housing • Market driven • Skills on job training
	<p>Community based employment to supplement livelihood strategies Conceptualisation, Implementation, maintenance</p>	
	<p>Department of Transport: The Department of Transport is responsible for regulation of Transportation in South Africa, that is, public transport, rail transportation, civil aviation, shipping, freight and motor vehicles The South African Transport and Allied Workers Union, SATAWU.</p>	
<hr style="border: 1px dashed red;"/>		
	<p>Management of parks and public open spaces Environmental conservation and maintenance Supports development of small scale businesses Facilitate area-based developments</p>	<ul style="list-style-type: none"> o Supply • Electricity • Internet • Secure building • IT lab • Post office • Network providers o Recycling • Color coded bins • Implemented by cooperative • Skills on job training
	<p>Skills development</p>	
	<p>Connect electricity to the centre. Law allows connection to the edge if informal centre is not proclaimed.</p>	
	<p>Job opportunities Financial aid Donations Community support programs</p>	

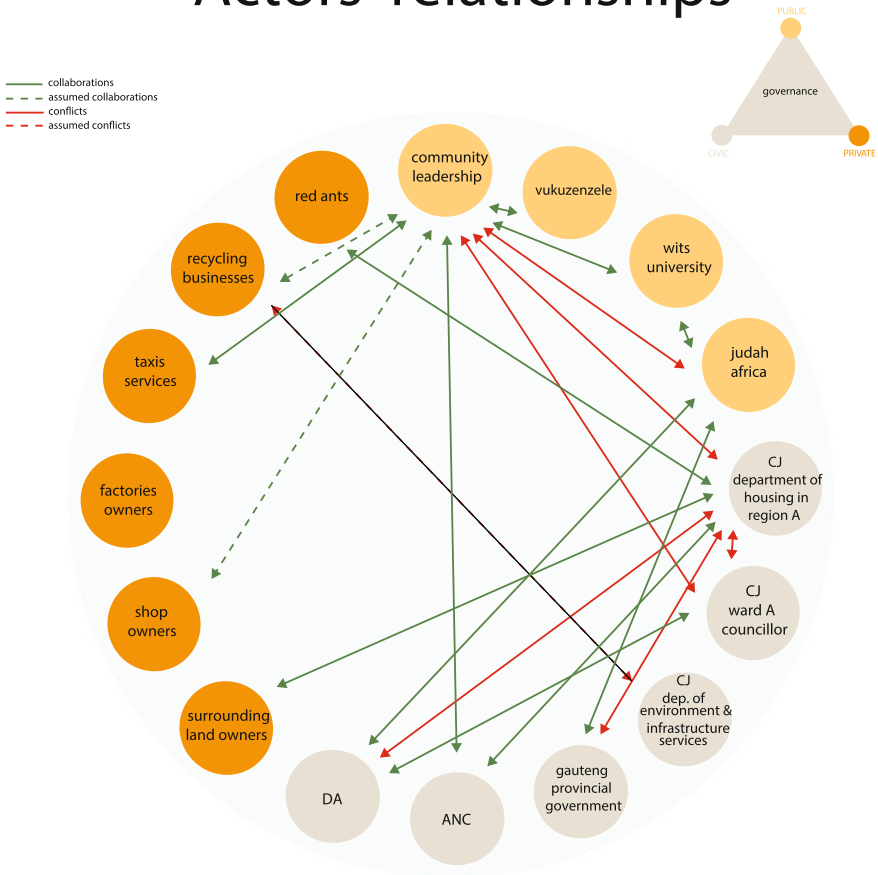
Challenges & Opportunities for Kya Sands



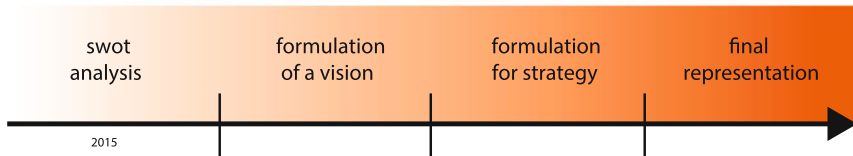
Crucial Objectives

- Environmental Management and Urban Metabolism Approach
- Investment in Social Infrastructures for Human Capital Development
 - Addressing Tenure and Ownership Issues
- Addressing Issues of Leadership, Governance and Coordination of Actions
 - Tackling the Needs of Minorities and Vulnerable Groups
- Tackling Physical infrastructural Challenges Permanently (water, sewage, electricity and mobility)

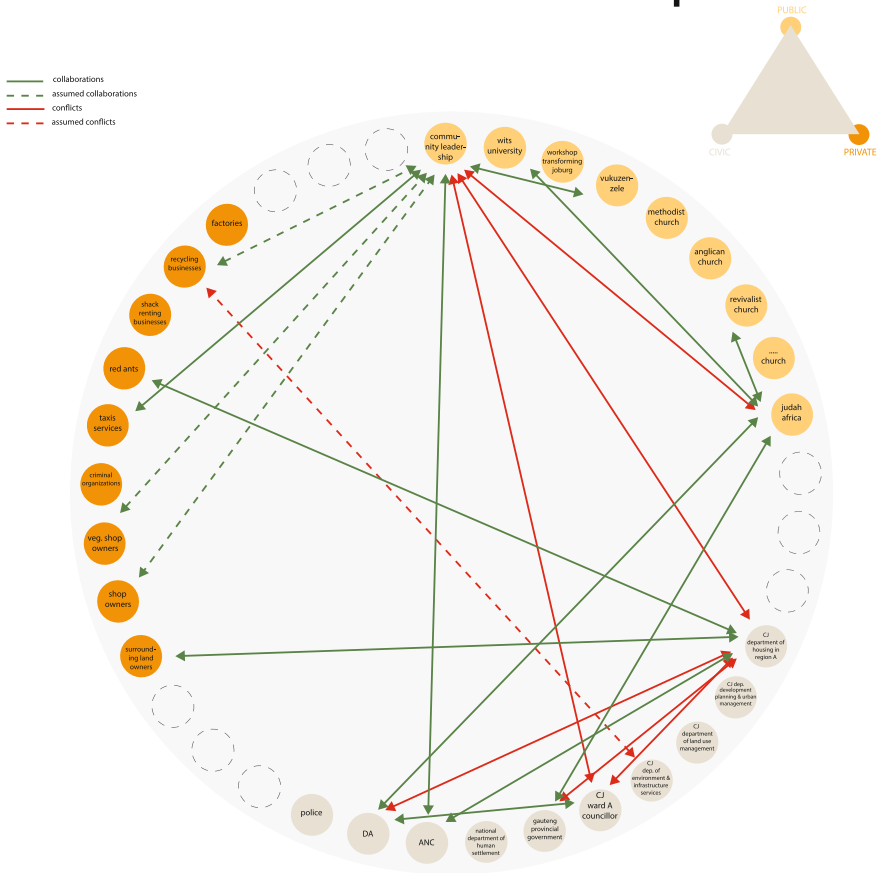
Kya Sands Actors' relationships



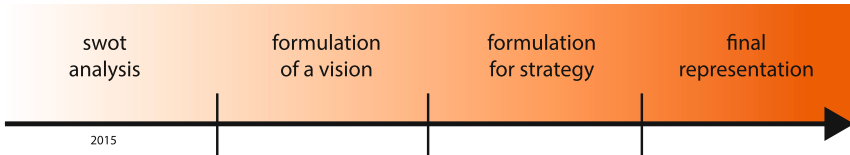
Action timeline



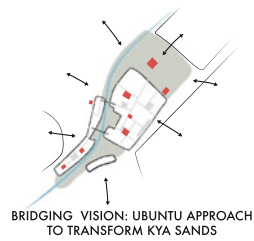
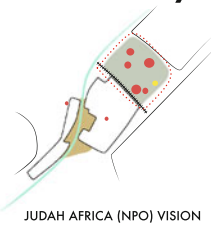
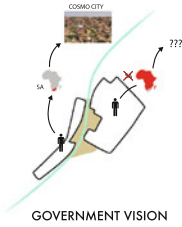
Kya Sands Actors' relationships



Action timeline



Scenarios for Kya Sands



STANDARDIZE PROCEDURE:

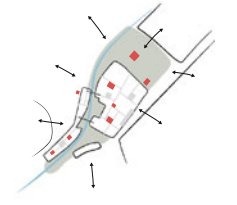
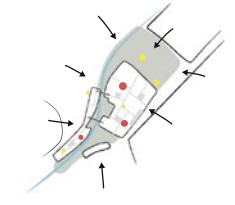
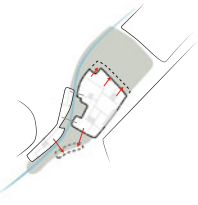
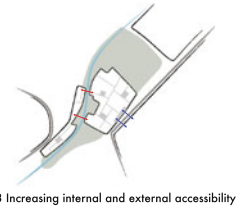
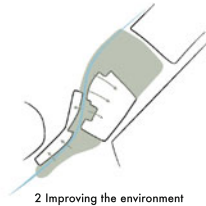
- RELOCATION
- EVICTION OF UNDOCUMENTED PEOPLE
- PROVISION OF RDP HOUSING FOR SOUTH AFRICANS

A SUCCESSFUL FLAGSHIP FOR A SOCIAL ECONOMIC DEVELOPMENT THROUGH 5 MAIN PROJECTS:

- SCHOOL
- CLINIC
- COMMUNITY AND MULTI-PURPOSE CENTER
- AGRICULTURE
- ORPHANAGE

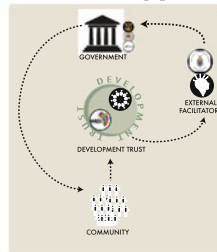
A PARTICIPATORY APPROACH WHICH TRIES TO UPGRADE THE INTERVENTIONS ALREADY DONE IN THE SETTLEMENT IN A SUSTAINABLE WAY IN ORDER TO CONNECT KYA SANDS ON A LOCAL AND REGIONAL SCALE

6 steps for a participatory development in Kya Sands



Governance strategy












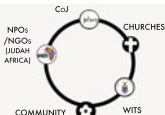
- 1 ESTABLISHMENT OF A STEER COMMITTEE FORMED BY ALL THE STAKEHOLDERS AND OF A DEVELOPMENT TRUST FOR K.S. INFORMAL SETTLEMENT
- 2 COORDINATION AND FACILITATION OF THE PROCESS LED BY EXTERNAL IMPARTIAL SUBJECTS
- 3 SET UP OF A PILOT PROJECT FOR KYA SANDS INFORMAL SETTLEMENT



Objectives

Actions

Stakeholders

<p>1</p> 	<p>Declare Kya Sands a Special Transitional Residential Zone</p>	<ul style="list-style-type: none"> changing the current zoning of Kya Sands developing a flagship project for the strategic spatial development of Johannesburg (livability, sustainability and resilience) setting up an impartial organizing structure 	<p>by Action</p> <p>City of Johannesburg (CoJ)</p> <p>CoJ, Gauteng Dep. of Human Settlements, Community Leaders, NPOs/NGOs</p> <p>Urban Community Facilitors, University, CoJ</p>	<p>Main Actors</p> 
<p>2</p> 	<p>Participatory environmental regeneration</p>	<ul style="list-style-type: none"> reclaiming of the dumping sites cleaning up the river and the wetland creating a green belt along the river within the larger water systems providing sustainable grey water management generation of blue and green economies 	<p>Pikitup (Municipal Entity)</p> <p>CoJ Dept. Of Environmental Management and National Dept. of Water and Sanitation [Jane Eagle]</p> <p>Mayor, CoJ Dept. of Economic Development, Community Leaders, NPOs/NGOs</p>	
<p>3</p> 	<p>Improve connectivity and accessibility in the settlement, with its surroundings and the city at large</p>	<ul style="list-style-type: none"> improving the quality and accessibility of the streets inside the area (street lighting, pavement) connecting the area to the surroundings and the city through an affordable, integrated and sustainable transport systems constructing bridges to safely cross the river 	<p>CoJ Road Agency and Provincial Dept. Of Human Settlements</p> <p>CoJ Transport Departments and Provincial Transport Departments</p> <p>CoJ Environment and Infrastructure Service</p> <p>Urban Development Settlement, Grant</p> <p>Urban Development Settlement, Grant</p> <p>Urban Development Settlement, Grant</p>	
<p>4</p> 	<p>Provide multiple options for incremental housing and improvement of housing conditions</p>	<ul style="list-style-type: none"> providing water and sanitation to the settlement decreasing the density in the congested parts of the urban fabric self-built upgrading of the houses (self-managed, technically supported, economically supported) enabling the construction of single-storey housing units (mixed-use and residential typologies) 	<p>CoJ Environment & Infrastructure Service, Natl. Dep. of Water & Sanitation</p> <p>CoJ Development Planning and Urban Management, Comm. Stakeholders</p> <p>Provincial Dept. of Human Settlements and Community</p> <p>Provincial Dept. Of Human Settlements, Community, NPOs and NGOs</p>	
<p>5</p> 	<p>Establish attractive social facilities and public spaces</p>	<ul style="list-style-type: none"> strengthening and complementing the common spaces and services network within the settlement constructing a multi-functional and attractive community center, services, facilities (sports facilities, community kitchen, sustainable ablution facilities, playgrounds and cultural spaces) set up a system of urban agriculture initiatives and provide common gardens for the community creating spaces of interface between the different publics of the area providing high-level multifunctional public facilities for the whole area (starting from a clinic and a school) establishing empowerment programs for vulnerable groups 	<p>Urban Designers , Community, City Parks, Community Leaders, NPOs and NGOs</p> <p>Urban Designers, Comm. Stakeholders, Provincial Dept. Art, Culture and Sports, CoJ, Community Leaders, NPOs, NGOs, churches</p> <p>Provincial Agriculture Dept., CoJ Environmental Management, Community Leaders, NPOs/NGOs</p> <p>City of Johannesburg Development Agency</p> <p>Provincial Dept. of Education, CoJ Dept. of Health, Provincial Dept. of Health, Community Leaders, NPOs, NGOs and churches</p> <p>National Dept. of Women, Children and Disabled, Home Affairs and SA Social Services Agency</p>	
<p>6</p> 	<p>Resignifying the imaginary and identity by strengthening the positive aspects of Kya Sands</p>	<ul style="list-style-type: none"> Organizing a competition to create a branding identity and logo with and for the community Tying the brand and the logo with a system of economic and social activities Promoting the unique social and cultural characteristics and opportunities of Kya Sands 	<p>Community Leaders, NPOs, NGOs, churches, Wits University and City of Johannesburg</p>	

Participants:

Michela Crevatin, *Università IUAV di Venezia, Italy*

Lorenzo Mauloni, *Politecnico di Milano*

Daniel Ringeisen, *Technical University Berlin; Albert Speer & Partner Frankfurt* (Figs. A.2 and A.3)



Fig. A.2 Workshop exhibition of final boards at University of the Witwatersrand



Fig. A.3 Presentation of final boards at Final Community and Stakeholders Meeting in Kya Sands