# CCMAP ISSUE BRIEF SERIES Nº2

# **Resilient Cities**



ENHANCING CAPACITIES TO REDUCE DISASTER RISK IN URBAN SETTLEMENTS



HALF of the world's population lives in cities<sup>1</sup>. Global population is on track to exceed 9 billion by 2050, with urban settlements expected to absorb most of the projected future population growth. High concentrations of people and assets render cities hotspots for disaster risk. Climate change is likely to further undermine cities by adding a different - and potentially more detrimental laver of risk as well as aggravating existing urban challenges. Moreover, cities are significant sources of GHG emissions, due, in large part, to urban density. Given the unique place of cities in this increasingly urbanizing world as well as the complexity of the challenges they face in the context of the changing climate, the case for smart urban adaptation cannot be stronger.

This issue brief explores the prevailing knowledge on urban disaster risk management and the role of capacity development in promoting climate resilient cities.

## 1 For purposes of this brief, the term "cities" is used broadly to encompass urban areas, as well as suburban and metropolitan areas.

### KEY MESSAGES

- Climate change heightens vulnerability of poor and marginalized groups in informal settlements who are among the most exposed to disaster risk.
- Integration of climate change adaptation and disaster risk reduction and management in urban planning produces synergies that can enhance urban resilience.
- Good governance (urban and multilevel) is key to building urban resilience.
- Sustained capacity development (individual and institutional) of the urban sector (as well as efficient financing) is crucial for building climate-resilient cities.
- Significant knowledge gaps need to be addressed related to relationships among the complex biophysical and socio-economic dynamics that underpin urban vulnerability.

#### "SLUMIZATION" HEIGHTENS EXPOSURE TO CLIMATIC RISK

By 2050, 70 percent of the projected global population of 9 billion will be living in cities. While urbanization can bring positive benefits (e.g. reduction of rural poverty, see Ravallion et al., 2007), it has numerous physical and socio-economic attributes that render urban settlements more prone to disaster risk. High population density, usually including high concentrations of the urban poor, is one such characteristic. At present, about a billion people live in informal settlements (slums), in dwellings that lack basic, essential infrastructure and services. For example, 70 percent of the inhabitants of Dar es Salaam, one of the fastest urbanizing cities in Africa, are slum dwellers (Dickson et al., 2010). Absent action, the urban slum population in sub-Saharan African countries is expected to double to 400 million by 2020. This challenge is no less daunting in poor countries in other regions. For example, of the estimated 15 million inhabitants of Dhaka - one of top 11 mega cities in the world – 28 percent are poor and live in informal settlements (Khondker, 2010). Such urban slums are usually situated in marginal areas (such as steep hillsides, flood plains, coastal zones, or near hazardous waste), putting residents at higher risk from flash floods, landslides and heavy downpours and other impacts of climate change and natural hazards (see Baker ed., 2012; Satterthwaite et al., 2007; Dickson et al., 2012).



Slums at risk in Manila, Philippines



CCMAP Issue Brief Series N°2 Resilient Cities: Enhancing Capacities to Reduce Disaster Risk in Urban Settlements

#### CLIMATE CHANGE COMPOUNDS URBAN CHALLENGES AND INCREASES DISASTER RISK

Urban areas are particularly vulnerable to climate change impacts due to the high concentration of people and assets (Carmin et al., 2012; Baker (ed.), 2012). While all urban environments are at risk, "**urban areas in the global south are likely to experience some of the most immediate and severe impacts**" (Carmin et al., 2012; see Satterthwaite et al., 2007).

As many cities struggle to meet basic needs of their residents, such as clean water, sanitation and mass transport, climate change impacts, including increased flooding and droughts, will likely compound these urban challenges.

Mitigating disaster risk is a major challenge for cities. While disaster events have always dogged urban settlements, climate change presents a new and systematic challenge to urban development and sustainability (IFRCRC, 2010). Climate change impacts could increase the intensity and frequency of hydrometeorological disasters and, therefore more damaging especially in coastal cities. From Dakar, Lagos, Cape Town, Maputo, Mombasa and Djibouti to Kolkata, Mumbai, Ho Chi Minh City and Bangkok, many coastal cities in developing countries are highly exposed to climatic risk (see Fuchs, 2010; Simon, 2010). To illustrate, in Buenos Aires, the projected cost of sea level rise (SLR) to real estate is expected to be \$US 300 million per year by 2050 (Rosenzweig et al. (eds.), 2012). Asian megadeltas and low-lying coastal urban areas including megacities are particularly vulnerable to flooding from SLR (Nicholls et al., 2007; IFRC, 2010). It is instructive to note that most urban centers are coastal – 35 of the 40 largest cities in the developed world as well as 18 of Asia's 20 largest cities are either coastal, on a river bank or in a delta, at risk of flooding from SLR and powerful storms (UN-Habitat, 2008).

Cities occupy less than 2% of the Earth's surface; yet are home to over 50% of the world population and account for more than 40% of global GHGs. As hubs of most anthropogenic activities in this rapidly urbanizing world, cities are useful laboratories for developing innovative climate change responses.



Floodgates in Bangkok help relieve urban flooding

## **DRR/M – CCA** POLICY INTEGRATION COULD HELP REDUCE URBAN RISK

Because an increase in the intensity and recurrence of hydrometeorological disaster events is the most troubling climate change impact on urban settlements (especially coastal cities), there is a clear need for integration of disaster risk reduction and management (DRR/M) and climate change adaptation (CCA) in urban planning (See Michelle et al., 2010).

A special report of Working Groups I and II of the Intergovernmental Panel on Climate Change on "Managing the Risks of Extreme Events and Disasters to Advance Climate Change Adaptation" underlines that disaster risk reduction and management (DRR/M) and climate change adaptation (CCA) integration into national policy domains could potentially boost "social, economic and environmental sustainability" (IPCC 2012). Any serious disaster reduction related effort does need to take account of climate change projections of hydrometeorological hazards, state of exposure and vulnerability of populations and ecosystems. To this end, recent research (e.g. Murray et al., 2012) suggests that integrated DRR/M and CCA is, in some measure, responsible for fewer disaster casualties in Bangladesh (cyclone Sidr 2007 = 3,400 fatalities) compared to Myanmar (cyclone Nargis 2008 = 138,000 fatalities), although both countries were hit by Category 4 storms.

There are important overlaps of concepts and shared goals between DRR/M and CCA (Michelle et al., 2010). Looking at both practice areas at a more functional level, there are efficiencies to be gained in integrating CCA and DRR/M. According to Michelle et al. (2010), not pursuing an integrated approach to DRR/M and CCA could "waste time and risk reinventing older approaches ... developed for DRR".

Despite the payoffs of an integrated approach to disasters and adaptation, DRR/M and CCA have yet to fully converge - as there are "significant structural barriers to convergence in critical institutions at different scales" (Michelle et al., 2010). In the urban context, DRR/M and CCA integration would require adjustments to urban planning and management assumptions, tools, laws, practices and values.

Integration of DRR/M and CCA in the urban context will necessitate rethinking of past assumptions on urban development, updating city "master plans"; zoning laws and related spatial plans; land use planning tools and regulations; building and design codes, etc., in light of new climatic knowledge and based on local risk and vulnerability assessments. All this requires sustained capacity development (for example training urban planners in use of climate models and scenarios for urban planning processes).

#### **GOOD GOVERNANCE IS IMPORTANT IN DISASTER RISK REDUCTION**

Good governance is one of the fundamental factors influencing disaster risk; its benefits include: "increased coordination of disaster risk reduction programs at all levels; existence of multi-sectoral disaster risk management policies and strategies based on the broad involvement of all individuals, government, private sector and civil society institutions; allocation of appropriate resources at local and national levels to disaster risk reduction activities; greater participation of communities at risk in the design and implementation of disaster risk management programs ... greater sensitivity towards the poor and emphasis on poverty reduction policies and strategies" (UNISDR, 2004).

Largely on account of their proximity, local governments play a pivotal role in dealing with climate change impacts and risks at the local level. The basic infrastructure and services that cities provide are "the first line of defense against the impacts of climate change and natural hazards" (Baker (ed)., 2012). It is, therefore, crucial to climate-proof infrastructure and services and, just as important, put in place smart mechanisms for urban planning and governance (Birkmann et al., 2010).

#### CCMAP SPDs Highlight the Need for Capacity Development to Address <u>Disaster Risk in Urban Centers</u>

The need for building institutional capacity - broadly defined - is a common thread that ran through many of the 9 nationallevel science-policy dialogues facilitated by START under the Integrating Climate Change Mitigation and Adaptation into Development Planning (CCMAP) project - a joint project of START, WMO, UNEP, IPCC, the University of Ghana, the University of Dar es Salaam, and the Bangladesh Center for Advanced Studies. Participating countries emphasized the need for enhancing capacity, improving governance and making smart investments in the urban sector, taking into account the realities of the changing climate. Below are examples of institutional capacity needs identified through this dialogue process:

- Climate sensitive and effective urban planning and governance mechanisms (Senegal);
- Proactive relief plans, early warning systems, adaptation measures (Senegal)
- Enforcement of zoning laws (Senegal, Rwanda);
- Need for proper risk mapping to help avoid informal settlements in risk-prone areas (Senegal);
- Flood vulnerability assessment maps (Nigeria); and
- Support districts in DRR/M planning (Rwanda).

Actions by national governments are critically important to advancing these efforts. For example, in analyzing the human impact of Indian Ocean cyclones of Nargis (2008) and Sidr (2007), the absence of good governance in Myanmar has been identified as a "major vulnerability component for human mortality due to tropical cyclones" (Murray et al., 2012, Peduzzi et al., 2009).

Based on assessment of 10 cities in Asia, Tanner et al. (2009) submit that the characteristics for good urban governance are "decentralization and autonomy; accountability and transparency; responsiveness and flexibility; participation and inclusion and experience and support". These characteristics for good (strong, integrative, inclusive and flexible) urban governance require serious effort to expand and improve institutional capacity at local and national scales (Jabareen, 2012).

Given the multiplicity of actors and processes involved in DDR & M and CCA - and the attendant problems of scale, both temporally and spatially - it is important to have strong urban sector governance that integrates the multi-level facets. One "good practice" lesson from national experience with multi-level climate change governance is that policy coherence at all scales of governance is an essential requirement for successful adaptation at the local level (see Corfee-Morlot et al., 2009).

#### In Focus: <u>Tanzania Science-Policy Dialogue</u>

As a coastal city, Dar es Salaam is exposed to climatic risk from "sea-level rise and coastal erosion, flooding, drought and water scarcity, and the disruption of hydroelectricity generation" (UN-HABITAT 2011, see Dikinson 2012). With its high population growth, widespread poverty and large extent of informal settlements that have poor access to basic services such as water and sanitation, Dar es Salaam epitomizes the cumulative challenges of urbanization, slumization, poverty and disaster risk.

START facilitated a science-policy dialogue in Dar es Salaam, Tanzania, in January 2010, under the CCMAP project. Among the challenges identified for effective adaptation of the urban sector are:

- There is need for addressing the broader dynamics (e.g. governance deficits) that lead to unplanned urban expansion and settlements;
- There is a need for investing in rural development to curb the rapid rate of urbanization;
- DRR/M and CCA should be integrated in urban planning - urban development needs to be attuned to expected climatic hazards; and
- There is a need for better coordination of activities of all stakeholders.

#### INSTITUTIONAL CAPACITY DEVELOPMENT IS KEY TO FOSTERING URBAN RESILIENCE

Corfee-Morlot et al., (2009) note that "climate policy at city-scale remains fragmented and the basic tools to facilitate good decision making are still lacking" due to "financial, technical, capacity, informational, and institutional governance obstacles, among others". Institutional capacity building will be a key part building urban resilience in the years to come.

DRR and CCA in the urban sector will require significant investment in infrastructure and services, especially in developing countries. According to a survey made by the World Meteorological Organization "more than 60 per cent of its 189 members are inadequately equipped to warn populations against hazards, particularly in most vulnerable countries" (IFRCRCS, 2010).

Finance is a key element of institutional capacity development in developing countries. Rosenzweig et al (ed.) (2011) note that "... success to date with efforts to confront climate challenges in cities has been hampered due to deficient financing". It is estimated that 80 percent of the projected 80 - 100 billion per year in CCA costs will likely be borne by urban centers (World Bank, 2010). Juxtaposed against resource handicaps of cities in the south, the price tag on DRR/M and CCA in the urban sector will be enormous.

To summarize, the road to climate resilient cities will likely be an arduous journey, but we could make significant headway through sustained effort at enhancing technical and institutional capacities of local governments.

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#### Authors: Senay Habtezion and Jon Padgham / START

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