

Managing urban flooding in the face of continuous change

Many cities around the world are facing the challenges of sustainable living and development and are exploring ways to enhance their ability to manage an uncertain future. Drivers and pressures include relative wealth; population growth; the provision of food; lifestyle expectations; energy and resource use and climate change. These pose new challenges for the way in which we manage urban floods. There is no clear cut, 'best' solution for the avoidance of catastrophic flood events or even how to 'live with (all) floods'. The way forward is thus far from clear although what we can be sure about is that we are rapidly entering a phase of fundamental change and our willingness and ability to adapt to and mitigate the worst effects of this will be critical.

We live in 'yesterday's' cities. Many of the urban patterns that we see today – such as city layouts, buildings, roads and land ownership – are legacies of up to a century and a half of urban policy and decision-making; even longer in some of our cities. Tomorrow's cities will also be shaped by the decisions we make today. They must respond to more rapid changes in physical, social, economic and institutional conditions than recent generations have been used to.

In general, cities are becoming larger and denser. Urban expansion is an issue of serious concern and is often placed as a justification for densification. The fundamental question of whether urban expansion should be resisted, accepted or welcomed is still largely unresolved. From the perspective of flooding, concerns for indiscriminate urban expansion or 'sprawl' have captured the attention of both policymakers and academics during the last decade. This is because, alongside climate change, it is considered as the major driver for increased flood risk. Sprawl will occur where unplanned, decentralised development dominates, as is common in developing countries. Where growth around the periphery of the city is coordinated by a strong urban policy, more compact and less vulnerable forms of urban development can be secured. It is evident that these approaches to development have direct consequences for the way floods are managed both in terms of the vulnerability of the urban area and its inhabitants and also in terms of the often indiscriminate effect that urban growth has on the generation of floods in terms of runoff and flood probabilities. At first glance there seem to be conflicting interests between the flood-risk managers who advocate open, green spaces in their cities and those who adhere to the compact cities concept as the sustainable urban form for controlling transport-related greenhouse gas emissions.

Urbanisation, both as a social phenomenon and physical transformation, is driven by processes that take place at varying temporal scales from relatively slow (e.g. migration, rising water demand, sea level rise and changes in laws) to rapid (e.g. natural disasters, changes in regulations and economic systems). While there is much that is uncertain about the urban future, some recent experiences show that

some urbanisation pathways are more desirable than others because they will likely lead to more (flood) resilient cities. These experiences highlight the need to take a completely new and different perspective on urban design, planning, and building. Creative thinking and innovations in socio-economic and technological systems are essential to change existing management structures and regimes. There is a growing recognition that responses which enhance resilience can be implemented gradually in combination with autonomous retrofitting, and offer prospects for action in the short term in regional planning and development in cities. These interventions should operate in a mode of constant learning and experimentation. Those interventions do not only reduce flood impacts, but also create new opportunities and co-benefits.

The term 'resilience' is often used in discussions about sustainability. For some, resilience is a more useful concept than sustainability, for instance when it is used within the context of sustainable urbanisation. This is partly because resilience embraces explicitly the dynamic nature of (complex) systems such as cities, whereas sustainability is often conceived as a goal to which we should collectively aspire. For others, however, sustainability is an attribute



“There is no single ‘magic’ recipe for successful planning of a city in response to the challenges of sustainability, climate change and flood risks.”

of dynamic, adaptive systems that are able to flourish and grow in the face of change.

Resilience in cities depends both on its physical form and characteristics as well as on the people’s capacity, and social behaviour. Community resilience requires self-reliant, skilled and capable citizens who have ‘developed iterative learning with mature face-to-face social networks’. There is no blueprint for urban sustainability, but there is a growing recognition that innovative planning approaches and processes based on these resilience principles will guide citizens and other stakeholders the way to become co-producers of a sustainable community that can respond to change and disruption, and pro-actively reduce vulnerabilities. These approaches (and processes) should not be viewed as models that can be applied in all contexts since they are shaped by the social and cultural norms of particular places.

There is no single ‘magic’ recipe for successful planning of a city in response to the challenges of sustainability, climate change and flood risks. This is partly because every city has a unique context. What we have learned is that urban design, master planning and the management of buildings, infrastructure, public utilities and

green spaces must be included in any urban flood-risk management strategy. We also learned of the need for long-term planning. A long-term perspective allows us to identify opportunities for synergy and to overcome barriers for implementation, such as investments that both enhance resilience and provide short-term additional economic, social or environmental benefits. A long-term perspective is also fundamental for incorporating sustainability indicators, such as life cycle cost. Planning with a long-term perspective thus opens the way to develop strategies that are more resilient, adaptable and responsive. It also requires skilled and capable stakeholders who are knowledgeable about the systems they live in and are capable of mainstreaming flood-risk management in the process of (re)development.

In most industrialised countries, the building stock is mainly ageing and there is much heritage. In the coming decades, the redevelopment (c.f. renovation and modernisation) of the existing stock is a high priority and certainly of higher priority than the provision of new housing. European cities are composed of mixtures of buildings of different ages and life spans, but within 30 years, around one-third of its building stock will probably be renewed. The same holds true for many other cities of the Western world, where continuous restructuring will be common practice. Redevelopment projects may thus provide windows of opportunity to make adjustments in the process of urban renewal in order to restore old mistakes and to build in more resilience by adapting and restructuring the urban fabric to new conditions of increased flood risk. The developing world, however, is not constrained by past investments, and much of their ‘urbanisation’ is to come in the next few decades. There is a huge challenge to exploit this momentum. If we are able to seize these windows of opportunity and share good practices via city-to-city networks stretching across country boundaries and other social networks, then we can create the groundswell for real practical change towards flood-resilient cities on a more global scale. There are a growing number of emerging examples of innovatory initiatives changing the way in which these challenges are being addressed and of which we can learn!

