



**Resilient  
Cities** 2013

# Congress Report

4<sup>th</sup> Global Forum on Urban Resilience and  
Adaptation

Bonn, Germany | 31 May - 2 June 2013

**NACHHALTIGKEIT.  
SUSTAINABILITY.  
DURABILITÉ.  
BONN.**



### Resilient Cities 2013: Congress Report

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Authors: Alice Balbo, Emily Dowding-Smith, Laura Kavanaugh

Layout: Ugne Vaitiekunaite

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### ICLEI World Secretariat

ICLEI - Local Governments for Sustainability e.V.

Kaiser-Friedrich Straße 7

53113 Bonn, Germany

resilient.cities@iclei.org

www.iclei.org

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The Resilient Cities congress series was launched in May 2010 by ICLEI to establish the first global forum on climate adaptation and resilience at the local level. Based on the 2013 congress proceedings, this publication summarizes key issues affecting cities, local governments and stakeholders around the world. Presentations and session descriptions from the 2013 congress, along with additional publications, multi-media coverage, and updates for 2014 can be found on the Resilient Cities homepage:

<http://resilient-cities.iclei.org>

The Resilient Cities 2013 Congress Report summarizes the core discussions and outcomes of the 4<sup>th</sup> Global Forum on Urban Resilience and Adaptation to climate change. While an increasing number of cities and organizations now recognize the need for urban adaptation planning, it is clear that more must be done to move local governments quickly toward the implementation phase.

The following pages provide insight into how this objective can be achieved. They offer a snapshot of the state of urban resilience and adaptation examples from

around the world. Ideas, suggestions, and lesson learned for future adaptation work from leading experts and practitioners are also provided.

The 2013 report expands upon core themes of the Resilient Cities congress series, detailing tips, innovations, and case studies. The aim is to provide current, actionable advice for local governments to create more resilient cities. The outcomes contained in the 2012 Congress Report remain relevant and may be read in conjunction for further context.

## Key messages of the Resilient Cities 2013 Congress include:

**Local government leadership** must continue to drive global action on climate change and champion the local adaptation agenda.

Mayors Adaptation Forum | **p. 7**

**City region food systems** make cities more attractive and resilient.

Resilient Urban Food Systems Forum | **pp. 8 - 9**

**Building and construction practices** can mitigate climate change while reducing future risks and vulnerabilities.

Resilient Building and Construction Forum | **p. 10**

**Spatial data tools** support informed, transparent decision-making on urban resilience and disaster risk reduction.

Spatial data kick-off session | **p. 11**

**Multi-sectoral, multi-stakeholder collaboration** builds local capacity and support to face the complex and uncertain impacts of climate change.

Urban planning and policy | **pp. 11 - 13**

**Urban risk and vulnerability assessments** are an important early step to prioritize adaptation actions.

Urban planning and policy | **pp. 12 - 13**

**Adaptation on the ground** is progressing in cities worldwide.

Reality Check Workshops: Vancouver, Canada | **p. 12**  
Dar es Salaam, Tanzania | **p. 14**  
In Focus: ACCCRN | **p. 16**

**Community-based and participatory methods** can achieve cost-effective knowledge exchange and promote community ownership.

Social aspects of adaptation | **pp. 15 - 16**

As **climate change vulnerability and poverty are interlinked**, so too should be development and adaptation plans.

Social aspects of adaptation | **p. 16**

**Ecosystem based adaptation** and the use of **blue-green infrastructure** is increasingly popular for its many co-benefits, though some are difficult to quantify.

Ecosystem based adaptation | **p. 17**

**Resilient infrastructure and technology** can boost efficiency today and prevent future costs and damages.

Resilient infrastructure and technology | **p. 18**

**Public-private partnerships** and reducing the **risk with private sector involvement** are essential to finance resilience.

Financing resilience | **p. 15**

## Congress composition

The congress consisted of 48 sessions over three days including:

- **29 theme sessions** on key aspects of urban adaptation and resilience.
- **3 plenary sessions:** Opening, Financing the resilient city, Summary and outlook.
- **2 Reality Check Workshops** featuring the cities of Dar es Salaam, Tanzania and Vancouver, Canada.
- **23 poster presentations** in two dedicated sessions.
- **10 exhibitors** present throughout the three days.
- **The Resilient Urban Food Systems Forum.**
- **The 3<sup>rd</sup> Mayors Adaptation Forum.**
- **The Resilient Building and Construction Forum.**
- **A Spatial data kick-off session.**
- **Young Researchers Forum.**
- **A networking event, exhibit opening, and 3 coffee break launches** of a platform, publication, and network.

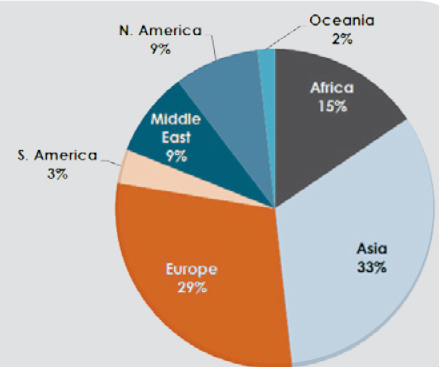
**498** participants from **51** countries

22% from developing countries

**212** speakers

**115** local government representatives

from **55** cities



Local government representation by region

## Scene setting

Resilient Cities 2013, the 4<sup>th</sup> Global Forum on Urban Resilience and Adaptation to climate change, gathered nearly 500 participants including over 200 speakers in Bonn, Germany. From May 31<sup>st</sup> to June 2<sup>nd</sup>, representatives from local governments, international and non-government organizations (NGOs), academic and research institutions, and the private sector exchanged ideas and solutions on how to make cities more resilient and adaptive to climate change ahead of the UNFCCC Bonn Climate Change Conference.

## Importance for local governments

Resilient Cities is a global platform for exchange on urban adaptation and resilience. The forum allows local governments to share challenges, solutions, and experiences with cities from around the world. They learn from new research, innovative tools and methodologies, and successful programs showcased at the congress. In addition, city leaders can connect with new allies in adaptation. The progress made and partnerships forged across four successful global forums demonstrate the importance of the congress for catalyzing local action on climate adaptation and resilience. It also attests to ICLEI's continued leadership in local capacity building and international, multi-sectoral knowledge exchange.

*"The congress offers an interesting exchange of ideas on what the state of climate adaptation is in different cities."*

*Birgit Georgi, Project Manager,  
European Environment Agency, Denmark*

## Patronage

- **Helen Clark**, Administrator, United Nations Development Programme (UNDP)
- **Joan Clos**, Under Secretary General, United Nations; Executive Director, UN-Habitat
- **Margareta Wahlström**, Special Representative of the Secretary-General (SRSG) for Disaster Risk Reduction, The United Nations Office for Disaster Risk Reduction (UNISDR)
- **James Nxumalo**, Mayor, eThekweni Municipality/Durban, South Africa; ICLEI Vice President and Resilient Cities portfolio holder
- **Peter Altmaier**, German Federal Minister, Environment, Nature Conservation, and Nuclear Safety
- **Dirk Niebel**, German Federal Minister, Economic Cooperation and Development



### Resilience is key to local development

Urban systems and communities need to be able to withstand stress and survive, adapt, and bounce back after a crisis or disaster. The capacity and ability to do this is a city's resilience. Water, food, energy, infrastructure, flows of goods and services, and health and safety can all be affected by extreme events like earthquakes or tsunamis, testing a city. When more frequent impacts of climate change such as flooding or storm surges are felt at a higher intensity, cities must be prepared and ready to adapt. As illustrated throughout the Resilient Cities congress series, there are key overlaps between adaptation planning and disaster risk reduction (DRR). From a development perspective, however, resilience goes beyond climate adaptation and the risk-oriented approaches of DRR. Cities must, in addition to taking a long term view of sustainability, prepare themselves to be more resilient. They must capture the synergies between sustainability planning, DRR, and resilience, and mainstream plans and policies into all aspects of urban development. The need for cities to proceed in this manner is the underlying theme of the congress series.

### Natural disasters and losses in 2012

In 2012, the recorded losses in terms of human life and insurance costs from disasters - though lower than in 2011 - still ranked above the ten year average. According to [Munich Re](#) (2013), the worst catastrophe in 2012 was Typhoon

*“Empowered communities with local government support is crucial for scaled up Disaster Risk Reduction.”*

*Diane Archer, Researcher, International Institute for Environment and Development (IIED), UK*

Bopha in the Philippines with more than 1,100 fatalities, followed by the cold wave in Europe (530), floods in Pakistan (455) and Nigeria (431), and an earthquake in Iran (306). Hurricane Sandy was the most expensive disaster, resulting in economic losses of US\$65 billion and insured losses of US\$30 billion in the states of New York and New Jersey (USA) alone. Drought in the USA with its subsequent agricultural losses was the second most costly disaster, and severe weather and tornadoes were the third. Ninety three percent of loss events were weather related and seven percent were caused by earthquakes. The losses from earthquakes in Italy's Emilia Romagna province totaled US\$16 billion.

Less well known than these large, high profile examples were the flow on effects of natural disasters felt within cities and specifically by the urban poor. Droughts reduce yields and lead to food price hikes, indirectly pushing millions of people below the poverty line and reducing food and nutritional security. For urban areas, it is these flow on effects which local governments need to take into account. Local action will always be connected to global issues.



## ●●● Developments from 2012 to 2013

### Progress 2012 - 2013

The Resilient Cities congress series has evolved as cities become more confident with adaptation planning. However, the focus remains on the early stages, with only a few cities discussing implementation. It is evident that many more cities not in attendance have yet to consider adaptation planning (Hanna et al, 2013; EC-DG Clima, 2012; CAI-Asia and CDIA, 2012), posing the question: are we moving fast enough?

### Partnerships

For the 2013 edition, Resilient Cities teamed up with a wide range of partners. The Rockefeller Foundation and the International Development Research Centre (IDRC) brought their international experience on adaptation in Asia and Africa to several dynamic sessions. There was also increased involvement of the private sector, with representatives from the World Green Building Council, Forest Stewardship Council, Plantagon International, and Esri. The input of these partners plus 39 endorsing partners contributed to the extreme relevance and richness of the congress program.

### Publications

[The Resilient Cities 2012 Congress Report](#) (August 2012) summarized the congress discussions and outcomes.

[The Crisis Response Journal](#) (Vol. 8, 4) covered Resilient Cities on the need for better planning and policy tools for disaster risk reduction in terms of food and nutritional security at the local level.

### Governance

#### **A new ICLEI governance structure: Mayor Nxumalo as portfolio holder of the Resilient City agenda**

In the past year ICLEI – Local Governments for Sustainability underwent a governance reform, formalized in the new Strategic Plan 2012-2018 at the Global Executive Committee meeting in October 2012 in Seoul, Republic of Korea. Included was the appointment of Mayor James Nxumalo of the City of Durban as ICLEI's Vice President and portfolio holder for ICLEI's Resilient City agenda. More than 10 years of ICLEI adaptation experience worldwide is now combined with the expertise and global leadership of the City of Durban.

#### **The Durban Adaptation Charter: From commitment to implementation**

After the adoption of the [Durban Adaptation Charter for Local Governments](#) in December 2011, several steps have been taken to translate the commitments into real actions under the strong leadership of the City of Durban and

ICLEI. A three day workshop in March 2013 was organized in Durban with the support of ICMA and USAID and in cooperation with IIED and MIT. Climate change adaptation leaders from selected local governments and experts identified the principles with which to translate the charter into an implementation path for local governments. The workshop results were shared in a special Mayors' session at Resilient Cities 2013 (see page 7).



*James Nxumalo, Mayor, City of Durban, South Africa; ICLEI's Vice President and portfolio holder for ICLEI's Resilient City agenda*

### Finance

The bottom-up approach identified in the ICLEI Global Report [Financing the Resilient City](#) is still very relevant. ICLEI is continuing its cooperation with Global Infrastructure Basel (formerly Global Energy Basel) which convenes an annual Sustainable Infrastructure Financing Summit in Basel, Switzerland. For the second year in 2013, ICLEI supported the selection of sustainable infrastructure projects from local governments by endorsing and assisting four ICLEI members (Cape Town, South Africa; Buenos Aires, Argentina; Shimla, India; and Dumangas, Philippines) in using the Global Infrastructure Basel Project Grading Tool and preparing their pitches to the audience of investors.

*"An adaptive and resilient community on disaster risks and climate change related hazards becomes a more progressive and productive community."*

*Ronaldo B. Golez, Municipal Mayor, City of Dumangas, Philippines*

## ●●● Mayors Adaptation Forum

Twenty mayors and municipal leaders convened at Resilient Cities 2013 for the 3<sup>rd</sup> Mayors Adaptation Forum. The two day forum consisted of open sessions within the congress agenda and special closed meetings. The Mayors Adaptation Forum is the leadership segment of the congress. It facilitates focused consultations between city and global leaders on how to advance the local adaptation and resilience agenda and garners concrete commitments. The forum was organized by ICLEI in cooperation with the World Mayors Council on Climate Change and the City of Bonn.

### Outcomes

This year, the dialogues focused on three core themes:

- **the Durban Adaptation Charter** –implementation and promotion;
- **city region food systems** – and their importance for urban resilience and adaptation; and
- **local government advocacy** - in global climate decisions and follow-up on the Rio+20 process.

These themes were highlighted in the [2013 Bonn Declaration of Mayors](#), the principle outcome of the forum. The declaration was drafted and adopted by all forum participants.

Putting words into action, 12 city leaders signed the Durban Adaptation Charter for Local Governments at a special ceremony. Signatories pledge their political commitment to strengthen local level adaptive capacity to climate change, and undertake to become key drivers and champions for the local government adaptation agenda.

### Outlook

The road ahead for local governments and global climate advocacy will include the 2013 World Mayors Summit on Climate Change (27 - 28 September, Nantes, France), the 2013 Warsaw Climate Conference, and the World Urban Forum 2014.

*“We, the Mayors and local leaders coming from 20 cities on four continents convened in Bonn, Germany... confirm our commitment to globally coordinated local climate action.”*

*The 2013 Bonn Declaration of Mayors*



*Durban Adaptation Charter signing ceremony at the Mayors Adaptation Forum*

*“Resilience requires very different planning to the planning your predecessors did 20 years ago... [and a] very very different set of policy measures.”*

*Christiana Figueres, Executive Secretary, UNFCCC*

### New Signatories to the Durban Adaptation Charter

- Baya El Garbia, Israel
- Bonn, Germany
- Cochin, India
- Kathmandu, Nepal
- Linköping, Sweden
- Matale, Sri Lanka
- North Vancouver District, Canada
- Pekalongan, Indonesia
- Seferihisar, Turkey
- Seoul, South Korea
- Shimla, India
- Teveragh-Zeina, Mauritania

### The 2013 Bonn Declaration of Mayors calls for:

- implementation of the Durban Adaptation Charter;
- development of city-region food systems;
- local to global sourcing of financial support and loss and damage;
- local government consultation in the technical guidelines of National Adaptation Plans;
- a universal Sustainable Development Goal for cities; and
- increased involvement of local governments within the High Level Political Forum of the post Rio+20 process.

# Resilient Urban Food Systems Forum

*“Taking a food systems approach is about shifting a whole variety of dynamics to promote a wide range of urban-regional improvements.”*

*Lauren Baker, Food Policy Coordinator, Toronto Food Policy Council, Canada*



This summary presents opportunities and challenges for the creation of resilient city region food systems. It is harvested from the Resilient Urban Food Systems Forum, held on Saturday 1 June 2013. Outcomes and suggestions from the discussions, case studies, workshops, and dialogues with over 70 interdisciplinary actors present at the forum were reviewed. They have been condensed into take home messages to generate ideas and actions for those working on food systems in the city region. The [full report](#) is available on the resilient cities website.

## What is a food system?

Urban food is much more than just food: It is about the system and taking an ecosystem approach. Looking at the food system and thinking about the resilience of a city region will assist with this process. More holistic perspectives are needed. In practice, this means considering city and regional food in common avenues like health and education, but also in sectors that are usually neglected including: transport and logistics (getting food to where it needs to be going), disaster and emergency management, urban food networks for urban poor, and food infrastructure.

## What is a city-region?

Taking a city region approach means looking beyond traditional jurisdictional borders, sectors, and scales. For cities, this requires understanding what rural counter-parts are doing. Leveraging different resources (research, financial, knowledge, etc.) and finding synergies between different municipal programs can help.

## What are the challenges?

**Poverty alleviation:** Bridging local urban poverty and nutritional security.

**Physical challenges:** Encouraging a holistic view of demands on the urban region land base (climate variability, urbanization, population growth, etc.), as belonging to a coupled social-ecological system.

**The unknowns:** Advancing research on food systems vulnerabilities, capacity for urban production, and the social and economic benefits of local production and consumption.

**Lack of guidelines:** Developing legal frameworks and assessments for the food systems, including urban agriculture, considering local risks and the multiple functions and services of green spaces.

**Considering everyone:** Incorporating diverse actors - including businesses, academics, government, and consumers (noting different cultures, diets, and preferences) - and their perspectives.

**Global trade and agriculture:** Considering connections of actors in city region food systems to global trading systems and how these impact natural resource bases and links between cities and countries.

## What can cities do?

**Communication, training, education, workshops, and actions needed through different sectors**

- Team up with other actors, NGOs, and international organizations where available. Make resource centers or hubs, introductory curriculums with buddy



or mentoring schemes (e.g. London, UK had free “experts” such as planners, designers, and architects working pro bono).

- Be creative and involve youth and elders: Educate school children on gardens and healthy eating. Enlist farmers directly to run trainings, adapting the programs to the students. Consider elderly care and intergenerational vocational training to teach, but also learn from, traditional gardening practices and knowledge.
- Involve food practitioners in the food value chain (e.g. producers, processors, and transporters) as first responders in disasters and in programs for preparedness and training.

**Attractive cities will have food startups and will incorporate projects about city region food**

- Gardens and local food are increasingly popular in many cities.
- Food and healthy lifestyles make cities attractive places – use this to gain popular support.
- Community buy in and support ensures longevity.

**Combine with other sectors - See where food systems innovations are already taking place**

- Find out what retailers and local researchers are doing in the city. For example, use waste from households and food processing industries for biogas production.
- Link gardeners with entrepreneurs: Multifunctional usages of urban farms make them competitive (e.g. solar harvesting, social initiatives, food supply etc.).
- Think strategically about the use of spaces and ecosystem services (e.g. forestry and new greenways). For example, planting green spaces on roofs is a ‘no regrets’ measure addressing climate change adaptation and mitigation as well as the viability and resilience of city region food supply.



*Food market in Belo Horizonte, Brazil*

### Toronto, Canada

World renown as a municipal food policy leader, Toronto has a long history working to ensure access to healthy, affordable, sustainable and culturally acceptable food. Toronto Food Policy Council uses food access mapping, shortened and diversified food supply chains, urban agriculture, cultural foods, global gardens, and increased integration through public health program delivery.

#### **What makes TFPC so successful?**

Driving an agenda for over 20 years with very few resources means working with and taking advantage of what is available. Cities need political will and support for food system projects, but this can come from different avenues such as health or social programs. In TFPC’s case, this complex weave of interests contributes to the longevity and success of the food system innovations. TFPC shows that in recognizing these areas it is important to start from bottom up, community based projects.

### Belo Horizonte, Brazil

The Municipal Secretary of Food and Nutritional Security has a vision to contribute to the improvement of life quality for the inhabitants of Belo Horizonte through developing actions which promote Nutrition and Food Security. In its most impressive example, the municipality runs increasingly popular public restaurants which supply affordable, healthy meals to its citizens.

#### **What makes Belo Horizonte so successful?**

Strong leadership and commitment to the human right to food and nutritional security for citizens. The city provides training programs on food, school meals to students which aid nutritional security, education within schools on healthy and nutritious food, and local employment by procuring food from regional family suppliers. In addition, the city delivers tasty fresh meals daily to thousands of people from all over the city. To achieve this, the city leverages federal and state policies and funding on food security and social welfare toward locally specific policy and program designs.

## Key points for resilient building and construction

- Align climate resilience strategies with certification schemes and plans e.g. LEED.
- Resilience is more than Green for buildings.
- Stakeholder engagement is key to the process.
- Materials matter (e.g. FSC certified wood – flow on effects to other sectors).
- As a city, consider public works and infrastructures (e.g. Barcelona Resilient Board TISU).

*“ Just like green building works to avoid locking-in inefficiency in our buildings, we need resilient building techniques that help us avoid locking-in risk and vulnerability. If we do this right, we’ll have buildings that are more sustainable and that help protect us from disaster.”*

*Jason Hartke, Vice President,  
US Green Building Council,  
USA*

Resilient Cities featured a half day forum addressing the topic of resilient building and construction, sponsored by the US Green Building Council on behalf of the World Green Building Council and by the Forest Stewardship Council (FSC).

Climate change will expose buildings to increased environmental and resource stress. At the same time, construction policies and practices are today scrutinized for sustainable consumption and production. These aspects must be considered together to create resilient building and construction processes.

## Outcomes

Resilient buildings means juggling different challenges such as energy disruption, green buildings, ecological risks, environmental responsibility, innovation, and business. The forum explored how buildings and associated codes and practices can combine mitigation measures, such as energy efficiency standards, material selection, and construction disposal, with adaptation and resilience measures. The growing importance of the latter in urban planning was discussed.

## What can cities do?

Buildings need to reduce the drivers of climatic change while maintaining an ability to perform under future conditions. Therefore, buildings have an important role which should be more carefully considered. The exchange of energy waste flows within buildings should be explored, along with fresh water and food supplies, and innovative design strategies for materials such as Cradle to Cradle. In other words, stakeholders need to view buildings more holistically, not just in terms of isolated rating systems (e.g. community based initiatives such as STAR Communities). To do this, they must use appropriate schemes that integrate climate change adaptation into existing strategies (e.g. Green Building Council Australia). For houses, this means considering site design, the ability to relocate buildings, redundancy of high risk spaces, raising the floor height, floatable foundations, and providing a reasonable level of certainty for homeowners.



*Manuel Valdés Lopéz, Barcelona City Council, Spain*

One of the most important aspects for cities is fiscal regret for inaction in the building sector. Crucially, cities need to understand the cost of taking in more risk by ignoring the resilience of buildings.

## Gaps identified

There needs to be a more robust conversation on the financial aspects of resilient building and construction and how to include and attract investors. Further research is needed on how to better measure the vulnerability of buildings and the role of data in this process. Lastly, cities in developing countries must be more involved in this discussion.

## Kick-off session: The strategic use of spatial data for urban resilience

Spatial data and analysis tools, including those with Geographic Information Systems (GIS) technology, are powerful, multi-purpose resources. The latest innovations and applications were discussed during a kick-off session at Resilient Cities 2013 organized in cooperation with Esri and the GPC group.

### How can spatial data advance urban resilience?

- **By visualizing integrated data to inform decision-making:** Cities can collect and share risk data, pinpoint vulnerable areas, and rationalize urban development plans. In Ferizaj/Urosevac Municipality (Kosovo), traditional data collection and GIS tools were used to integrate Disaster Risk Assessment Management into planning.
- **By facilitating participatory, transparent processes:** In Florida (USA), public participants overwhelmingly chose the greener scenario when shown projected urban growth maps. In Portugal, Project RENCOASTAL uses GIS and multi-criteria analysis to measure human vulnerability to coastal erosion. The results can be used to support public interventions.
- **By tracking change:** This aids in resource, risk, and disaster management. With innovations like the Executive Dashboard tool, leaders can monitor trends (e.g. energy use) and map events (power outages) in their cities.

Further applications of spatial data for resilience will be explored during a forum at Resilient Cities 2014.

*“Decision-making is a continuing, iterative process that needs to be actively supported with appropriate technologies and toolsets.”*

*Jim Geringer, Director, Policy and Public Sector Strategies, Esri; former Governor, State of Wyoming, USA*



## Four key themes in 2013

This section considers what drives and guides cities to implement adaptation policy in order to inspire and assist those in the nascent stages of adaptation work. Tips and examples are provided on how to develop and fund robust plans and policies that involve community members, incorporate ecosystem services, and utilize innovative tools and technologies.

### Theme I: Urban planning and policy

Integration of adaptation approaches into urban planning and development is necessary for local governments to achieve their climate change adaptation goals. Mainstreaming adaptation across city plans and policies means cities need to address both technical concerns as well as harness political support, while working with different partners and stakeholders.

**Why do cities commence adaptation planning?** International negotiations and partnerships (e.g. Tevragh Zeina, Mauritania), the implementation of a national adaptation strategy (e.g. Johannesburg, South Africa), a regional adaptation plan suggested by neighboring municipalities (eg. Helsinki Metropolitan Area, Finland), or a local disaster (e.g. Copenhagen, Denmark) may spur action.

**What are the common challenges and gaps?** Uncertainty over climate change impacts and their interaction with other variables including city development is a challenge. This is compounded by a lack of appropriate tools and data and inadequate coordination between researchers, practitioners, and policy makers. Moreover, many local governments lack capacity in terms of financial and human resources or are missing political will.

### Adaptation planning:

#### Tips for Cities

- Evaluate and reflect throughout the process.
- Local leadership and champions are vital to mainstream adaptation.
- Frame the issues positively in communications.
- Bring popular choices to fruition with the plans.
- Consider new and underrepresented sectors (in health, education, business, social entrepreneurship).
- Partner with cities who have established plans for support and information.
- Reach out to networks for guidance.

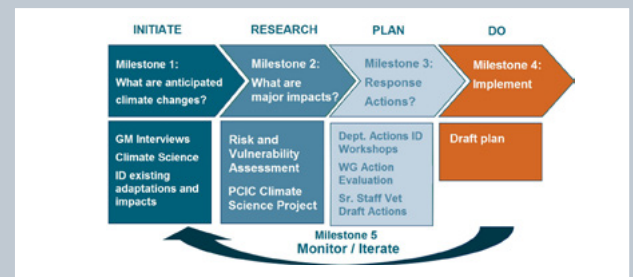
## Reality Check: Vancouver, Canada

Vancouver is a diverse and densely populated coastal, delta city of 603,500 people. It has one third of the region's jobs, Canada's largest port, and a vibrant tourism industry. The City is projected to experience increased annual precipitation and temperatures with more intense storms and sea level rise. In addition, the City is in a seismically active area with over 1,000 events each year. Not surprisingly, a 2008 Hazard Risk Assessment found climate-related hazards and earthquakes to be the primary threats.

### Climate change adaptation strategy

As part of a plan to become the world's greenest city by 2020, city staff developed a [Climate Change Adaptation Strategy](#). It is based on the ICLEI adaption framework and Vancouver's participation in ICLEI's Climate Change Adaptation Initiative pilot in Canada.

Work is underway to implement the strategy and assume an integrated approach toward natural hazard risk management. This includes coordinating risk assessments for earthquakes and sea level rise. It also means prioritizing actions which incorporate adaptation into existing projects and build resilience across hazards.



*The City of Vancouver's adaptation planning process*



*Tamsin Mills, Senior Sustainability Specialist, City of Vancouver, Canada presenting at the workshop*



*The City of Vancouver coastline*

### Priority actions include:

- amending flood-proofing policies;
- coastal flood risk assessment;
- citywide integrated stormwater management plan;
- urban forest management plan;
- back-up power policy;
- extreme heat planning;
- future building bylaw update (for climate, seismic risks)
- water conservation (in progress); and
- sewer separation (in progress).

Metro Vancouver also shares information, resources, and policy with peer cities as a member of the Coastal Communities at Risk Project, supported by IDRC.

### Gaps identified

Valuing benefits and environmental externalities in the absence of appropriate financial tools is problematic. This

makes pricing, accounting, and building a business case for actions difficult. Long timelines and uncertainty require novel tools and solutions for decision-making.

### Solutions and tips

Vancouver focuses on projects that offer multiple benefits across program areas and actions with immediate and long-term payoffs. Pilot actions are implemented during the planning process and quick-win initiatives chosen to build capacity and momentum. Finally, decision-making processes follow the precautionary principle and rely on scenario planning and risk assessments to prioritize actions.

### Challenges ahead

The principles above are being applied to achieve affordable upgrades to housing and stormwater management, protect against sea level rise, and integrate and mainstream adaptation into city processes.

### Key actions for urban risk assessment and planning

- Create a knowledge base with urban risk and vulnerability assessments (URAs, UVAs).
- Integrate forecasting of natural risks (fast-onset) with climate change impacts (slow-onset) (e.g. Greater Alexandria, Egypt).
- Prepare for multiple scenarios and think holistically about how sectors interact.
- Consider bottom up and top down views and social vulnerabilities (e.g. Ada Foah, Ghana).
- Strengthen data collection, monitoring, and early warning systems (e.g. Dagupan, Philippines).
- Insure public and private investments against natural risks via publicly supported schemes.

**What can cities do?** Multi-sectoral, multi-stakeholder collaboration pools resources and expertise while creating adaptation advocates. Cities should educate and consult residents, civil society, researchers (e.g. EMI and Pasig City, Philippines), and the private sector throughout the process. External support from international organizations and donors can also develop local capacity. For example, ICLEI has [several tools to guide cities](#), such as the Building Adaptive and Resilient Communities tool developed by ICLEI Canada and the ICLEI USA ADAPT tool. UNISDR has a successful “Making Cities Resilient” Campaign with resources like the Local Government Self Assessment Tool (LG-SAT). In addition, organizations such as UN-Habitat, CDKN, IDRC, IIED, GIZ, and the Rockefeller Foundation provide expert guidance and/or funding. Lastly, cities can establish resilience departments or governance bodies to facilitate horizontal and vertical policy integration (e.g. Barcelona, Spain).

### Key points for urban adaptation and resilience planning and policy

- Decreasing vulnerability to today’s climate enhances resilience.
- It’s not about certainty of impact, but certainty of response.
- Consider what risks to accept and how to divide responsibilities between citizens and authorities.
- Awareness is important but not enough – we need behavioral change.
- Commitment of management and support by decision makers is key for implementation.
- State governments can support with regulatory frameworks, guidance, coordination, resources.
- Adaptation is a process. Be proactive and innovate with new tools, actors, and approaches.



*Johannesburg, South Africa is integrating climate change resilience and adaptation into its 2040 Growth and Development Strategy*

*“Informing people about cities’ risks is the first step of a good resilience project. In order to implement the 10 essentials in Teveragh Zeina, we launched a strong awareness campaign about the risks that we face aimed at schoolchildren, women, youth, mayors, researchers, and partners.”*

*Fatimetou Mint Abdel Malick,  
Mayor, City of Teveragh Zeina,  
Mauritania*

### Case studies in brief

#### Helsinki, Finland

Helsinki has a joint regional adaptation strategy (available online) between Helsinki Metropolitan Area cities, Helsinki Region Environmental Services Authority (HSY), and other regional authorities and actors who focus on the built environment and multi-city, multi-sector collaboration with cross-border impacts and measures. **Targets:** identify regional impacts and risks of climate change, prepare for these and external weather events, and reduce vulnerabilities while enhancing resilience.

#### Cairo, Egypt

Adaptation in Cairo is complicated by organizational issues, poor infrastructure, and a growing population with limited income and climate change knowledge. Combined government, civil society, and development efforts aim to address these challenges. **Actions** include a study on expected climate change impacts, improving climate-related stakeholder knowledge, increasing public awareness of consequences and coping mechanisms, and implementing concrete community-based adaptation measures in informal settlements.

## Reality Check: Dar es Salaam, Tanzania

Dar es Salaam is the largest industrial, commercial and public administrative center in Tanzania. It generates more than 40% of the country's GDP and houses 4.5 million people.

The City faces increased rainfall and temperatures from climate change. Expected impacts include flooding, erosion, sea level rise, storm surges, crop failure, water (and electricity) shortages, and salinization. Rapid urbanization compounds these threats, as poor migrants crowd into unplanned settlements in high risk areas.

### Climate adaptation actions

Dar es Salaam has several projects related to adaptation. Sea wall construction and community based programs to plant mangroves and seaweed are combatting erosion. Public

awareness campaigns have improved disaster preparedness. River and drainage systems are being improved to reduce flood risks. In addition, residents are being relocated from flood zones to peri-urban land. 654 families left homeless by the 2011 floods were given free 100 m<sup>2</sup> plots 35km from City center.

Unplanned areas with lower flood risks are being improved through projects like the Community Infrastructure Upgrading Program (CIUP). This program aimed to improve livelihoods and resilience for 330,000 low-income residents by upgrading infrastructure and services. In a bottom up approach, community members identified problems and prioritized projects. Community planning teams collaborated with project and technical support teams



*Mussa Natty, Municipal Director, Kinondoni Dar es Salaam, Tanzania*



*Flooding in high risk areas of Dar es Salaam, Tanzania*

across multiple levels of local government. The result was improved living conditions, flood resilience, and property values in 31 communities.

These projects and adaptation measures were used to inform the Dar es Salaam Master Plan 2012 to 2032. The plan focuses on socio-economic development and incorporates climate risks.

### Gaps identified and challenges ahead

- Lack of reliable finances for resilience – need to get the private sector on board.
- Limited municipal resources – compounded by rapid

urbanization and climate risks which already damage infrastructure and reduce productivity.

- Criticism of relocation and lack of suitable sites - low-income residents prioritize proximity to services and economic activities in the city center over reduced risks in peri-urban areas. Meanwhile, 5,342 families remain in high flood risk areas.

### Solutions and tips

- It is better to have a plan and no money than to have no plan.
- Coordinate public action with community based approaches and small scale private investments.

## Financing resilience

Access to funding remains a major stumbling block for advancing adaptation work. Public-private partnerships (PPPs) are essential to raise capital and spread out risks. However, a reconstruction of government and financial institutions is required, which will take time and vision.

For local governments, training is needed on feasibility studies and proposal development (e.g. finance bootcamps). Cities should consider appointing a resilience officer as a focal point or adopting a city region approach to mobilize the scale of resources necessary (e.g. Aberdeen, Scotland; New York City, USA).

For the financial sector, mechanisms are needed to enable long term investments (e.g. GlB, Munich Re and Swiss Re, hyper local insurance), higher city credit ratings, project liquidity, and monetization of avoided losses (e.g. Colombo, Sri Lanka). These will reduce risk for private sector involvement. Furthermore, funders should move from small, single-focus projects toward holistic, multi-funder initiatives that are more cost-effective and support integrated adaptation planning.

### Adaptation finance: Tips for cities

- Integrate adaptation into existing measures.
- Apply preventative regulations.
- Invest in social resilience.
- Cost risks to incentivize action.
- Leverage networks to mobilize funding.
- Show how adaptation is good for business.
- Attract initial investment with 'no regrets' approaches, smaller projects, and ones with multiple advantages and beneficiaries in the short and long term.
- Require PPPs below a certain budget threshold.

*"There is a growing need to enter into public-private partnerships... this is a significant component moving into the future."*

*Kgosientso Ramokgopa, Executive Mayor, City of Tshwane Metropolitan Municipality, South Africa*

## Theme II: Social aspects of adaptation

Incorporating the needs and voices of community members is essential to achieve more comprehensive, equitable adaptation to climate change. Building on local knowledge and practices is important to strengthen the resilience of all sectors of society and especially the urban poor who are frequently the most vulnerable to climate change impacts.

### What can cities do?

Cities can adopt strategies with these three elements: participatory methodologies, community-based solutions, frameworks inclusive of the urban poor.

Participatory methodologies generate bottom up and top down knowledge exchange. For example, in Batticaloa City, Sri Lanka, a flood mapping project captured vulnerability data from community members while disseminating

information on flood risks. Such projects help fill data gaps, set priorities, and facilitate mutual learning. They can provide cost-effective solutions for local governments with limited capacity and reliable data. Crucially, they can foster behavior change and community buy-in to reduce vulnerability in the long term.

Community based solutions strengthen resilience through community-led actions. As a type of participatory method, they offer similar benefits. They also make use of existing coping mechanisms, enhance municipal-community partnerships, and deepen community ownership. One such solution is Community Development Funds in which residents pool savings and risk. Urban poor working with the Asian Coalition for Community Action use these to combine public and private contributions in disaster rehabilitation funds.



*Diane Archer, Researcher, IIED, UK, presenting in session C1 on community-based adaptation*



*A community house design and settlement planning workshop in the Salyani community in Bharatpur, Nepal*

## In Focus: Asian Cities Climate Change Resilience Network (ACCCRN)

The ACCCRN initiative works with cities in India, Indonesia, Thailand, and Vietnam to strengthen resilience while reducing poverty. Initiated in 2008 in ten secondary cities, the ACCCRN approach is now being trialed and scaled up across the region.

ACCCRN was discussed by city stakeholders and partners at Resilient Cities 2013. They stressed the need for forward looking resilience policies that:

- prioritize equity, not only adaptive capacity;
- avoid elite capture;
- consider indirect impacts, future scenarios, and critical thresholds related to poverty;
- integrate perceptions of the urban poor; and
- use vulnerability assessments early on for effective interventions.

### Three ACCCRN case studies were presented:

**Bandar Lampung, Indonesia** – Urban poor were engaged through Shared Learning Dialogues after the city's vulnerability assessment. The findings shaped a resilience strategy integrated into the city's five year plan.

**Can Tho, Vietnam** – A Climate Change Coordination Office connects the city government to the community. It compiles and disseminates climate change information and conducts research, e.g. on poverty assessments.

**Gorakhpur, India** – Gorakhpur Environmental Action Group worked with poor residents to identify risks (flooding, food insecurity) and initiate community DRR actions (improve drainage infrastructure, urban agriculture on floodplains) in partnership with local government.

*“The effects of climate change exacerbate poverty. Thus poverty, vulnerability and resilience are interlinked. It is essential to address these together.”*

*Shiraz Wajih, President, Gorakhpur Environmental Action Group, Gorakhpur, India*



Adaptation planning should be inclusive and equitable. Socio-economic conditions determine relative risk - compare the aftermath of earthquakes of similar magnitude in Port-au-Prince, Haiti (2010) and Christchurch, New Zealand (2010, 2011). Thus, to reduce vulnerability, cities must also reduce poverty (e.g. ICLEI Africa Five-City Network cities). Behavior change may then follow. For example, fewer residents will need to choose proximity to social and economic services in informal settlements over security from flood risks.

### Tips for cities

- Allow sufficient time and flexibility to build trust among actors.
- Identify local leaders and champions, but avoid contributing to unequal power structures.
- Accommodate local philosophies, language, and ideals.
- Link community action to municipal infrastructure and services with policy frameworks.

- Consider gender roles, and lack of housing and land tenure in adaptive capacity.
- Integrate resilience into socio-economic development strategies.

### Key points for social aspects of adaptation

- Participatory approaches facilitate knowledge exchange and more successful interventions.
- Resilience requires community buy-in.
- Community based actions create opportunities for innovative, cost-effective solutions.
- The urban poor are active, resourceful agents, but still the most vulnerable.
- Adaptation and development planning should be integrated.



## Theme III: Ecosystem based adaptation

Ecosystem based adaptation (EBA) is relatively new, especially for cities, and is rising to the fore of adaptation work. EBA considers existing features of urban ecosystems like trees, green and blue spaces, mangroves, and peri-urban agriculture. It reduces vulnerability while maintaining secondary ecosystem services and can span city boundaries. The benefits and services of biodiversity and ecosystems have great potential to support sustainable economic growth and the needs of urban residents.

### What can cities do?

Green or blue-green infrastructure is used to implement EBA into planning. This combines considerations of water (blue) and ecosystem services from vegetation (green) to restore the natural water cycle through increased infiltration and up to 90% reduction in runoff and pollutants. The result is multiple co-benefits beyond increased adaptive capacity and the conversion of threats like storm water into resources. In Copenhagen (Denmark), the City's Green and Blue Structure Plan incorporates adaptation, the Cloudburst Plan, and greener living spaces.

To begin, cities should identify natural spaces and their services to assess the potential for local EBA. Weigh traditional infrastructure against blue-green infrastructure during adaptation planning. Lami Town, Fiji, for example, replanted a mangrove forest instead of constructing a seawall.

EBA must also include social considerations. This should link to regional and national strategies e.g. it is predicted that 75% of Nepal's National Adaptation Programme of Action goals could come through EBA, including measures to restore degraded forests and rangelands. Techniques such as ecosystem biotechnology for storm water purification, absorbing pollution, and regenerating waterways are also important (e.g. Lodz, Poland).

### Challenges and gaps identified

Watershed based planning and coordination across regions and within municipality departments is lacking. A more thorough analysis of catchments, watersheds, and all possible scenarios – such as the potential for dry zones parks to become lakes or the reverse - is also needed.

### Tips for cities

- Research on ecosystem services in Copenhagen revealed willingness among private households to contribute as well as some potential conflicts with other drivers of development.
- Investing in green infrastructure and sustainable management of natural resources pays off. Ways to quantify the benefits include: figures on air pollution removal, added real estate value, taxes to municipalities including the multiplier effect, saved damages in the long term, and the Economics of Ecosystems and Biodiversity (TEEB) metrics. Factor these into accounting and reporting systems.

### Defining Green Infrastructure

*"An interconnected network of open and green spaces, both natural and designed, that can provide multiple functions and services such as water and air purification, aesthetics, cultural and socio-economic benefits, recreation, and habitat."*

*Sadahisa Kato, Research Associate, ICAS, Ibaraki University, Japan*

*"We have to stop degrading ecosystems if they are to help us adapt to climate change."*

*Keith Alverson,  
Head of Climate Change  
Adaptation Unit, UNEP*

### Case studies in brief

#### Rotterdam, the Netherlands

**Challenges:** flooding, housing, transport, and lack of public space.

**Actions:** Rotterdam incorporated four clusters of ecosystem services of TEEB (2012) then completed an action and policy review, scenario assessment, and workshops with local practitioners.

**Outcome:** 34.9 m<sup>2</sup> of green space per person and higher life expectancies. **Innovation:** included watersquares, water living and canal transport, sponge roofs, underground storage for sewage overflow, and resilience profiles combined with GIS data to set new targets for ecosystem services.

#### Yokohama, Japan

**Challenges:** 8,500 people/km<sup>2</sup> and 35% blue-green cover.

**Actions:** The Yokohama Blue-Green Master Plan creates and protects green, enhances blue-green with a watershed based approach, and fosters collaboration and participation.

**Lessons learned:** planning bodies and green infrastructure should be at the regional scale, implement green infrastructure policies at the city/town scale, coordinate local plans with prefectural (regional) plans, consider different types of "green" together to develop an interconnected network, and apply watershed scale planning.

## Theme IV: Resilient infrastructure and technology

Several congress sessions discussed resilient design and technology including the Resilient Building and Construction Forum and Spatial data kick-off session. In addition, a session organized in cooperation with Siemens focused on resilient infrastructure. Intelligent, automated, infrastructure boosts resilience while providing additional benefits. Robust design, redundant capacity, system control, and adjustment are key criteria. For example, a New York City electrical grid action plan that combines short and long term investments could create a smart grid with automated demand management that is protected from disasters like

Hurricane Sandy. Full implementation of such a plan would result in resilience, and efficiency with net benefits, saving US\$1-3 billion in damages over 20 years (Siemens AG, 2013).

*“Resilience is a must to become and remain competitive.”*

*Stefan Denig, Vice President, Siemens Global Centre of Competence Cities*

### Side events and launches at Resilient Cities 2013

A **Young Researchers' Forum (YRF)** was hosted by the United Nations University Institute for Environment and Human Security (UNU-EHS). The forum was an opportunity for young scientists from different countries and disciplines to share ideas and network. In an innovative workshop, they gained insights to advance their research on urban adaptation. They then joined international experts at a Scientific Market Place and brainstorming session for building Groups of Interest. Twenty-two participants joined a platform to see important methods for supporting education and knowledge exchange on urban adaptation during the round table discussion.

**Plantagon International AB** presented [“101 Cities – Food Security Network in the 21st Century.”](#) The network targets cities and organizations wishing to collaborate on food security, urban agriculture, and vertical farming solutions.

The travelling exhibit [“Carrot City - Designing for Urban Agriculture”](#) opened in Bonn at the Resilient Cities congress reception. It showcased design projects from around the world that enable sustainable urban food production.

**UN-Habitat** launched a Special Edition of *Local Environment: The International Journal of Justice and Sustainability*. The articles examine the experience of UN-Habitat's Cities and Climate Change Initiative in the global south. Areas for future research and policy on vulnerability, adaptation, and resilience are identified.

**International Urban Food Network (IUFN)** presented its interactive, web-based platform on urban food governance. The platform is a center to analyze, produce, and share information between researchers and cities in industrialized countries and in Brazil, India, Russia and China.



Discussion at the Young Researchers' Forum



Hans Hassle, CEO, Plantagon International AB presenting at Resilient Cities 2013

## ●●● Outlook for 2014

### Progress, challenges, and opportunities

Resilient Cities 2013 once again showcased examples of urban climate change adaptation and resilience actions worldwide. Unfortunately these actions are insufficient to face climate change: now is the time to turn more plans into effective measures. Accessing technical support and financing mechanisms are the main, intertwined challenges. However, opportunities exist and more are emerging with:

- Growing attention to capacity building for urban resilience in developing countries; and
- Initial financial mechanisms that are city-oriented and flexible enough to fund local, integrated actions.

The real key to success is developing the capacity of local governments to tap into resilience financing options that involve the private sector and international climate finance mechanisms.

### Involving more sectors and more actors

The urban resilience challenge is made more complex by its cross-sectoral dimension. Potentials can be unlocked here with the increased, consistent involvement of the private sector. Facilitating access to private sector technologies designed to meet the urban resilience challenge is a path to explore further at upcoming Resilient Cities events.

We also acknowledge the need to better involve younger generations. Their fresh ideas and active participation today

*“Global action and negotiations on climate change in the next three years will determine the fate of our cities and our planet. We can make the change, but it has to be bottom up.”*

*David Cadman, President, ICLEI - Local Governments for Sustainability*



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## Resilient Cities 2014

Bonn, Germany

For the fifth year, the Global Forum on Urban Resilience and Adaptation will provide a platform to discuss and create solutions.

The focus will be on urban risk and resilience financing.

A special link will be created with the  
**World City Summit in Singapore** taking place on the 3rd of June 2014.

# Save the date!

1 - 3 June 2014

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## Resilient Cities Team and Congress Secretariat

ICLEI – Local Governments for Sustainability  
World Secretariat  
Kaiser-Friedrich-Str. 7  
53113 Bonn, Germany

Tel: +49-(0)228 / 976 299-28  
Fax: +49-(0)228 / 976 299-01  
Email: resilient.cities@iclei.org  
www.iclei.org/resilient-cities