



© Nacira Kabisch

Urban resilience and sustainability, two sides of the same coin?

We have entered a new urban era in which the ecology of the planet is increasingly influenced by human activity. Due to increasing urbanisation, cities have become the center of attention, as they generate a rising demand for natural resources and have a global environmental impact.

Urbanisation puts increasing pressure on nature, and weakens its resilience to a changing climate and events such as natural disasters, with devastating consequences for cities and their inhabitants. With the recent memories of hurricanes Sandy and Haiyan, floods in England and Wales, urban heat waves and air pollution, in addition to increasing costs of energy, food and water supply, cities and urbanized regions are aware of the urgent need for action. Many cities have seen an increase in community initiatives for restoring nature and have supported sustainable activities. There is now an opportunity to strongly improve global sustainable development over the next two to three decades by increasing resource efficiency, and exploring how cities and citizens can reconnect to the biosphere and become responsible stewards of biodiversity and ecosystem services, both within and beyond city boundaries.

This factsheet will explain the importance of understanding the relationship between people and nature in urban planning and decision making in order to achieve urban resilience and sustainability.

Urban resilience and sustainability thinking

Change and flexibility in urban planning are needed to encourage sustainable development, enhance resilience and develop solutions for today's urban challenges.

What is urban sustainability?

The classic definition of sustainability focuses on managing resources in a way that guarantees welfare and promotes equity for current and future generations. Building on this definition, urban sustainability needs to incorporate a holistic perspective of urban areas and their impact on the rest of the planet.

What is urban resilience?

Resilience is the capacity of a system to absorb disturbance, such as a hazard or natural disaster, and reorganize itself while undergoing change, thereby essentially retaining the same function, structure, feedbacks and identity. Urban resilience is commonly thought of in the context of response to sudden impacts. However, it is important to look beyond single disturbances.

Combining urban sustainability and resilience

Sustainability should preferably be viewed as the goal of society while resilience represents a characteristic of the urban system. The two concepts come together as a powerful team in the context of development. Urban areas engaging in sustainable development increase their capability and flexibility to adapt and recover when faced with changes. This creates opportunities for cities to maintain environmental and human well-being, while making sure this does not erode the well-being and the ability of places elsewhere on the globe to be adaptive and sustainable.

Adapted from: Urban Resilience Thinking, Thomas Elmqvist, Stockholm Resilience Centre, Stockholm University, 2013

Many cities have started using the ideas of urban resilience and sustainability in the context of specific locations. However, urban resilience and sustainability are not linked to any particular location but apply to entire systems – open systems consisting of a wide range of resource, waste, capital, and knowledge flows. The links can be very complex and the feedback mechanisms indirect. A narrow definition and too local

an application of sustainability can result in unintended consequences such as the 'lock-in' of undesirable urban development trajectories and degradation of sustainability elsewhere. However, new models which place a value on the services that nature can provide in urban settings are emerging and in combination with increased global collaboration across cities they can help produce sustainable resource chains.

How nature contributes to urban resilience and sustainability

Cities consist of much more than their citizens and human-made structures, such as houses, roads, bridges, parks, harbours or airports. They are also home to the natural and social foundations for human well-being and a sustainable future. To understand and enhance these city functions, particularly in light of challenges such as climate change, food, water and energy security, it is important to acknowledge and value the relationship between society and ecological systems and the solutions that nature can offer.

To achieve a transition to a sustainable and resilient urban future, resource use and environmental impacts need to be addressed not only within the urban boundaries, but also by accounting for the dependence of cities on ecosystems, natural resources and people in surrounding areas and other parts of the world. Today, a major challenge for many cities

is disaster resilience, which is a strong determinant of urban sustainability. Many of the world's cities are located in coastal regions which are prone to flooding and erosion. Even with extensive investments in flood prevention technologies such as dikes and dams, flood occurrence is increasing globally due to a combination of climate change, construction practices and changes in land use. Nature can be a source of resilience; the restoration of wetlands or forests, the conservation of sand dunes, fresh water marshes, coral reefs and mangroves all provide more cost-effective solutions to coastal protection.

The cost-effectiveness of such nature-based solutions is demonstrated by New York City that evaluated two schemes to manage its storm water flows. One was a green infrastructure plan that emphasized stream restoration, green roofs, and bio-swales, landscape

elements designed to remove silt and pollution from surface runoff water. The other option was a grey infrastructure plan involving tunnels and storm drains. The green infrastructure option presented cost savings of more than \$1.5 billion (NYC Green Infrastructure

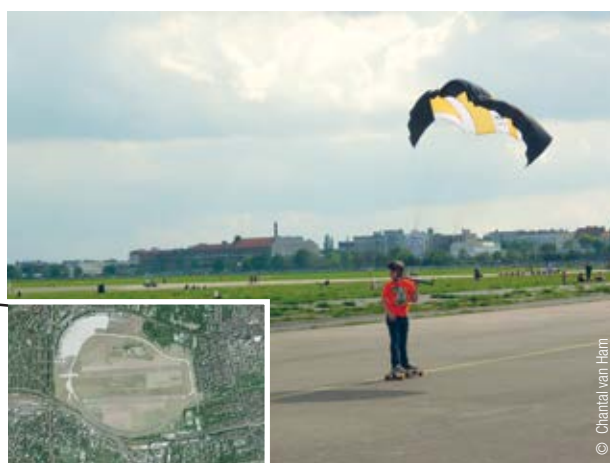
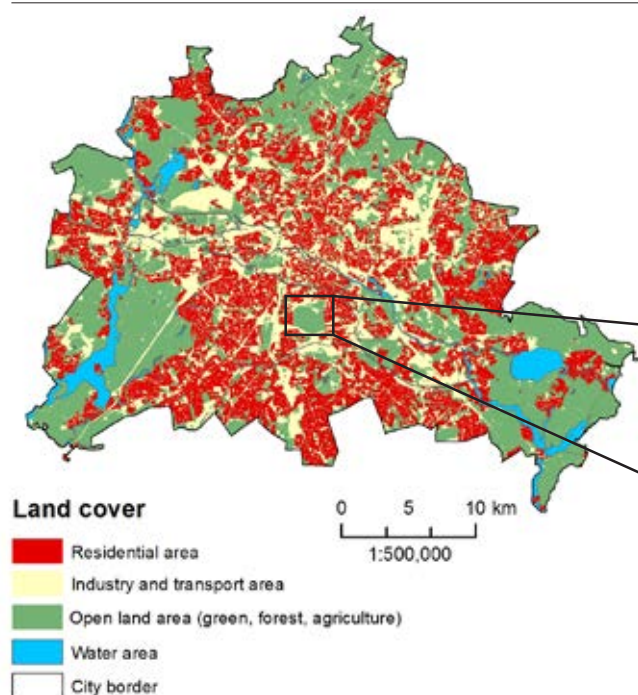
Plan¹). Although green infrastructure may not always be the most cost-effective approach, the simple act of comparing green and grey alternatives can help to identify new opportunities for investing in nature and increasing urban resilience.

Case study: Brownfield regeneration in Berlin – the former city airport Tempelhof

Collective management of green spaces can contribute to resilience by promoting citizens' capacity for learning and adaptation, and strengthen their interest and involvement in urban planning and decision making. The conversion of a brownfield site, the former city airport Berlin-Tempelhof, into an exceptionally large urban green space of more than 300 hectares, is a good example of a resilient development that promotes sustainability. The green space provides several sports and recreation facilities and helps the city to adapt to and mitigate climate change and related heat stress, mainly through night time cooling in the open spaces and through fresh

air corridors on the outer parts. This type of renaturing of brownfield sites and green space enhancement for recreation, presents one way of contributing to urban resilience and transformation, while improving the health and well-being of the people in Berlin.

This transformation represents the experience of many early industrialised cities where inner-city transportation areas or large water fronts have been converted to other types of land use. Situated 5 km south of Berlin's city center, Tempelhof was opened for public use in May 2010.



The land cover in the study area is based on Urban Atlas (reference year 2006, European Commission, Directorate-General for Regional Policy). The photo shows a part of the former runway.

The area hosts a variety of recreation facilities and, on warm summer days, is visited by more than 10,000 people. Sealed areas such as the former runways are used for cycling and running, while parts of the large lawns are nature conservation areas. Other areas have been designated for activities such as barbecuing, picnics or dog-walking. Some spaces are reserved as pioneer areas based on a one-year contract with local residents, and include spaces for urban gardening and environmental education, which foster public participation and have a long-term perspective.

Due to its strategic location, Tempelhof is easily accessible via Berlin's rapid transit system for more than 25,000 inhabitants who live within a 500 m distance from the park entrances and for more than 180,000 inhabitants who live within a distance of 1,500 m. This means that around 5% of the city population can directly benefit from the ecological and recreational services provided by Tempelhof.

¹ NYC Green Infrastructure Plan: A sustainable strategy for clean waterways, New York City http://www.nyc.gov/html/dep/pdf/green_infrastructure/NYCGreenInfrastructurePlan_ExecutiveSummary.pdf

Towards urban planning for resilience

Urban planners can, in collaboration with local stakeholders and experts, formulate policies and programmes that build resilience and promote sustainable development. A good strategy for prioritising and addressing trade-offs among social, environmental and economic decisions is to initiate an Urban Resilience Assessment, which consists of the following guiding principles:

1. **Promote sustainable innovation:** Cities are places where many innovations take place, but they can cause problems if they are not designed to contribute to a sustainable pathway.
2. **Maintain diversity:** Greater diversity of ecological functions increases urban sustainability through the ability to thrive, survive and bounce back from external shocks or stresses and respond to a high degree of uncertainty.
3. **Focus on modularity:** Urban landscapes are complex systems. It has to be ensured that urban components - such as green spaces, infrastructure and institutions - have enough independence, to ensure that damage or failure of one part or component of a system has a low probability of affecting the other components, e.g. to prevent spread of infectious diseases by improving urban water circulation and water quality.
4. **Restore ecological functions:** Ecosystems offer unique values for achieving resilience in an uncertain urban environment. Their un-priced functions, which offer multiple benefits to society (such as clean air), have to be maintained, restored and integrated in development planning and assessment.
5. **Tighten the decision cycle:** The faster a system can detect and respond to changes in and outside the system, the greater its potential for effectively coping with these changes, and thus for achieving higher levels of resilience.
6. **Build social capital:** Establishing environmental stewardship can nurture urban resilience and increase equitable access to green space as well as access to the benefits of natural resources. Empowering local communities and capacity-building can contribute to find sustainable solutions for managing natural resources.
7. **Connect urban governance processes:** Effective governance of urban biodiversity and ecosystem services requires a multi-disciplinary and collaborative approach and the creation of synergies between various urban policy areas.
8. **Connect local and global scales:** Cooperation is important for harmonising sustainable actions at international, national, sub-national and local levels. Individual cities cannot be considered sustainable without acknowledging and accounting for their teleconnections, i.e. the long-distance dependence and impact on ecosystems, resources and populations in other regions around the world.

Project donor



Project partners



Self-financed partners



Contact:

Thomas Elmqvist
Stockholm Resilience Centre
Kräfricket 9A
11419 Stockholm, Sweden
Tel: +46 (0)705264806
info@urbesproject.org
www.urbesproject.org

This factsheet is part of a series of factsheets produced by the URBES project.