

9. Institutionalizing the resilient city: constraints and opportunities

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9.1 INTRODUCTION

Urban lands have increased in the last decades, generating fundamental challenges as well as an unprecedented necessity and opportunity to enhance the resilience of urban systems. As human-dominated, constructed landscapes supplied with urban infrastructure and a series of urban-specific services, urban areas are prone to the consequences of climate change regardless of their wealth or geographical location (Hough, 1995; Kelly, 2004; Alberti, 2008).

Considered to be critical in meeting environmental challenges like growing exposure to flooding, the interest in adopting and implementing adaptation and mitigation measures has increased greatly (see Chapter 8 in this volume), with more strategic and long-term planning decisions becoming necessary (see Chapter 10 in this volume). As urbanization rates are increasing rapidly worldwide, living with floods by alleviating their consequences is becoming more important. Therefore, it is assumed that built areas will have to be transformed to withstand rising surface-watercourses and rainfall levels in order to keep damage low when flooding occurs. Resilient cities should be able to withstand, adapt to and eventually transform under the influence of shocks in order to maintain the functioning of their economic, socio-cultural, institutional and ecological services as well as to develop and provide new opportunities for their residents regardless of the nature of the shocks, pressures or changes to which they must respond.

But how this transformation can happen and how the resilience of urban areas can be achieved is not that straightforward, as it challenges existing distributions of responsibilities, property rights and availability of knowledge, skill and resources in managing flood risks. It is known that resilience initiatives emerged as efficient short-term actions that can be taken to reduce climate-related vulnerabilities (e.g. flood risk). However, the success of implementing resilience in urban areas prone to flood risks depends on a series of

factors such as efficient leadership, cities' economic growth, social policies, infrastructure development, environmental policies, participatory learning, stakeholders' involvement, and a sustainable planning and urban land management system.

This chapter aims to unravel the institutional challenges related to this transformation. First, we describe what role urban lands and developments (could) play in the light of the resilient city. Then we go into the challenges related to urban land management systems on a legislative, institutional and spatial level. Finally, we discuss some opportunities to deal with these challenges. As such, this chapter contributes to the understanding of the thresholds for the implementation of the resilient city.

9.2 URBAN LANDS FOR A RESILIENT CITY

In many areas, public protection is provided through traditional flood protection measures, mainly based on grey infrastructure (i.e. dikes, dams, etc.). However, these alone may not be sufficient to cope with increasing overall flood risks and flood extremes in particular in cities. Urban lands can absorb shocks, in this case floods. Therefore, integrating urban lands in public protection strategies through land-use measures offers a promising contribution to flood resilience.

We discuss here two ways in which urban lands can contribute to flood resilience: multifunctional land use and Nature Based Solutions (NBS). These concepts contribute to the key principles on which cities' resilience is based, i.e. redundancy, flexibility, capacity to reorganize and capacity to learn (Dodman, 2010; Hordijk and Baud, 2010). In what follows, we discuss how these concepts can contribute to flood resilience from the urban land perspective.

Urban lands should and can have the ability to substitute other urban systems in terms of flood protection. The development of multifunctional areas that can buffer flood waters or offer flood protection can reduce the vulnerability of urban areas to flood risk. Examples include the retention and/or infiltration of flood waters in water squares, multifunctional flood-defence zones such as terraced quay-walls that combine less vulnerable functions on the lower levels with better protection for the more vulnerable functions on the higher levels, or even integrating buildings as part of the flood-defence system. Fostering the implementation of multifunctional urban lands is complex as it requires accurate information on the contribution of these lands to flood protection but also the ability of local authorities to implement them, and therefore a better connection between academic interdisciplinary knowledge and real-world policy formulation and decision-making.

Crossing sectoral borders and recognizing the inter-linkage between cultural traditions and urban land use is a prerequisite to initiate dialogue on urban

land-use change, water excess storage and infiltration and flood risk reduction management.

However, despite considerable efforts in managing flood risk in urbanized areas, the implementation of multifunctional urban lands, able to increase retention and promote resilience in urban areas, is still in its infancy, both in research and in practice (Knieling and Mueller, 2015). The lack of collaborative approaches burdens the ability to identify potential substitutions between different urban systems in managing flood risk and, furthermore, in using lands as an institutional factor in developing a resilient city.

Mitigation measures tend to be potentially more efficient and more sustainable solutions to water-related problems in cities, redirecting the focus from traditional, technical and engineering-dominated protective measures towards measures based on NBS, including natural water-retention measures. NBS and urban-ecosystems restoration can serve as buffers against flooding, leading to a diversification of flood risk management approaches (Driessen et al., 2018). These NBS types of measures not only serve to reduce risk and provide more robust urban flood protection. They also provide additional environmental services, including increased biodiversity and recreation opportunities, as well as other environmental benefits such as improved water quality and aquatic habitats. However, a common characteristic of green infrastructure measures is that they often claim more land than traditional methods do. Land already in use for other purposes is often privately owned. Mobilizing private urban land for temporary flood storage means having to coordinate different actors and institutions in water management. This particularly includes engaging landowners and land-users actively in developing and implementing management plans (Hartmann, 2011). However, it also implies that managers employ a more transdisciplinary perspective and create governance mechanisms for transferring benefits from the downstream urban beneficiary to the upstream, often rural, provider (Macháč et al., 2018). There are few, if any, working models for such transfers of benefits and their development will require collaboration from all communities of end-use implementers – those who must benefit from the implementation on the ground level. This includes municipal and other governmental stakeholders, but also the landowners/users who will benefit from the reduced flood risks in return for some level of compensation for those benefits. Such a benefit transfer policy will be extremely difficult to impose from the top. Therefore, what is particularly needed are dialogue tools which policy makers can use to encourage the effective adoption of such nature-based technologies.

NBS for resilient cities – such as green roofs – can only be effectively implemented on a larger scale if land and building owners agree on implementing them. Further, such measures can raise conflicts around land-use issues (Van Straalen et al., 2018). Thus, making land available and getting the landowner/

user to implement the measures is one of the key challenges for NBS to contribute to mitigating and adapting to water-related risks in urban areas.

For the implementation of both multifunctional land use and NBS, the capacity to reorganize and learn are necessary conditions. There will be situations when critical decisions must be taken about where flood protection can be offered and where not. Therefore, it is important that as a society we are able to internalize previous experiences and use them for the future planning of urban areas.

The urban hydro-social system is a chain which includes not only the natural resources of an urban area, but also the human beliefs, activities and policies which affect the functioning of that system. Implementation of specific measures for gaining a resilient city in terms of flood risk (see Chapter 8 in this volume) requires extensive dialogue processes in order to ‘bring everyone onboard’ – to assure that the local ‘payers’ for the implementation of these services see the benefits they are paying for and that, by changing their practices, they can gain significant protection from flooding and other consequences of climate change. As such, the shift towards flood resilience is not just a shift towards different types of measures, but a societal shift towards learning how to live with floods in urban areas.

9.3 CHALLENGES FOR URBAN LAND MANAGEMENT SYSTEMS

In the following paragraphs we will discuss the link between urban land management systems and flood risk management, and in particular the spatial, legislative and institutional challenges. Which challenges can we meet in our efforts to ensure cities’ resilience against flooding? And how can urbanized areas be transformed to withstand rising surface-watercourses?

9.3.1 Spatial Challenges

Land use and zoning may exacerbate or limit the exposure and vulnerability of urban dwellers and infrastructure to the growing threat of climate change (flooding). Therefore, developing an integrated urban land-planning framework is a major issue in the process of implementing the resilient city.

New building activity poses important challenges to urban flood resilience. Exponential growth and aggressive development of peri-urban areas often conflicts with environmental aspects and climate change effects. Rapidly increasing urbanization rates worldwide are resulting in a deterioration of environmental quality. Uncontrolled urban development might lead to increased soil sealing and thus increased flood risks on the one hand and building activity in flood-prone areas that is not designed to withstand flooding on the other.

Even in planned urban developments, challenges lie in uniting urban planning with flood risk management (see also Chapter 10 in this volume). Urban planning has relatively short planning horizons and focuses on normal day-to-day flood conditions, whereas flood risk management takes the long term into account while also focusing on extreme flood conditions. According to Zevenbergen et al. (2008), matching these temporal scales is key to maintaining and improving urban flood resilience.

Also, the existing urban fabric often does not sustain flooding well. Due to increasing flood risks and the heavy reliance on engineered flood protection in the past, areas that were previously considered safe from flooding are increasingly affected by floods. Accommodating flooding in such areas would require high investments. As buildings affected by flooding become less valuable, vulnerable populations might move into flood-prone parts of the city, not only increasing overall vulnerability, but also inciting unjust situations (Nagenborg, 2019).

Therefore, the spatial challenge lies in regulating extensions to develop in a resilient way and retrofitting existing structures to accommodate flooding and thus become more resilient. Tackling these challenges requires thorough consideration of the distribution of responsibilities among all parties involved, i.e. legislative and institutional challenges.

9.3.2 Legislative Challenges

Legislative aspects play a crucial role in implementing efficient urban land management in order to obtain resilience to floods. Ensuring property rights over urban land and securing these rights, adopting a set of policies governing access to and use of land in the city under changing climate conditions and planning and managing cities all require a coherent and efficient legislative framework.

However, there are several challenges in securing this legislative framework. We can mention here the cities' bureaucracies, the frequency of political transitions in city leadership, financial policies and the access to technical assistance and knowledge resources.

The legislative capacity to combat the effects of climate change (including reducing the risk of floods in urban areas) is affected by the major focus of property rights on the market-oriented economy (especially in developing countries) to the detriment of ecological aspects. Restoring this capacity may, however, require government regulations in the public interest that will restrict private property rights (Freyfogle, 2003; Goldstein, 2004), which triggers the question of adequate compensation (see Chapter 3 in this volume).

Unfortunately, these issues are inevitably influenced by bureaucracy and political transitions in leadership. The integration in the legislative framework

of all stakeholders implies an interdepartmental cooperation between different institutions, working groups and committees, as well as key concepts such as participatory processes and public governance. In addition, the importance of the respective education level as well as the existence of easily assimilable sources of knowledge must be emphasized here. Cities with easily readable and understandable bureaucratic procedures and people who are able to understand bureaucratic procedures recover more quickly (Blaikie et al., 1994; Buckle et al., 2001; de Bruijn, 2005).

However, technical assistance and knowledge resources are not always easily accessible and may require special attention. In many cases, cities' fiscal systems are based on local collection of different taxes which may generate inequities. The absence of a sustainable source of revenues for local authorities is a major liability in the efforts of enforcing a legislative plan effective in achieving the state of resilience (Razin, 2000; Raphaelson, 2004). Resilient cities have succeeded in implementing a robust fiscal system capable of supporting the development and implementation of regulations on efficient urban land use at a local level in order to mitigate climate-change effects or planning adaptation.

Political transitions are also a significant challenge. Even if the resilience of a city represents a political commitment for all political orientations, political transitions are usually characterized by changes in agendas on the environment, land taxes, the level of bureaucracy and economic strategies. Political instability and inefficient leadership (which unfortunately almost inevitably occur especially in developing countries with a higher degree of corruption) will only exacerbate the difficulties of obtaining a resilient city.

As resilience is not an easily visible short-term goal, there is generally no interest in using political capital to implement specific resilience measures. However, a strong and committed political framework for urban land management systems is crucial for institutionalizing resilient cities.

9.3.3 Institutional Challenges

The institutionalization of different urban land policies and strategies aiming to reduce flood risk in urban areas within local administration and their integration with other sectoral plans is a key issue in implementing the resilient city. It has been proven that institutionally well-organized cities have a privileged position in developing measures for urban land management and their implementation (Blanco et al., 2011; Otto-Zimmermann, 2011). The regulation of urban land usually includes institutional processes for planning, subdivision of undeveloped land, zoning, and building codes for private and public development to ensure an appropriate approach to different challenges threatening the resilience status.

Worldwide, cities' institutions have created a range of mechanisms to implement flood risk-related policies. Unfortunately, there are several factors that threaten the effectiveness of these mechanisms: insufficient capacity and expertise, lack of devolved authority or appropriate responsibility, and decentralization level and financial resources.

Adapting institutional capacity to the complexity of urban land management to promote the concept of resilient city is a complex process. It involves a harmonious integration of three factors: human resources, financial resources, and capacity and decision-making power. In addition, the human component involves addressing an additional factor: expertise. Numerous situations have been documented in which the institutions involved in reducing the risk of floods have proved unable to achieve their objectives due to the lack of adequate staff with appropriate technical and socio-economic knowledge (Blanco et al., 2011; Otto-Zimmermann, 2011). In terms of financial resources, a challenge is to shift public investments from flood-protection to flood-resilience measures, which requires a wider range of actors to be involved and is much harder to realize.

An effective implementation of flood risk reduction mechanisms in urban areas requires a dedicated local authority with clearly assigned responsibilities. Unfortunately, in many OECD countries it has been documented that the local authorities from urban areas lack sufficient jurisdiction over aspects that significantly affect flood risk reduction (OECD, 2009, 2010).

Empowering local authorities from both political and financial perspectives could be a silver bullet in overcoming several institutional challenges regarding the institutionalization of resilient city. McCarney (2006) mentioned that cities could develop and implement more efficient planning and management functions if the local authorities are considered as key partners in national governmental structures and if they have significant financial power (see also McCarney et al., 2011). These aspects are strongly linked with decentralization processes that ensure the ability to take and implement decisions from the governmental sphere (in a manner closer to the citizens) in urban areas for mitigating flood risk. Decentralization also provides local authorities with the responsibility for the management of their urban lands. Efficient urban land-use planning, a process that is not easy to develop and implement, is a key aspect for institutionalizing the measures for achieving a resilient city.

9.4 OPPORTUNITIES FOR THE FLOOD-RESILIENT CITY

A wide range of structural and non-structural measures exist to accommodate flooding in cities. Structural measures are physical constructions aimed at reducing or avoiding impacts of floods, such as dikes, barriers and dams, while

non-structural measures use knowledge, practice or agreement to reduce flood risks, such as building codes, awareness raising and early warning systems. In what follows, we discuss some of the spatial, legislative and institutional opportunities that might arise to advance the development of the flood-resilient city.

9.4.1 Spatial Opportunities

Different flood-proofing measures are available, in terms of different types of development (new vs. existing structures), scales (building vs. neighbourhood vs. city vs. region), distribution of responsibilities (individual vs. collective) and type of solution (engineered vs. NBS). Most of these measures have been or are being tested for soundness and cost-efficiency, proving to be promising opportunities to achieve flood resilience through redundancy and flexibility. Especially individual adaptation measures are believed to contribute substantially to the resilient city by contributing to urban planning objectives such as attractive waterfronts (see Chapter 8 in this volume). As Zevenbergen et al. (2008, p. 87) explain “This is because they do not have to hinder urban development, unlike some collective, resistive measures (e.g. large embankments), and can provide simultaneous short-term societal benefits (e.g. high amenity value of attractive waterfronts)”.

The choice between these different measures is not merely a technical one. It raises important political questions on the distribution of risk and the costs and benefits among the different stakeholders involved, especially the people exposed to flood risks. For example, while individual adaptation measures might be promising, this also means that responsibilities for flood protection are shifted from collective (principle of solidarity) to individual, challenging existing distributions of responsibility. Considering the already existing potential issues with fairness and justice (Fainstein, 2015), it is important to carefully consider efficiency, effectiveness and distribution of responsibility when proposing flood-resilience measures.

Technical solutions can be found to almost any flood problem. However, in order to achieve the flood-resilient city, the challenge lies in implementing these measures (Hartmann and Jüpner, 2020). Depending on the specific nature of the preferred flood-proofing measures, different stakeholders are involved in the implementation. To create the right momentum or window of opportunity for the implementation of flood-resilience measures, different types of resources need to be available. While it might be hard to pursue flood resilience under normal day-to-day conditions, moments of new developments or redevelopment and renovation signify a real opportunity to develop resilient cities. In the (re)development phase, financial capital and technical expertise

gather around a specific area or building(s), representing a window of opportunity for the resilient city to be implemented.

It is often easier to flood-proof buildings and areas as part of the initial design than retrofitting measures into existing spatial structures. Indeed, “opportunities created by urban transformation and restructuring can be used to implement additional or even new flood mitigation measures and thus deliver resilience” (Zevenbergen et al., 2008, pp. 86–87). For existing spatial structures, flood-resilience measures can be retrofitted into existing structures during a renovation phase.

Aside from the presence of capital and momentum, also some kind of motivation for the implementation of flood-resilience measures is needed. After all, it is highly unlikely that the implementation of the flood-resilient city will happen spontaneously. Therefore, structural flood-resilience measures need to be flanked by non-structural measures promoting the implementation of these measures. These include land-use regulations (making the implementation of flood-resilience measures mandatory) or other rules and regulations, for example to mediate costs through subsidies or tax reductions.

9.4.2 Legislative Opportunities

It is difficult to identify truly legislative opportunities that can support the process of institutionalizing the resilient city. Instead of pursuing a bureaucratic process for legislative changes, the focus should be on a more accessible approach based on often-overlooked issues like participatory governance, public consultation and participatory process. Involving citizens in the decision process regarding urban land use, flood risk mitigation, and spatial planning within the broad objective of achieving city resilience is a must since these decisions will have direct and indirect effects on them. Thus, participatory process is a key aspect in institutionalizing the resilient city (Lovan et al., 2017; Schauppenlehner-Kloyber and Penker, 2016; Marana et al., 2018).

In addition, successful implementation of specific measures for achieving urban resilience demands a broad range of stakeholders at the local level to support, internalize and adapt to strategies in order to produce successful results. Using dialogue-based and action research-adapted techniques to build community capacity in order to facilitate future implementation of flood risk reduction management strategies which are sustainable economically, environmentally and socially can represent an alternative to overcome potential legislative obstacles.

Another key concept used at the European policy level in this context of rapid environmental and social changes that are threatening and/or impeding urban resilience is co-creation. This concept integrates participatory governance and the process of bottom-up innovation for development. It involves

the active contribution of citizens to delivering flood-resilience measures, an action that can lead to more resilient cities (Heron and Reason, 1997; Lemos and Morehouse, 2005; Ruiz-Mallén, 2020).

Aside from pursuing development and coordination, spatial planning also has an important regulatory function. In this function, land-use policies could enforce a minimal degree of flood resilience. Available instruments are zoning plans and ordinance, development controls for land use and density and building codes, for example for elevated (infra)structures, flood-proofing and NBS (Burby, 2000). As such, the implementation of the flood-resilient city could be legally enshrined in spatial planning law.

9.4.3 Institutional Opportunities

The integration of the resilience concept in the urban planning processes implies the inclusion of cultural, environmental, social and economic factors in innovative planning and design solutions.

In many cases, the development of new infrastructure to increase cities' resilience can be particularly costly so that a more affordable and less bureaucratic alternative may be the process of renovating existing infrastructure. The process of renovation or retrofitting should be conducted in ways that respond to current societal challenges such as the need for increased liveability and sustainability, reducing the impact of natural hazards and risks, and ensuring the conditions for a fast and efficient post-disaster recovery (see also Chapter 10 in this volume).

As local communities are often the main contributors to increasing the resilience of urban areas, the implementation of a system of subsidies and facilities for contractors could help to mitigate financial pressures. Renovation and/or retrofitting for resilience is challenging, but within a sustainable dialogue-based approach it can catalyse positive energies across communities and improve quality of life.

Mobilizing private and public urban landowners for implementing flood-resilience measures that also allow urban development means coordinating different actors and institutions. This particularly includes engaging building owners, landowners and land-users actively in developing and implementing flood risk management plans, but it also implies that managers employ a more trans-disciplinary perspective and create governance mechanisms for transferring risks and benefits (Hartmann, 2011; Macháč et al., 2018). There are few, if any, working models for such transfers of benefits and their development will require collaboration from all communities of end-use implementers – those who should benefit from the implementation on the ground level. These include municipal and other governmental stakeholders, but also the building owners, landowners and land users who will benefit from

the reduced flood risks, in return for some level of compensation for those benefits. Such a benefit transfer policy will be extremely difficult to impose from the top. What is particularly needed are dialogue tools which can be used to encourage the effective adoption of innovative solutions like nature-based technologies.

9.5 DISCUSSION AND CONCLUSIONS

Transforming urban lands to withstand rising surface-watercourses and rainfall levels in order to keep damage low when flooding occurs offers a promising contribution to enhancing flood resilience of urban systems. However, this transformation process requires changes at institutional, legislative and spatial levels as well as the participation and coordinated action of multiple stakeholders. These changes should ensure and support the integration of urban lands in public protection strategies through land-use measures, enhancing overall resilience to flooding.

The capacity of urban lands to absorb climatic shocks and to replace certain functions of urban systems in the area of civil protection must be addressed in an inter- and multi-disciplinary fashion, securing effective cooperation between various stakeholders involved in developing urban land management systems for achieving resilience.

However, the implementation of these urban land management systems involves overcoming certain obstacles of a legislative, spatial and institutional nature. Developing an integrated urban land planning and management framework is a major issue in the process of implementing the resilient city. This process is threatened in many situations by rapidly increasing urbanization rates, insufficient capacity and expertise of local and regional authorities, lack of devolved authority or appropriate responsibility, inadequate decentralization, insufficient financial resources and policies, bureaucratic aspects, frequent political transitions in city leadership, insufficient access to technical assistance and knowledge resources, and unsuitable market-oriented approaches in urban land management.

Overcoming these obstacles is an issue of responsibilities allocation across scales of governance and among different categories of stakeholders. The distribution of risk and the costs and benefits among the different stakeholders involved within a cooperation framework based on participatory governance, public consultation and participatory process will facilitate future implementation of flood risk reduction management strategies, which are sustainable economically, environmentally and societally. The overall coherence and alignment of resilience policies is based on valuable dialogue-based and action research-adapted techniques which encourage co-creation and effective

adoption of innovative solutions like nature-based technologies (Yohe and Strzepek, 2007; Revi, 2008).

In conclusion, urban land planning and urban land management systems are key adaptive institutions in the process of adapting to unavoidable impacts of climate change and reaching resilience status. Institutionalizing resilient cities is a matter of several urban policy issues including governance efficiency, effective planning capacity, agile planning and land markets, and sustainable planning strategies.

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