Chapter 7
Local Networks of Resilience and Climate Adaptation: The Case of Istanbul

Rana I. Connelly and Pınar G. Bal

Abstract Large coastal cities are often the engines of national growth but also tend to be areas with high sensitivity to the impacts of climate change. Therefore, integrated adaptation plans are essential for turning them into resilient cities. National competitiveness strategies are, however, increasingly at odds with the very idea of resilient cities, either forcing urban sprawl to its limits or transforming green spaces into grey spaces within the city. In the midst of heated conflict about how to use public land, the role of networks of local initiatives to protect green spaces and residential rights of poor and marginal groups becomes pivotal to achieve equity and urban resilience. The aim of this paper is to explore the dynamics of such networks in Istanbul and investigate how to integrate them into local climate change adaptation plans. Conflicts over Istanbul's historical urban vegetable gardens (bostan) and the construction of the third bridge are good examples of sites of contestation which, unless resolved, seriously hinder any possibility of agreement and action on climate adaptation plans.

Keywords Resilience • Urban farming • Green spaces • Local adaptation • Climate change

Introduction: Protests and Conflicts

Many cities form regional and global alliances to mitigate climate change. They share their experiences and commit to support innovative ideas to reduce greenhouse gas emissions from urban activities. Unquestionably, the scale and pace of climate change reconstitute global interconnectedness and local innovations (Bulkeley 2005; Taylor et al. 2012).

R.I. Connelly (✉)
Marmara University-EU Institute, Istanbul, Turkey
e-mail: ranaizci@marmara.edu.tr; ranaizci@gmail.com

P.G. Bal
Faculty of Economics and Administrative Sciences, Beykent University, Ayazağa–Maslak Campus, Istanbul, Turkey

W.L. Filho et al. (eds.), *Climate Change Adaptation, Resilience and Hazards*,
Climate Change Management, DOI 10.1007/978-3-319-39880-8_7

However, local governments often face difficulties in integrating hard (engineering based interventions/innovations) and soft adaptation (legal, institutional, social and economic incentives/ innovations) measures into everyday urban life. Hence local governments seek to establish stakeholder partnerships from different parts of society to implement climate change plans and strategies at the local level. Building and promoting public engagement in adaptation plans offer more flexible solutions for cities to improve their resilience. According to the IPCC (Intergovernmental Panel on Climate Change) definition, resilience is

> The capacity of social, economic, and environmental systems to cope with a hazardous event or trend or disturbance, responding or reorganizing in ways that maintain their essential function, identity, and structure, while also maintaining the capacity for adaptation, learning, and transformation (IPCC 2014, p. 5).

The term resilience might have different meanings for social and physical sciences, but in either case it is linked to reducing vulnerability which has three components: exposure, sensitivity and adaptive capacity of natural and/or social systems (IPCC 2014; Beichler et al. 2014). And, as Adger has suggested, "...vulnerability to environmental change does not exist in isolation from the wider political economy of resource use" (Adger 2006, p. 270). Cultural, technological, economic and institutional structures can shape vulnerability. Nevertheless, resilient ecosystems can reduce social and ecological vulnerability. Green areas are particularly important for socio-ecological systems to adapt to challenges and to reduce their sensitivity to any hazard. Therefore, land use patterns have a great impact on strengthening resilience in urban areas (Haq 2011; Cavan and Kazmierczak 2011).

At this point, two important questions arise:

- How can the adaptation agenda be more efficiently integrated into land use planning in urban areas?
- What is a local action, who are the local actors, and to what extent can non state actors affect urban social and ecological resilience?

Recent protests showed that citizens in Istanbul demanded more citizen involvement in urban planning. They expressed their disappointments about decisions of local and national authorities to shape their small neighbourhoods as well as Istanbul's landscape by implementing mega plans with strong economic growth arguments. Decisions that caused wide spread discomfort included construction of the third bridge and the third airport around the Northern Forests of Istanbul (Kuzey Ormanları), redesigning the green land for other uses in the Gezi Park/Taksim, the Validebağ grove (Validebağ korusu), the Kuzguncuk vegetable garden (Kuzguncuk bostanı) as well as urban renewal projects about Sulukule and the Yedikule vegetable gardens (Yedikule bostanı) (Gerçek 2014; Akçalı and Korkut 2015; Özkaynak et al. 2015).

Local initiatives were evolved to protect historical neighbourhoods, green spaces, protected sites and to encourage alternative life styles. Neighbourhood

communities started to take legal actions and organised public events. Civil society organisations also took part in this process. They supported local urban stewardship attempts providing expertise and resources. The emergence of strong local initiatives demonstrated citizens' growing demand for living in harmony with nature, not against it, in their cities. Collective memories of landscape, demands for equity and participation in city life also shaped these initiatives.

Even though these protests did not start with the aim of affecting local adaptation strategies and plans, their aims are apparently in line with the *raison d'être* of adaptation. Local initiatives often aim to maintain urban ecosystems and to support diversity of interests and necessities in urban planning. There is a growing body of research trying to understand co-management and social networks in climate change adaptation (Tompkins and Adger 2004; Newman and Dale 2005; Bodin et al. 2006). Although most of this research focuses on communities heavily dependent on natural resources, the role of local networks on urban ecosystems has started to receive more attention (Enqvist et al. 2014; Ernstson et al. 2010; Haq 2011). This study claims that local environmental initiatives have an increasing role to improve urban resilience in Istanbul whose socio-ecological integrity is under threat due to its status as the engine of Turkish economy. A number of mega projects and local plans have been particularly challenging the ecology, social justice and quality of life in the city. This study will firstly refer to the recent developments in Istanbul which have led to protests and the emergence of local initiatives. The case of the third bridge demonstrates how mega projects can easily disturb the socio-ecological resilience of a mega city. Then conflicts over the Yedikule and Kuzguncuk vegetable gardens will also be examined within the framework of urban/peri urban agriculture, which is now regarded as one of the main elements of urban resilience in adapting to the impacts of climate change. The study, finally, analyses the approaches of each local initiative to the specific area of contention. It is difficult to define such new and dynamic networks, initiatives and groups. Nevertheless, they all prefer loose and non-hierarchical structures and formulate innovative responses to problems. At this point, it is premature to draw precise conclusions about the impact of such networks on urban resilience: but we hope to stimulate new lines of inquiry on the development of effective communication for local adaptation plans in Turkey.

Redesigning the City: Resilient or Dispossessed and Vulnerable?

There have always been protests demanding social justice and alternative urban life styles in big cities. Since the early 2000s, however, all around the world ardent protestors have taken the streets to claim their right to the city (Mayer 2009; Özkaynak et al. 2015). Intra generational equity, sustainable land use practices and participation are at the centre of these claims (Özkaynak et al. 2015).

Various economic reasons as well as opportunities of different lifestyles have attracted people to cities. Although better quality of life is the motto for urban life, cities are often vulnerable human agglomerations. They depend on large quantities of long distance supplies to meet the demands of ever increasing population. Moreover, urban land expansion causes severe ecological degradation in suburban areas, leading to continuous decline in inner city areas. Traffic congestion, poor air quality and social inequality are, *inter alia*, the most detrimental effects of unfettered urban growth. Earthquakes and other natural disasters, such as hurricanes, aggravate existing socio-ecological problems and inequalities. Local governments often resort to urban renewal projects to address these problems. However, since most urban renewal projects depend on property led or project based approaches, they often cause the loss of urban green space and lead to gentrification, pushing the locals out of the neighbourhood (Aksoy 2014). Thus, urban fabric might be severely damaged and social exclusion—particularly in historical but economically deprived urban areas—becomes a new urban normality. For instance, the Sulukule urban renewal project in Istanbul was criticized for not implementing the original plan for supporting the revitalisation of economic and socio-cultural development of the area (Eren 2014). As a historic Roma neighbourhood dating back to the Byzantine era, Sulukule needed to renew its building stock and improve its infrastructure. However, it ended up with displacement of its inhabitants, demolishing registered historic buildings and damaging civic culture (Eren 2014).

Since housing, post-earthquake/disaster reconstruction and economic revitalisation are the key priorities of urban renewal projects, built environment in and around the target areas often increases. However, climate friendly urban development requires a balance between built and natural environments. So far, there is not any particular sign that urban renewal projects have paid enough attention to the impacts of climate change in Istanbul. On the contrary, environmental concerns and public participation seem rather marginalized within these projects. Ideological views on the future of urban life also affect land use patterns in the city. Accordingly, other renewal or regeneration projects in Istanbul have caused even greater social unrest and resistance as in the cases of Gezi Park (2013) and of Validebağ grove (2014).

Natural forests, gardens, recreational green areas and public parks have always been the landmarks of Istanbul because Istanbul has a rich cultural and ecological heritage under the influence of a transitional climate between the Mediterranean and the Black sea. The topography of the city also engenders micro climatic zones and rich biodiversity making urban and peri-urban agriculture possible throughout centuries. However the status of vegetable gardens was also challenged by recent urban renewal projects.

Despite increasing complaints about environmental governance in Istanbul, the Metropolitan Municipality claims that green spaces and parks are being improved and enlarged during their terms of governance. However, green space per capita in Istanbul is 6.5 m^2 in 2010 (IBB 2010). This percentage is far below the recommended minimum standard per citizen (9 m^2) by the United Nations Food

and Agriculture Organisation (Singh et al. 2010). The Municipality has recently pledged to sow 115,000 trees of 40 different types including fruit trees in 300 areas of Istanbul. Water catchment areas and highways are the priority areas within this plan (IBB 2015). Local governors, through new afforestation and reforestation projects, also aim to achieve further reductions in Istanbul's green house gas emissions (IBB 2015). Istanbul Metropolitan Municipality has also launched extensive transport projects (Marmaray) and waste management plans stating that these plans would reduce Istanbul's greenhouse gas emissions. It is also important to note that Istanbul is a member of C40 Cities.

Nevertheless, new transportation and urban renewal projects threaten the existence of natural systems which has enabled the city to survive to date. New projects clearly indicate that Istanbul, as a coastal mega city, is spreading into undisturbed and semi-disturbed forest and coastal systems. Construction of the third bridge on the Bosphorus as part of the Northern Marmara Motorway is one of these mega projects.

The Northern Forests and the Third Bridge: Water Resources, Wildlife and Livelihoods

The Northern Forests are of vital importance for urban sustainability in Istanbul (and beyond Istanbul). The Northern Forests include city forests, coastal areas, sand dunes, rivers, becks, springs, historical water catchment areas, dams, lakes, natural parks, an arboretum and natural forests on both the European and Asian sides of Istanbul. These areas also provide valuable refugee for birds. Istanbul's forests are registered as one of the 200 most important ecological sites in the world. They also absorb and stock significant amounts of CO_2 from urban activities (Tolunay 2014).

The third bridge is a part of the Northern Marmara Motorway Project and is located in the northern part of Istanbul facing the Black Sea. Construction of the bridge started in 2013 but, before and during its construction, various legal cases were brought to the court. A number of civil society organisations and associations strongly argued that the construction of the third bridge was illegal, since it violated 1/100,000 scaled Istanbul Provincial Environmental Plan. Nevertheless, according to the third bridge construction consortium, the bridge symbolizes the modern face of Turkey and "is going to be the widest suspension bridge in the world" with "8 lanes for motorway and 2 lanes for railway" (ICA 2013). The Consortium claims that with the construction of this bridge, inner city traffic is expected to be reduced significantly. It has been also argued that the bridge aims to reduce the costs for cargo traffic and to increase employment (ICA 2013). On this point, a number of experts warn that the main function of the third bridge would be to serve mostly to intercity and cargo traffic causing even a greater regional environmental damage rather than to reduce inner-city traffic (Şahin 2013; Çalışkan 2010).

The third bridge was not subject to the Environmental Impact Assessment (EIA); however a private company conducted an Environmental and Social Impact assessment. According to the court cases, the original route of the bridge has been revised (Gülersoy and Gökmen 2014; Hürriyet Daily News 2015). Various nationwide and Istanbul based organisations (Green Party, Istanbul Chamber of Architects and Engineers, Doğa Derneği/Doğa, TEMA/The Turkish Foundation for Combating Soil Erosion, For Reforestation and the Protection for Natural Habitats) and local groups have expressed their strong opposition to the third bridge and have taken legal action. More than 30 cases were brought to court. A movement was also formed (Kuzey Ormanları Savunması/Northern Forests Defence) to protect these forests and support the sustainability of the socio-ecosystems in the area. Northern Forests Defence describes itself as a grassroots movement dedicated to stop any plans which would harm urban and rural environment (Northern Forests Defence 2015). It includes sociologists, urban planners, students and other volunteers from different parts of the society. The movement states that they reject any hierarchy and are open to any ideas and participation. The movement functions on the basis of rotating responsibility and moderation.

While legal actions and protests on the cancellation of the third bridge plans still continue, construction of the third bridge has already threatened the wetlands, sand dunes, historical water catchment areas and endemic species at an alarming level. Wild boar tried to escape from their damaged environment and appeared in the city (Weise 2015). Some boar also tried to swim to cross the Bosphorus. The villages around these areas have also faced the threat to lose their livelihoods. Due to the construction of an express road between the Trans-European Motorway (TEM) and the Northern Marmara Motorway, a huge picnic area in the Asian side was almost totally destroyed (Güvemli 2014; Ocak and Sönmez 2014).

Urban planners argue that most of the mega transportation projects essentially provide infrastructure for other projects and make investments in those areas possible (Yalçıntan et al. 2014). The first and the second bridges caused unplanned urbanisation and expansion of industrial zones in areas between the core and periphery as well as in the outskirts of the city (Terzi and Bölen 2012). The second bridge on the Bosphorus paved the way for the construction of the Sabiha Gökçen Airport, Istanbul Racing circuit/Formula 1 (Istanbul Park) and big shopping outlets (Yalçıntan et al. 2014). According to many specialists, a new city project in the north is the main factor behind the third bridge and the motorway plan. They also argue that the third bridge would not solve Istanbul's traffic problem but create a new source of congestion in different centres (Yalçıntan et al. 2014; Gerçek 2014).

At this stage, it is also difficult to predict the micro-climatic changes (such as in humidity, temperature, energy flows, evaporation, local winds) which might occur due to these mega projects—and their impacts on various ecosystems—in and around Istanbul (Türkeş 2014). This uncertainty might engender further difficulties to cope with and adapt to the impacts of climate change in Istanbul and neighbouring cities. Yet the third bridge is not the only threat to Northern Forests; the third airport and Kanal Istanbul are two other recent mega projects which also

threaten Istanbul's ecosystems (Gerçek 2014; Gülersoy and Gökmen 2014; Northern Forests 2015). The Northern Forests Defence, other local initiatives, NGOs and experts groups have organized campaigns and meetings against the construction of the third bridge, the third airport and against the housing projects in some parts of the historical city forests.

Urban Food as Part of Adaptation Measures and Istanbul Vegetable Gardens

Urban -and peri-urban- agriculture is listed as one of the prerequisites for climate change adaptation (IPCC 2014). Urban agriculture might broaden and raise awareness necessary to respond to the impacts of climate change. It can also expand collaborative relationships between different actors which in turn might encourage effective public involvement in the local adaptation plans (Aylett 2014). Vegetable gardens (bostan), orchards and farms have always been essential parts of Istanbul city life both within and outside the city fortifications for centuries.

The Historic Vegetable Gardens of Yedikule

Yedikule historic vegetable gardens have been used as urban agricultural land for more than 1500 years. Historical evidence and documents confirm the existence of farming areas around the city walls (Theodosian Landwalls) during the Byzantine era (Barthel et al. 2010; Kaldjian 2004). Ottoman documents also provide significant amount of detailed evidence about the management of historic vegetable gardens. This area is the one and only remaining example of both Ottoman and Byzantine urban farming practices (Başer and Tunçay 2010). However, the Marmaray project (railway tunnel underneath the Bosphorus was opened in 2013), recent restoration plans for city land walls and the construction of Yenikapı meeting area challenge the status of historic vegetable gardens. In 2013, the Fatih Municipality decided to run a recreation project from Belgrade gate to Yedikule gate for the preservation of inner land walls. The Fatih Municipality has also announced its plans for a park and recreational area along the walls. This plan included creating cycling routes and an artificial river, providing more security and preventing crime in deserted parts around the walls and building a playground for children (Koca 2014; Çorakbaş et al. 2014). The Fatih Municipality's plan to transform some part of historic vegetable gardens as a public space in this impoverished neighbourhood was warmly welcomed by many inhabitants. However, recent luxury housing development in the area has raised considerable concerns about the status of historic vegetable gardens (Çorakbaş et al. 2014).

At this point, local networks started to emerge. The locals, city planners, environmental groups, architects have formed a number of small networks to protest this decision. In addition to legal processes, a petition campaign was organised by Slow Food/Fikir Sahibi Damaklar, the School of Yedikule Historic Vegetable Gardens (Yedikule Bostan okulu) was established, several summer courses and art performances were held. The Initiative to Protect Yedikule Gardens was formed; a report was prepared by experts with the support of the Association of Archaeologists, Istanbul Branch and submitted to the UNESCO Istanbul (Çorakbaş et al. 2014; İnce 2014; Koca 2014). They have demanded more transparency about the decision and asked whether it would be possible to integrate the park project into vegetable gardens without obscuring farming activities (Koca 2014). After long protests and court cases, the park project was halted (Vardar 2014).

This was not the first attempt by local governments to transform vegetable gardens into a built environment. However, this is the first large scale project about the status of vegetable gardens as Yedikule is now at the centre stage of one of the new gentrification processes in Istanbul (Koca 2014). Local governors clearly stated their desire to protect the built environment (the walls, wooden house and stables in the vegetable gardens) but they did not acknowledge vegetable gardens as valuable to be included in the preservation project. However, protesters reminded the local government that under UNESCO guidelines, gardens were also to be protected. Networks involved in this case have encouraged urban agricultural activities in different parts of the city. They continue their model urban framing activities and festivals in the vegetable gardens.

The Kuzguncuk Vegetable Garden

Kuzguncuk is, in contrast to the Yedikule vegetable gardens, located in a more protected natural environment. It is a well known district with its natural beauty and traditional neighbourhood features. Due to its characteristic architecture, some parts of the district are often used as a background for many movies and TV dramas. There were three vegetable gardens in Kuzguncuk. However, only one of them still exists—known as Ilya (Ilia) Garden by residents—is named after its last tender (Koca 2014). This area has been registered as a vegetable garden for 700 years and provided fresh food to the neighbourhood. The Directorate General of Foundations, Istanbul 2nd Regional Directorate (Vakıflar Genel Müdürlüğü-Istanbul Bölge Müdürlüğü) obtained the garden's ownership in 1977. In 1986, the status of the garden was amended to include a public school project (Koca 2014). The neighbourhood did not need a new school and this school project was never put into practice. However, due to this small change in master plans, this area had to face new challenges. In 1992, the garden was rented to another foundation chaired by a famous businessman for 10 years to build a hospital. Locals protested immediately and, after extended effort, their resistance stopped the project. In order to prevent future threats to the existence of their only green land, Kuzguncuk

residents through their local association (Kuzguncuk Derneği) tried to rent the garden by themselves. It was very costly; they could not manage to get the right to use. But a garden nursery rented the vegetable gardens for 10 years and kept the land as it was. In 2011, the Üsküdar Municipality rented the land and a private school project was announced in the area (Koca 2014). Subsequently, public protests took place. Locals managed to halt the project and offered their plan about the future of garden to the Üsküdar Municipality. According to their project, the land was going to be divided into small allotments and priority would be given to Kuzguncuk residents (Aksu 2014). The Üsküdar Municipality accepted this plan and as of mid-2015, the Kuzguncuk garden keeps its status as an urban farming area and as a place for shelter in case of a disaster.

Local Networks and Grassroots Groups for a Socio-Ecological Resilient City

Urban environmental degradation either creates new actors or challenges the long established governance structures in urban politics. Some local issues often initiate *ad hoc* movements which have loose non-hierarchical features in contrast to non-governmental organisations. They organise demonstrations, petitions, and sit-ins to raise public awareness and to pressure decision makers to change their decisions about a specific issue. They often depend on the actions of local people who would be most affected by the decision taken at the local/or national level and who cease their activism once they reach their aim. Community based partnerships, grassroots organisations, social networks and local networks share certain features with this kind of movement. Even if they have nation wide support they are geographically local (Young 1997). It is very difficult to delineate the differences among them and between *ad hoc* movements. However, community based partnerships, grassroots groups, social networks and local networks not only pressurize local/national governments but also try to empower locals and to promote alternative life styles or innovative solutions to the problems. They also aim to achieve long term co-operative action in contrast to the short term aims of *ad hoc* movements. Thus some argue that citizen groups or networks might provide the most appropriate form of environmental stewardship to eliminate urban hotspots and protect urban green land (Enqvist et al. 2014). Even though there are certain limitations to their possible success, networks and partnerships provide more opportunities for marginalised groups (mostly women, students, poor, disabled and elderly), locals in the area and those who envisage alternative urban life styles (supporters of urban permaculture, social volunteering, reducing car dependency) to take action.

Local initiatives are not new in Turkey. However, local initiatives to protect urban green space are becoming increasingly important as urban areas in Turkey come under increasing pressure from new competitiveness targets, financial crises

and rapid urbanisation. Local networks might emerge due to a forced change in the historical usage of a green space for the interest of a small group and/or touristic recreation project as in the case of the Yedikule vegetable gardens. In this case, not only a historical urban area - a medium of interaction between humans and ecosystems - but also the source of income of a community was threatened. What is more, the landscape and social fabric of the area faced the risk of being altered. Short term impacts of such an urban regeneration plan would have included displacement of locals, creation of urban heat islands and traffic congestion in the area. Since the Yedikule vegetable gardens are close to a coastal zone, extreme meteorological events would have hit new built areas with great density. Responses to this regeneration plan were therefore organised around the idea of maintaining urban farming and recreating the human-urban ecosystem interaction. Social networks and local initiatives act, in this case, as a moderator between locals who see some parts of the garden as a desolate land to be regenerated and locals who want to maintain their farming activity or conserve the land as it is. The volunteers who belong to these networks have demonstrated that those who support urban farming are not disillusioned environmentalists or idealists but ordinary citizens of Istanbul.

A different citizen engagement has taken place to protect the Kuzguncuk vegetable garden. In this case, a small scale recreation project threatened another historical green space. Neighbourhood based communities played the central role in the fight against the municipality decision to change land use practice in the area. If the plans of the Üsküdar Municipality had been realised, the collective identity of an old neighbourhood and integrity of a very old ecosystem would have been irrevocably damaged. Through their efforts, this green space retains its status as vegetable gardens and continues to function as a gathering point in case of a disaster. Locals also obtained the right to farm through the allotment system. Since the construction plans in the area were halted, this area continues to serve as a critical ecosystem in a partially protected environment. In this case, the Kuzguncuk neighbourhood community has acted as entrepreneurs of change and offered innovative solution for a conflict (Bulkeley and Betsill 2013).

Taking local practice as well as knowledge into consideration is one of the essential elements of adaptation strategies. However, this is not a sufficient condition to achieve sustainable climate adaptation. “Local power differences and divergent interests in the community” should also be integrated into strategies (Taylor et al. 2012, p. 108). In both cases of urban farming, local initiatives in Istanbul have aimed to improve socio-ecological conditions and to promote alternative ways of development in order to overcome intergenerational inequality and environmental degradation (Young 1997).

Urban resilience is a multifaceted concept which “refers to the ability of urban systems to withstand, adapt to, and recover from climate related hazard” (Aylett 2014, p. 9). The third bridge project is still posing a great risk to resilience of the city. The damage imposed upon ecosystems in the area weakens their capacity to adapt to the climate change and recover from climate hazards. Impacts of the construction are visible. Some locals face the risk of being displaced; others might lose their source of income while some of them have to cope with air and

noise pollution. A great variety of forest vegetation, coastal ecosystems, inland water ecosystems and animal species are under threat. The overall impact is not, however, limited to local losses. Once this project is completed and integrated into the northern Marmara motorway and the third airport project, serious damage to the entire ecosystem on both sides of Istanbul appears inescapable. Water scarcity is the most expected and short term outcome of these developments. In this case, the problem might be regarded as a regional issue since its impacts would be extended throughout Northern Marmara. Another mega project, construction of the third airport, exacerbates the environmental destruction caused by the third bridge project (Gülersoy and Gökmen 2014; Northern Forests Defence 2015). At present, attempts to protect the Northern Forests have taken place mostly at the local level. However, the variety of actors involved in this issue and its wide scale impacts are likely to create not only a new social movement for urban resilience but also to contribute to more inclusive environmental activism which has already started with the protests against various mining and energy projects in Turkey (Özkaynak et al. 2015).

How climate change action is defined at national level frames the action at the local level (Schreurs 2008). Yet, local governments as the main actors in urban politics can produce a wide variety of mitigation and adaptation initiatives (Fünfgeld 2015; Schreurs 2008). Typical interpretations of sustainable urban development define resilience as an essential part of urban planning (ICLEI 2014). However, imminent and projected disturbances by the third bridge to the ecosystems in Istanbul reveal that local authorities not only underestimate the impacts of climate hazards and ecosystem resilience but also overlook Turkey's international commitments to protect biodiversity and wildlife as well as to combat against desertification and to reduce pollution (Budak 2014).

Conclusion: Ecosystem Based Adaptation and Urban Green Spaces

Adaptation is a continuous process which needs to comply not only with changing climate but also changing priorities, life styles and values (Brown et al. 2011). Thus, sustainable adaptation should respond to temporal and spatial challenges. Unquestionably adaptation to climate change goes beyond one size fits all approaches; consists of not only country specific but city specific solutions. Grassroots actions might provide social connectivity necessary to address dynamic forces of adaptation. They simply offer new "or emergent forms of collaborative action" (Feola and Nunes 2014, p. 234). They can promote resilience through participation and innovations based on alternative systems of energy and food systems (Feola and Nunes 2014).

Urban green spaces provide ecological, economic and social benefits for locals. They might contain high biodiversity and can function as shelters and meeting points in case of disasters. Some areas are suitable for urban and peri-urban

agriculture activities which provide local employment and enhance food security especially for deprived neighbourhoods. Expanding green spaces in urban areas also contribute to adaptation plans since they can reverse the impacts exacerbated by urban heat island effect (Cavan and Kazmierczak 2011). To put it differently, land use patterns in urban areas "regulate urban climate" (Haq 2011, p. 602).

Citizen involvement to conserve urban green spaces might fill an important gap in local adaptation plans of Istanbul. Their demands might force local governors of Istanbul to accept that the city is a socio-ecological system and to revise their adaptation plans according to ecosystem based adaptation strategies which reassess the links between use of land and built environment (e.g., green roofs, rainwater harvesting, urban agriculture, supporting drought tolerant gardens, restoration of coastal ecosystems, developing open spaces, creating permeable surfaces) (Colls et al. 2009).

Since 1960s, environmental movements in Turkey have been challenging various state decisions. Turkey tries to achieve the dual goals of economic growth and wealth creation. However, its market based regulations have so far created a significant number of tensions about natural richness and land use patterns in the country. In Turkey, inhabitants of many areas with high biological diversity have found themselves in the middle of heated conflicts due to energy projects. Istanbul is, on the other hand, facing with challenges of demand for land. Hitherto, political decisions and the dominant view on "nature" have evidently favoured techno-centric approaches towards green land in the city. And Istanbul becomes more risk prone to climate change related hazards as natural life in and around the city diminishes. While local and national authorities continue to expand and regenerate the city under smart city projects, local initiatives increasingly remind them that city belongs to its inhabitants and adaptation to impacts of climate change can only be achieved by collective action.

References

Adger WN (2006) Vulnerability. Glob Environ Chang 16:268–281

Akçalı E, Korkut U (2015) Urban transformation in Istanbul and Budapest: neoliberal governmentality in the EU's semi periphery and its limits. Polit Geogr 46:76–88

Aksoy A (2014) İstanbul'un Neoliberalizmle İmtihanı. In: Candan A, Özbay C (eds) Yeni İstanbul Çalışmaları Sınırlar, Mücadeleler, Açılımlar. Metis Yayınları, Istanbul

Aksu F (2014) Kuzguncuk'ta Ortak Karar Bostan Park, Hürriyet. 30 Ekim 2014. http://www.hurriyet.com.tr/gundem/27482376.asp. Accessed 01 Feb 2015

Aylett A (2014) Progress and challenges in the urban governance of climate change: results of a global survey. MIT, Cambridge, MA. http://observgo.uquebec.ca/observgo/fichiers/94238_GLR-1.pdf. Accessed 11 Feb 2015

Barthel S, Sörlin S, Ljungkvist J (2010) Innovative memory and resilient cities: echoes from ancient Constantinople. In: Sinclair PJJ, Nordquist G, Herschend F, Isendahl C (eds) Urban mind. Cultural and environmental dynamics. Uppsala Universitet, Uppsala

Başer B, Tunçay HE (2010) Understanding the spatial and historical characteristics of agricultural landscapes in Istanbul. ITU A/Z 7(2):106–120

Beichler SA, Hasibovic S, Davidse BJ, Deppisch S (2014) The role played by social-ecological resilience as a method of integration in interdisciplinary research. Ecol Soc 19(3):4. doi:10.5751/ES-06583-190304. Accessed 11 Jun 2015

Bodin Ö, Crona B, Ernstson H (2006) Social networks in natural resource management. What is there to learn from a structural perspective? Ecol Soc 11(2). http://www.ecologyandsociety.org/vol11/iss2/resp2/. Accessed 08 Feb 2015

Brown A, Gawith M, Lonsdale K, Pringle P (2011) Managing adaptation: linking theory and practice. UK Climate Impacts Programme, Oxford

Budak S (2014) Istanbul'da Yapılması Planlanan Projeler ve Taraf Olunan Uluslararası Sözleşmeler. In Istanbul'un Geleceğini Etkileyecek Üç Proje. 3. Köprü, 3. Havalimani ve Kanal Istanbul. TEMA Vakfi Uzman Görüşleri, TEMA Istanbul. http://www.tema.org.tr/folders/14966/categorial1docs/1244/BUYUKPROJELER20032014data.pdf. Accessed 11 Jun 2015

Bulkeley H (2005) Reconfiguring environmental governance: towards a politics of scales and network. Polit Geogr 24:875–902

Bulkeley H, Betsill MM (2013) Revisiting the urban politics of climate change. Environ Polit 22 (1):136–154

Cavan G, Kazmierczak A (2011) Urban greening to adapt urban areas to climate change. Oxford road corridor case study. Ecocities Project, University of Manchester, Manchester

Colls A, Ash N, Ikkala N (2009) Ecosystem based adaptation: a natural response to climate change. IUCN Gland, Switzerland. http://cmsdata.iucn.org/downloads/iucn_eba_brochure.pdf. Accessed 24 Feb 2015

Çalışkan ÇO (2010) 3. Köprü Projesi Değerlendirme Raporu, TMMOB Şehir Plancıları Odası, Istanbul. https://mutlukent.files.wordpress.com/2010/09/spoist_3-koprurapor.pdf. Accessed 07 Jun 2015

Çorakbaş FK, Aksoy A, Ricci A (2014) A report of concern on the conservation issues of the Istanbul Land Walls World Heritage Site. Istanbul, January 2014. https://oxfordbyzantinesociety.files.wordpress.com/2014/02/report_land_walls_whs.pdf. Accessed 07 Jun 2015

Enqvist J, Tengö M, Bodin Ö (2014) Citizen networks in the Garden City: protecting urban ecosystems in rapid urbanization. Landsc Urban Plan 130:24–35

Eren Öİ (2014) What is the threshold in urban generation in the context of urban identity? The case of Turkey. Spatium Int Rev 31:14–21

Ernstson H, Barthel S, Andersson E, Borgström ST (2010) Scale-crossing brokers and network governance of urban ecosystem services: the case of Stockholm. Ecol Soc 15(4):28. http://www.ecologyandsociety.org/vol15/iss4/art28/. Accessed 12 Feb 2015

Feola G, Nunes R (2014) Success and failure of grassroots innovations for addressing climate change: the case of the transition movement. Glob Environ Chang 24:232–250

Fünfgeld H (2015) Facilitating local climate change adaptation through transnational municipal network. Curr Opin Environ Sustain 12:67–73

Gerçek H (2014) 3. Köprü ve Kuzey Marmara Otoyolunun Istanbul'un Ulaşım ve Trafik Sorunlari Üzerindeki Etkileri. In Istanbul'un Geleceğini Etkileyecek Üç Proje. 3. Köprü, 3. Havalimani ve Kanal Istanbul. TEMA Vakfi Uzman Görüşleri, TEMA, Istanbul. http://www.tema.org.tr/folders/14966/categorial1docs/1244/BUYUKPROJELER20032014data.pdf. Accessed 24 Feb 2015

Gülersoy NZ, Gökmen EY (2014) Istanbul ve Tartışmalı Üç Proje: 3.Köprü, 3 Havalimanı ve Kanal Istanbul. In Istanbul'un Geleceğini Etkileyecek Üç Proje. 3. Köprü, 3. Havalimani ve Kanal Istanbul. TEMA Vakfi Uzman Görüşleri, TEMA, Istanbul. http://www.tema.org.tr/folders/14966/categorial1docs/1244/BUYUKPROJELER20032014data.pdf. Accessed 11 Jun 2015

Güvemli Ö (2014) 3. Köprü Evsizleri. Cumhuriyet. 06 Ekim 2014. http://www.cumhuriyet.com.tr/haber/turkiye/127623/3._kopru_evsizleri.html. Accessed 18 Feb 2015

Haq ASM (2011) Urban green spaces and an integrative approach to sustainable environment. J Environ Prot 2(5):601–608

Hürriyet Daily News (2015) Court cancels access road plans for Istanbul's third bridge. 11 June 2015 http://www.hurriyetdailynews.com/court-cancels-access-road-plans-for-Istanbuls-third-bridge.aspx?pageID=238&nID=83855&NewsCatID=340. Accessed 11 Jun 2015

İBB, Istanbul Büyükşehir Belediyesi Park ve Bahçeler Müdürlüğü (2010) Park ve Bahçeler Müdürlüğü 2004–2010. http://www.ibb.gov.tr/tr-TR/BilgiHizmetleri/Istatistikler/Documents/bldhizmetleri/2010/parkvebahceler_mud_2004-%202010.pdf. Accessed 21 Mar 2015

IBB, Istanbul Büyükşehir Belediyesi Park ve Bahçeler Müdürlüğü (2015) Istanbul'a 115 bin yeni ağaç. 23 January 2015. http://www.ibb.gov.tr/tr-TR/Pages/Haber.aspx?NewsID=22449#.VRqB7fysUho. Accessed 02 Mar 2015

ICA (2013) Proje Hakkında: İlklerin Köprüsü. http://www.3kopru.com/proje/PROJE-HAKKINDA/1. Accessed 12 Mar 2015

ICLEI (2014) Resilient cities 2014: congress report. http://resilient-cities.iclei.org/fileadmin/sites/resilient-cities/files/Full_papers/RC2014__Congress_Report__Final.pdf. Accessed 12 Feb 2015

İnce E (2014) Harvard Üniversitesi Yedikule Bostanları'nda Derste. Radikal. 16 Ağustos 2014. http://www.radikal.com.tr/cevre/harvard_universitesi_yedikule_bostanlarinda_derste-1207134. Accessed 02 Feb 2015

IPCC (2014) Climate change 2014: impacts, adaptation and vulnerability. Part A: global and sectoral aspects. In: Contribution of working group II to the fifth assessment report of the Intergovernmental Panel. Cambridge University Press, Cambridge and New York, NY

Kaldjian PJ (2004) Istanbul's Bostans. A millennium of market gardens. Geogr View 94 (3):284–304

Koca A (2014) Istanbul'un Yaşayan İki Bostanı Neden Yok Edilmek İsteniyor? Güncel Dosya: Bostanlar. YAPI 386:58–63. https://bogachandundaralp.files.wordpress.com/2014/01/guncel_dosya.pdf. Accessed 01 Feb 2015

Mayer M (2009) The right to the city in the context of shifting mottos of urban social movements. City: Anal Urban Trends Cult Theory Policy Action 13(2–3):362–374

Newman L, Dale A (2005) Network structure, diversity and proactive resilience building: a response to Tompkins and Adger. Ecol Soc 10(1). http://www.ecologyandsociety.org/vol10/iss1/resp2/. Accessed 14 Feb 2015

Northern Forests Defence (2015) The third airport project vis-a vis life, nature, environment, people and law, Istanbul. http://www.kuzeyormanlari.org/wp-content/uploads/2015/05/3rd_airport_project.pdf. Accessed 06 Jun 2015

Ocak S, Sönmez Y (2014) An aerial tour of Istanbul's disappearing forests. Hürriyet Daily News. 02 September 2014. http://www.hurriyetdailynews.com/an-aerial-tour-of-Istanbuls-disappearing-forests.aspx?pageID=238&nID=71201&NewsCatID=340. Accessed 01 Mar 2015

Özkaynak B, İskender AC, Ertör-Akyazı P, Ertör I (2015) The Gezi Park resistance from an environmental justice and social metabolism perspective. Capital Nat Socialism 26(1). doi:10.1080/10455752.2014.999102. Accessed 10 Jun 2015

Schreurs MA (2008) From the bottom up local and subnational climate change politics. J Environ Dev 17(4):343–355

Singh VS, Pandey DN, Chaudhry P (2010) Urban forests and open green spaces: lessons for Jaipur, Rajasthan India. RSPCB Occasional Paper No. 1/2010. http://www.indiaenvironmentportal.org.in/files/RSPCB-OP-1-2010.pdf. Accessed 05 Feb 2015

Şahin Ü (2013) Üçüncü Köprü'yü Neden Durdurmalıyız (2) 17 Temmuz 2013. Yeşil Gazete. http://yesilgazete.org/blog/2013/07/17/ucuncu-kopru%E2%80%99yu-neden-durdurmaliyiz-2/. Accessed 05 Jun 2015

Taylor RD, Olwig MF, Chettri N (2012) Adaptation as innovation, innovation as adaptation: an institutional approach to climate change. Appl Geogr 33:107–111. doi:10.1016/j.apgeog.2011.10.011

Terzi F, Bölen F (2012) The potential effects of spatial strategies on Urban Sprawl in Istanbul. Urban Stud 49(6):1229–1250

Tolunay D (2014) Istanbul'da Yapılması Planlanan Projelerin Orman Ekosistemi ve Endemik Türler Üzerindeki Etkileri. In Istanbul'un Geleceğini Etkileyecek Üç Proje. 3. Köprü, 3. Havalimani ve Kanal Istanbul. TEMA Vakfi Uzman Görüşleri, TEMA, Istanbul. http://www.tema.org.tr/folders/14966/categorial1docs/1244/BUYUKPROJELER20032014data.pdf. Accessed 24 Feb 2015

Tompkins EL, Adger NW (2004) Does management of natural resources enhance resilience to climate change? Ecol Soc 9(2):10. http://www.ecologyandsociety.org/vol9/iss2/art10/. Accessed 17 Feb 2015

Türkeş M (2014) Istanbul'da Yapılması Planlanan Projelerin Yerel İklim ve İklim Değişikliği Üzerindeki Etkileri. In Istanbul'un Geleceğini Etkileyecek Üç Proje. 3. Köprü, 3. Havalimani ve Kanal Istanbul. TEMA Vakfi Uzman Görüşleri, TEMA, Istanbul. http://www.tema.org.tr/folders/14966/categorial1docs/1244/BUYUKPROJELER20032014data.pdf. Accessed 08 Jun 2015

Vardar N (2014) Yedikule Bostanları Planı İade Edildi. Taraflar Temkinli. Istanbul Bia Haber. 25 Kasım 2014. http://www.bianet.org/bianet/toplum/160216-yedikule-bostanlari-plani-iade-edildi-taraflar-temkinli. Accessed 24 Feb 2015

Weise Z (2015) Wild boars arrive in Istanbul due to loss of habitat. The Guardian. 6 March 2015. http://www.theguardian.com/environment/2015/mar/06/wild-boars-arrive-in-Istanbul-due-to-loss-of-habitat. Accessed 08 Jun 2015

Yalçıntan MC, Çalışkan ÇO, Çılgın K, Dündar U (2014) İstanbul Dönüşüm Coğrafyası. In: Candan A, Özbay C (eds) Yeni İstanbul Çalışmaları Sınırlar, Mücadeleler, Açılımlar. Metis Yayınları, Istanbul

Young S (1997) Community-based partnerships and sustainable development: a third force in the social economy. In: Baker S, Kousis M, Richardson D, Young S (eds) The politics of sustainable development. Routledge, London, New York, NY