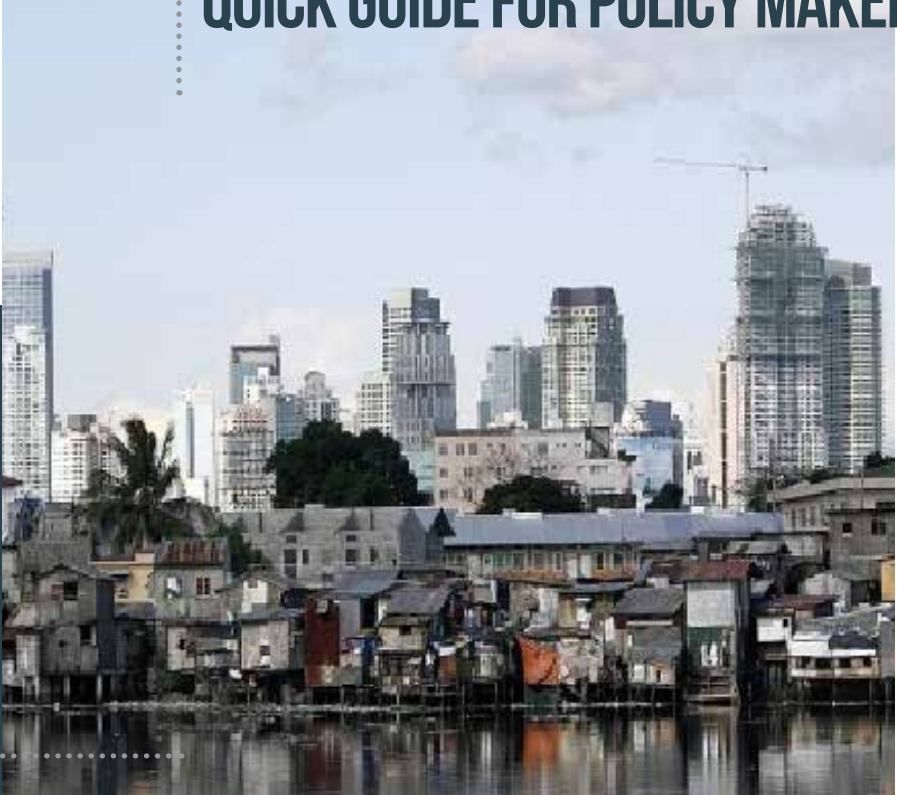




# QUICK GUIDE FOR POLICY MAKERS



# PRO-POOR URBAN CLIMATE RESILIENCE IN ASIA AND THE PACIFIC

**UN HABITAT**  
FOR A BETTER URBAN FUTURE

**UNITED NATIONS  
ESCAP**  
Economic and Social Commission for Asia and the Pacific

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**This publication is dedicated to Daphna Beerdsen (1983-2014) whose commitment, passion and inspiration made this Quick Guide possible.**



The cover features a dark blue rectangular block at the top left. Below it is a light blue horizontal band containing the text 'QUICK GUIDE FOR POLICY MAKERS'. Underneath that is a red rectangular block containing the main title 'PRO-POOR URBAN CLIMATE RESILIENCE IN ASIA AND THE PACIFIC' in white. The bottom right area is a light green rectangle, and the bottom edge is a solid orange horizontal band.

**QUICK GUIDE FOR POLICY MAKERS**

**PRO-POOR URBAN  
CLIMATE RESILIENCE  
IN ASIA AND THE PACIFIC**

# I. UPFRONT

## 1.1 Acknowledgements and contents

This Quick Guide has been jointly prepared by the Sustainable Urban Development Section of UN ESCAP, under the overall guidance of Mr. Rae Kwon Chung, Director, Environment and Development Division, and Mr. Yoshinobu Fukasawa, Director, Regional Office for Asia and the Pacific, of UN-Habitat, and The Rockefeller Foundation.

An accompanying set of good practice documentations and other information and training materials also form part of the collaboration.

The lead authors of the Quick Guide were Mr. Donovan Storey and Ms. Natalja Wehmer, UN ESCAP, and Mr. Bernhard Barth, UN-Habitat. The Quick Guide was reviewed by Ms. Anna Brown, The Rockefeller Foundation. An early draft was prepared by Mr. Steven Gawler and Ms. Helen Scott with support and inputs from Ms. Daphna Beerdsen, Mr. Joris Oele, and Mr. Peter Grant, with lay-out by Mr. Alejandro Hita. Further reviews and contributions were provided by Mr. Liam Fee, Ms. Verena Streitferdt, Ms. Seungji Choi, Ms. Tianyi Yang, Mr. Dario Cubelo, and Ms. Anh Dieu Le.

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“

We are now at a stage where what we need even more than a global agreement [on combating climate change] is for people to take the initiative to respond

(Dr. Rajendra Pachauri, Chairman of the IPCC)<sup>1</sup>

### ➔ **KARIAL SLUM**

Urban slum in Dhaka, Bangladesh (Kibae Park)

## 1.2 About this Quick Guide



Climate change is no longer something that may happen in the distant future. From higher temperatures and rising sea levels to changing rainfall patterns and more frequent extreme weather events, climate change is already impacting on the region's rapidly growing cities and their populations.

The urban poor are affected disproportionately by these changes due to a combination of factors, such as vulnerable physical location, poor quality housing and an often limited capacity to prepare for, cope with and recover from extreme weather events and slow-onset impacts of climate change. In fact, climate variability and change threatens to interfere with, and even reverse, hard won poverty reduction and development gains.

Given the significant overlap between climate change vulnerability and urban poverty, poor communities should be actively supported in efforts to strengthen resilience. Urban poor communities can do much to reduce their vulnerability, especially when local government and other key urban actors understand their needs and are ready to support them. At the very least, their needs should be considered in any climate change related intervention, in order to not exacerbate vulnerability. The main goal should be to pro-actively integrate poverty reduction efforts with climate change related interventions. This is not a trade-off. As this Quick Guide will show, pro-poor approaches to urban climate resilience that are holistic, flexible and participatory are also an effective way to foster inclusive and sustainable urban development.



## 1.3 An urban poor community is changing the storyline

When the great flood of 2011 reached the Thai riverside community of Wat Kao in Nakhon Sawan, everyone was prepared: relief teams were organized, sandbags were on standby, a community-disaster centre with a kitchen had been established, boat patrols to check on houses and people were organized, and communication systems with the local government and hospital were in place.

The water reached several meters and stayed for weeks, but Wat Kao and six surrounding communities had the necessary assets to

prepare for, withstand, clean up and “build back stronger”. Community members trusted each other and were confident in their actions. Over the years, they had accumulated collective savings for an unforeseen situation such as this. They also had close links with the local government, and support from the national government organization, the Community Organizations Development Institute (CODI) and its network of slum-dwellers.

Not only did the community ensure fair distribution of supplies and compensation,

This Quick Guide has been developed for those local government officials and policy-makers across Asia and the Pacific who need to enhance their understanding of climate change, appreciate how it affects their cities and decide on what actions they can take to make their populations - and especially their urban poor communities - more resilient to climate change impacts.

Using an easy-to-read format and showcasing experiences from across the region, the Quick Guide firstly introduces the reader to the nexus of urbanization, climate change and poverty. It discusses the concepts of vulnerability and resilience to climate change, and highlights pro-poor principles for climate resilience building. The second part of the Quick Guide is dedicated to discussing a number of entry points and holistic strategies.



### ↑ FLOODS

Thailand (Think4photop/Shutterstock.com)

but it also supported the rebuilding of livelihoods for those whose earnings had been disrupted by the floods. After the floods, the community cleaned up or constructed new housing – on stilts, so to be in line with the new bylaw also requiring electricity plugs and water connections to be above the flood line.

When hearing of a flood-affected urban poor community, this is not the story most people expect, so what turned potential ‘victims’ into ‘victors’?



**↑ DISASTER SHELTER ON THE ROOF**

Still visible flood line on a house and self-built disaster shelter on the roof (M. Gearlan)

In the years prior to the flood, there had been pressure to relocate. However, with no suitable land nearby and livelihoods dependent on the central location by the river, people wanted to stay. Using their aspiration for secure housing as an entry point, the community partnered with CODI's Baan Mankong ("secure housing") programme which helped people to organize, start community savings and construct houses in addition to community welfare, livelihood and environmental programmes.

This is also how the community learned how to organize and communicate with government. As the community leader Aram Sree explains: "the programme built our confidence - if we

want to achieve something and we try to do it, we can achieve it".

While there was no explicit focus on disaster risk reduction or climate change adaptation, years of people-centered development and the cultivation of strong social networks had built up the community's resilience and its capacity to adapt and recover.

There are in fact many communities such as Wat Kao across Asia and the Pacific - and much can be learned from their stories. This Quick Guide aims to contribute to such transformations by introducing approaches to urban climate resilience which are pro-poor and which result in benefits for both the city, and its most vulnerable.



**HOUSE ON STILTS**

House on stilts built after the flood with support from the Baan Mankong Programme (M. Gearlan)



**CLEAN-UP**

Community clean-up after the flood (Wat Kao community)





## COMMUNITY

Ararm Sree, Wat Kao community leader discussing with local government (M. Gearlan)



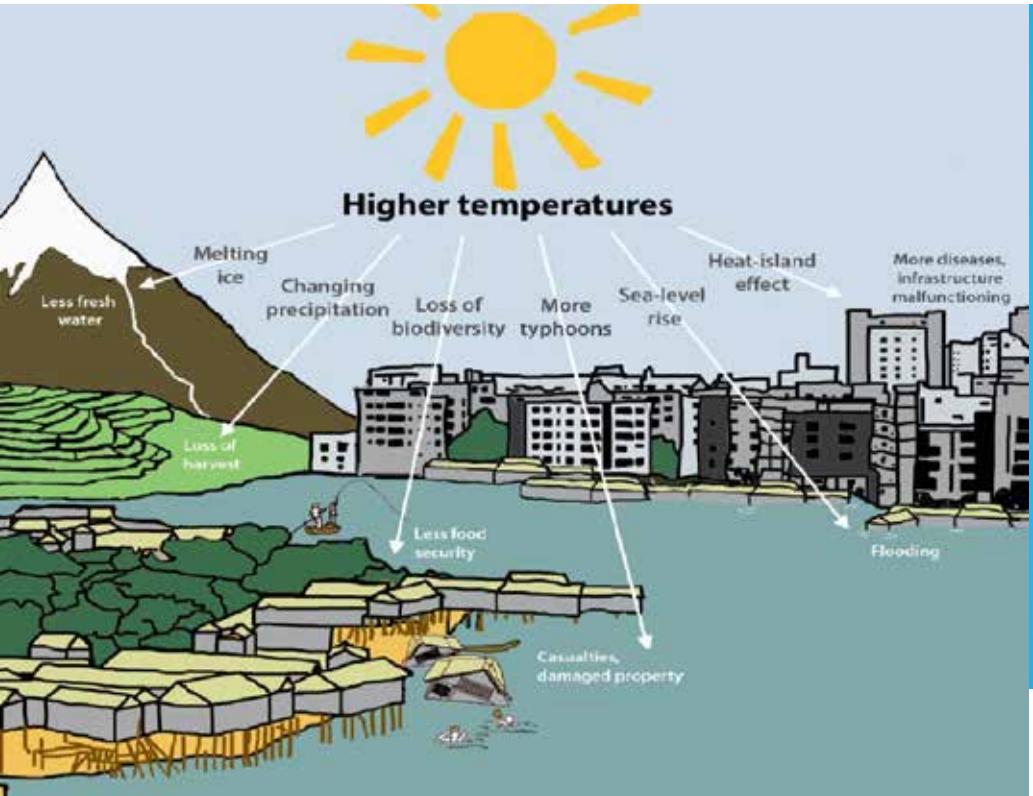
# 1.4 Debates on **climate change matter** to cities and their most vulnerable populations

When climate change first appeared on the global agenda, debates and actions focused on reducing greenhouse gas emissions and other forms of pre-emptive action or "mitigation". It was hoped that by addressing the root causes of climate change, the impacts could be offset. However, as emissions continued to rise alongside global warming, the negative effects of climate change become unambiguous and the need to respond more urgent.

The relationship between weather-related variability and extreme events and climate change are complex, more so if we project into the future. However, it is now widely acknowledged that climate change impacts will become more severe - even if greenhouse gas emissions can be curbed. In recognizing this, climate change related activities have begun to place greater attention to include resilience measures that could help natural and human systems to better adapt and respond to actual or expected climate change impacts.

In this light, the importance of understanding and responding to the specific impacts of climate change on urban areas and populations has become more evident. A strong urban climate resilience focus is needed not only because of the size of populations and magnitude of assets affected, but also because urban climate change impacts have different drivers and follow different patterns. We therefore need urban-specific approaches. It is also essential, in the context of international and national commitments to poverty reduction, that the needs of the poorest and most vulnerable are integrated into such strategies, so that building urban climate change resilience also contributes to pro-poor outcomes.

## II. THE URBAN CONTEXT



### ↑ CLIMATE CHANGE AND CITIES

Understanding the risks (UN ESCAP)

## 2.1 Urbanization

The Asia-Pacific region is in the midst of the largest and most consequential urban transformation in human history. Between 1980 and 2010 Asian cities grew by around one billion people and according to projections will grow by another billion by 2040. By 2050,

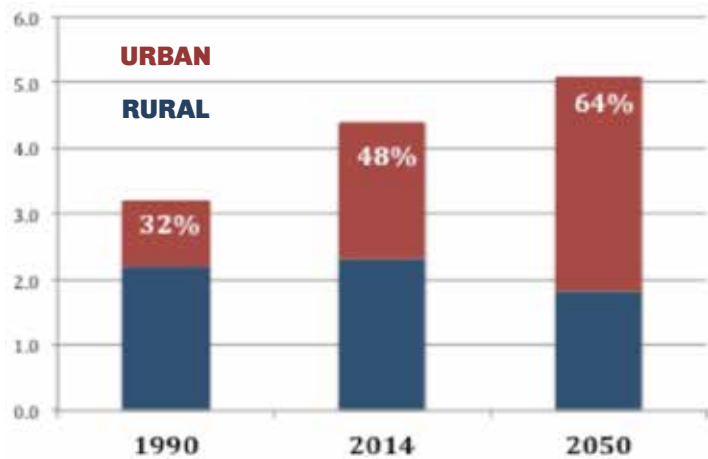


## RURAL AND URBAN POPULATION IN ESCAP MEMBER STATES IN 1990, 2014 AND 2050

UN DESA, World  
Urbanization Prospects, 2014



Our struggle for global sustainability will be won or lost in cities (Ban Ki-Moon, UN Secretary General)<sup>2</sup>



nearly two out of three people in the Asia-Pacific region will live in urban areas.<sup>3</sup> The future of the region's cities also has global implications. Today's 2.1 billion people living in the region's cities and towns already make up more than half the world's urban population.

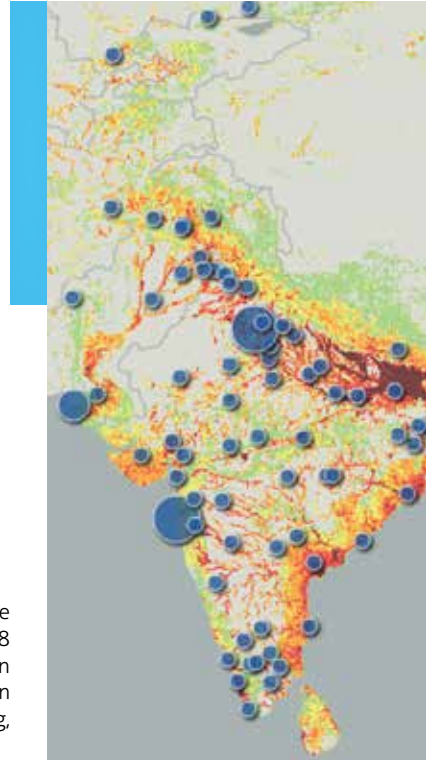
This population growth has gone hand in hand with economic transformation and for many countries urbanization has been an important driver of national development. But it has also put tremendous pressure on infrastructure, services, livelihoods and the environment.

Climate change is increasingly exacerbating these challenges. Sea-level rise, and extreme events, such as storms, floods or droughts are interacting with human impacts, such as degraded and altered biophysical environments. This creates complex and distinctly urban patterns of risk and impact, to which cities and their populations need to respond. Although precise projections are difficult, it is likely that future impacts will be significant.



## RISK LEVELS

Major Asian urban locations in 2011 and the distribution of potential mortality risk from hydro-meteorological hazards (Sujit Mohanty)

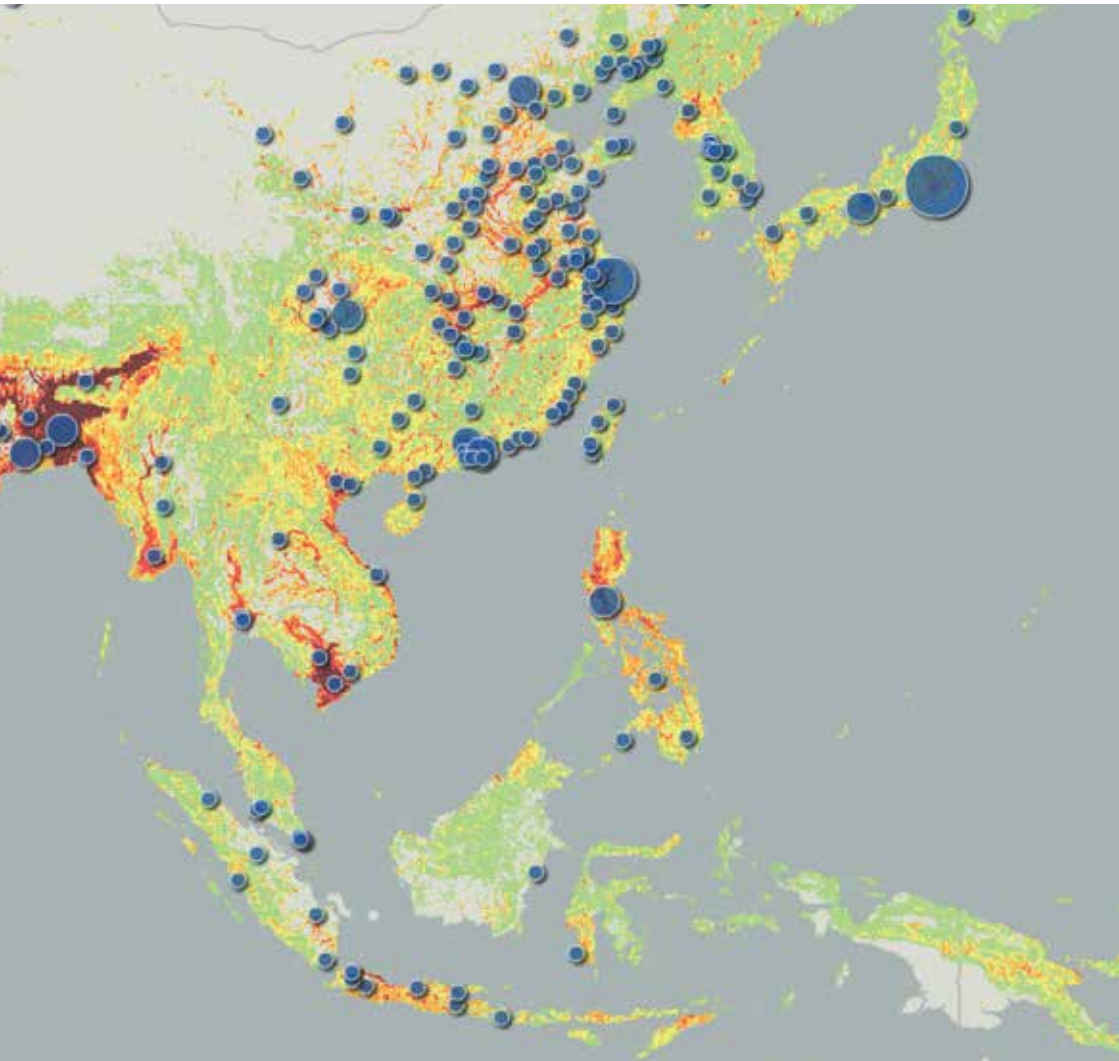


## 2.2 Climate change and disasters

Asia and the Pacific is the most disaster-prone and climate change-affected region in the world. Between 2000 and 2010, 8 out of the 12 largest disasters impacting on cities took place in Asia and the Pacific.<sup>4</sup> Today more than half of the region's urban population lives in cities and towns that are located in low-lying, coastal or riparian areas on the frontline of climate change.<sup>5</sup>

## 2.3 Urban Poverty

It is often the urban poor that are disproportionately vulnerable to disasters, in terms of where (and how) they live and work. This is often compounded by limited capacity and necessary assets to prepare for and cope with disasters, which includes lack of formal mechanisms of support in preparation, assistance and recovery. As a result, the cost of a major disaster frequently affects poor communities far more severely. In the Philippines, poor urban households suffered 90 per cent of the US \$ 4.3 billion in damage caused by Typhoon Ketsana in 2009. During the 2011 floods in Thailand, a third of Bangkok's population was directly affected, but this included two thirds of the city's poor. Similarly, in the flash flood which struck Cagayan de Oro in the Philippines, also in the same year, 95 per cent of deaths and damage to housing were suffered by those living in informal settlements.<sup>6</sup>



For many urban poor, secure and safe land and housing are out of reach and they often have little choice but to live in the most marginal and hazard prone areas. According to UN ESCAP slums - which can be seen as one proxy measure for poverty - house around 570 million people across the Asia-Pacific region. In many cities a third to over half of all people live in slums and the absolute numbers of slum dwellers continues to rise.

According to the United Nations, settlements are "slums" when they exhibit deficiencies including being located on risky or marginal land, having inadequate structural integrity of housing; a lack of

infrastructure and basic services; and having high population density among other conditions not suitable for habitation.<sup>7</sup>

Slums reflect what people can do given their limited choices and income. While they constitute a broader urban development challenge, they also are the outcome of many independent strategies where formal alternatives have failed to meet needs. In many cases governments can work effectively with urban poor communities, taking their settlements, living and working arrangements as a starting point. In some instances people need to move out of harm's way - but often, significant improvements can be achieved on-site at less cost and with less disruption to social networks and bonds. To achieve this, a shift in mindsets is required where urban poor communities are considered as integral partners in development, enabling them to contribute to solutions.

### Urban poverty is the sum total of multiple and reinforcing deprivations

- Inadequate and unstable income and asset security,
- Inadequate shelter and tenure security,
- Inadequate provision and access to public infrastructure and services (including finance and information),
- Limited or non-existent socio-economic safety nets,
- Inadequate legal protection and rights,
- Lack of voice and power in planning and decision-making processes,
- Disproportionate exposure to environmental and climate hazards.



The combination of these deprivations compounds a lack of choice and a lack of security for urban poor households and communities, often trapping them in intergenerational poverty. However, urban poverty is still largely misunderstood and underestimated. Urban statistics are rarely disaggregated and so can hide large disparities. Furthermore, official poverty lines often do not reflect the higher costs of food and non-food items in urban areas, while other forms of deprivation are difficult to measure. Unless counter-balanced by economic and/or other forms of support, poverty remains a key contributing factor in vulnerability to climate change impacts.

#### ↑ SLUM IN BANGKOK

Klong Toey Area  
(Donovan Storey)



# III. FRAMING PRO-POOR, URBAN CLIMATE RESILIENCE

## 3.1 Vulnerability defined

Though there are shared characteristics, 'poverty' and 'vulnerability' are not the same thing. While poverty reflects a lack of economic and social assets, vulnerability additionally implies a lack of capacity, security, and exposure to risks.<sup>8</sup> Though the overlap is significant, not all poor are vulnerable and not all who are vulnerable are necessarily poor. This has important implications for policy - as does understanding the assets and capabilities even very poor populations possess in their resilience and response to either slow-onset climate change or disasters. Much can often be built from communities, especially once assumptions regarding their capacities are put aside.

The Intergovernmental Panel on Climate Change (IPCC),<sup>9</sup> a scientific intergovernmental body set up by the United Nations to provide information about the worldwide risks of climate change, defines vulnerability as consisting of the interplay of three main components:

**1) Exposure:** How a city is exposed to changes in the climate: what changes can already be observed, what will the climate be like in the future? Exposure considers both current and projected changes based on a review of historic and current climate information (precipitation, temperature, extreme weather) and projected climate scenarios for a city or region. It also identifies the climate change hazards associated with the change (drought, flooding, sea level rise, increased frequency in storms) and their biophysical manifestations (landslides, coastal erosion).

**2) Sensitivity:** The degree to which exposed people, places, institutions and sectors are impacted, either positively or negatively, by climate change today and the degree to which they could be impacted in the future.

**3) Adaptive Capacity:** The degree to which people, places, institutions, and sectors are able to adapt and become more resilient to climate change impacts.

Vulnerability can be considered for a city as a whole, or a neighbourhood, for one sector or specific set of infrastructure, for different population groups, or institutions critical to the management of climate change or climate enhanced disasters. Also, vulnerability is not a static state, but changes over time.

While any person or community can reduce their vulnerability to climate change to some extent, vulnerability results from a combination of disadvantages or deprivations linked to environmental, economic or social factors which can and need to be addressed in unison. To sustainably address the root causes of such vulnerability, a process is often necessary that involves a range of stakeholders at various levels, from the household to the community to the city level and up.

## 3.2 What makes **urban poor communities** vulnerable?

**//** Most extreme weather disaster deaths in urban centers are in low and lower-middle income nations, and risks are concentrated in informal settlements (IPCC 5th Report)<sup>10</sup>

(Pictures by UN ESCAP)



### **1) THE URBAN POOR ARE THE MOST EXPOSED TO CLIMATE CHANGE**

Due to their location in environmentally vulnerable areas and the low quality of their housing, poor households face an elevated level of risk. In addition, they are frequently dependent on informal or subsistence livelihoods that may be directly impacted by natural disasters and other environmental threats. Often the poor are forced to exhaust limited savings or assets in order to respond to disasters, meaning that they have less resources to effectively cope and recover from future shocks.



### **2) SLUMS AND LOW INCOME COMMUNITIES ARE ESPECIALLY SENSITIVE TO THESE EFFECTS**

As these settlements typically lack adequate drainage, energy and communications systems, the impacts of an event such as flooding or drought will be felt more sharply than elsewhere. This is also true for indirect effects such as crop failure. Rising food prices, for example, hit the poor hardest.



### **3) THE URBAN POOR OFTEN LACK THE CAPACITY TO IMPROVE THEIR RESILIENCE**

The urban poor are most vulnerable to climate change and poor households are the least able to protect themselves from its effects. This is not only a reflection of their limited resources and access to information, but also their marginalization. Slums and informal settlements are often excluded, for instance, from early warning systems or flood prevention infrastructure.

## 3.3 Reducing community vulnerability by **investing** in different forms of capital

(Pictures by UN ESCAP)



### FINANCIAL CAPITAL

This comprises individual and community savings, access to credit and other available economic resources that can be used to invest in livelihoods or to support basic needs and rehabilitation following a storm or flood. Some urban poor communities have also experimented with disaster micro-insurance.



### HUMAN CAPITAL

Comprises an individual's or group's skills and wellbeing, for example adequate nutrition and health care, impacting directly on their ability to handle climate change impacts, or equipping them better to take positive actions to reduce their vulnerability, such as skills training, education and professional development.



### PHYSICAL CAPITAL

This includes assets such as housing, but also smaller more portable forms of capital used for livelihoods, such as a motorcycle, a vending trolley or a sewing machine. While these resources are themselves vulnerable to loss through disasters, they are also an essential component in building up resilience through income generation.



### SOCIAL CAPITAL

This comprises informal norms and responsibilities but also formal regulations, between individuals, households and at a wider level between communities, including informal settlements, and institutions.



### NATURAL CAPITAL

This resource is composed of local environmental assets, such as land, and eco-system services such as food and clean water.



Much can be achieved through understanding what forms of capital exist in even the poorest and most vulnerable communities, and investing in those forms of capital in order to develop resilience. Achieving a balanced and strong combination of these, even if it has to be done gradually over an extended period of time, is a much more promising strategy than putting scarce resources into, for example, just one expensive infrastructure improvement such as a flood wall. This is because with these various forms of capital, households, communities and cities can prepare for, cope with, recover from or learn to live with a variety of climate shocks and stresses.<sup>11</sup>

## 3.4 Resilience defined

For the purpose of this Quick Guide urban climate resilience is understood as both a process and a goal. It is an ONGOING PROCESS involving cities and their communities as climate risks and vulnerabilities change. It is also a NORMATIVE GOAL or a state that a city, including its most poor and vulnerable populations, strive to achieve to be safe and able to prosper in the face of a changing climate with uncertain impacts.<sup>12</sup>



### BUSHFIRE

Ku-ring-gai, Australia  
(Ku-ring-gai Council)



### URBAN RESILIENCE

The capacity of cities (individuals, communities, institutions, businesses and systems) to survive, adapt, and thrive in the face of stress and shocks, and even transform when conditions require it

(Picture by UN ESCAP)



## 3.5 Climate resilience or climate change adaptation?



Vulnerability, adaptation and resilience are defined in many different ways. No overall consensus exists, so discussions related to climate change, disaster risk and sustainable development can sometimes become confused when policy makers, experts or the public assign somewhat different meanings to these closely related concepts.

This Quick Guide uses the concept of 'urban climate resilience' in favour of 'climate change adaptation', as resilience is seen as a more comprehensive approach capable of both addressing

underlying climate vulnerabilities and of dealing with a range of uncertainties. The Quick Guide advocates for one common, integrated agenda rather than seeing climate change, disaster risk reduction and development as separate challenges.

## 3.6 Attributes of resilient cities

Resilience outcomes are shaped by the behaviors and capacities of multiple sets of actors, inclusive of local government, the business sector, civil society, and communities themselves.

The Rockefeller Foundation have summarized the following five as key elements:

### Aware

Awareness means knowing what your strengths and assets are, what liabilities and vulnerabilities you have, and what threats and risks you face. Being aware is not a static condition; it's the ability to constantly assess, take in new information, reassess and adjust your understanding of the most critical and relevant strengths and weaknesses, including through methods of sensing and information-gathering, including robust feedback loops, such as community meetings or monitoring systems.

## Diverse

Diversity implies that a person or system has a surplus of capacity such that it can successfully operate under a diverse set of circumstances. Diversity includes the notion of redundancy, alternatives, and back-ups, so it can call up reserves during a disruption or switch over to an alternative functioning mode. Being diverse also means that the system possesses or can draw upon a range of capabilities, information sources, technical elements, people or groups. For example multiple pathways to access water (city supply, water tankers, wells and tanks etc.) or the prevalence of back-up energy sources for cooking and boiling water can be extremely valuable in the face of a shock.

## Self-Regulating

This means elements within a system behave and interact in such a way as to continue functioning to the system's purpose, which means it can deal with anomalous situations and interferences without extreme malfunction, catastrophic collapse, or cascading disruptions. This is sometimes called "islanding" or "de-networking" – a kind of 'safe failure' that ensures failure is discrete and contained. A self-regulating system is more likely to withstand a disruption, less likely to exacerbate the effects of a crisis if it fails, and is more likely to return to function (or be replaced) more quickly once the crisis has passed. Overreliance on a single piece of protective infrastructure (e.g. a flood barrier) can expose the underlying lack of resilience of the city and its people, should that system falter in the face of increasingly unpredictable shocks and stresses.

## Integrated


Being integrated means that individuals, groups, organizations and other entities have the ability to bring together disparate thoughts and elements into cohesive solutions and actions. Integration involves the sharing of information across entities, the collaborative development of ideas and solutions, and transparent communication with people and entities that are involved or affected. It also refers to the coordination of people groups and activities. Again, this requires the presence of feedback loops.

## Adaptive

The final defining characteristic of resilience is being adaptive: the capacity to adjust to changing circumstances during a disruption by developing new plans, taking new actions, or modifying behaviors so that you are better able to withstand and recover from a disruption, particularly when it is not possible or wise to go back to the way things were before. Adaptability also suggests flexibility, the ability to apply existing resources to new purposes or for one thing to take on multiple roles. It also implies that people and institutions (government, businesses and civil society) in the city systematically learn from experience, with an adaptive planning mindset that is accepting of unpredictable outcomes. Adaptive cities and systems are also prepared to respond quickly to extreme events, including modifying organizations, procedures or structures as needed. This also ensures that key functions can be restored quickly after a shock or extreme event.

## 3.7 Principles of pro-poor urban climate resilience: **The Do's and the Don'ts**

While the previous section has outlined and introduced a number of key concepts and ideas, there are a number of important principles which this Quick Guide advocates as being the basis for effective and inclusive urban climate change resilience. These are:

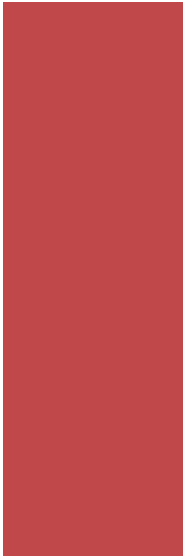


**1. Focus on the whole urban system:** cities are dynamic, with multiple linkages across a range of communities and sectors. An effective resilience strategy should therefore involve and address the entire 'system' of the city, rather than just a single part in isolation. Indeed, focussing on only one sector or intervention may have the unintended consequence of increasing overall vulnerability. For example, the construction of a floodwall around an industrial park may increase vulnerability to flooding of surrounding communities, or put at risk other urban assets and infrastructure.

A more holistic approach to urban management will help produce positive systemic feedback from one area to another - for instance, better health outcomes as a result of improved waste management in slums. Furthermore, by looking at the city as a whole, identifying the complex connections between neighbourhoods and sectors, it is more possible to design a model that addresses the needs of the whole urban system and all its citizens.

**2. Embrace flexibility:** cities should be responsive to existing and emerging opportunities and resources, including the ability to adapt to changing circumstances through innovative approaches. There is no one size fits all with regard to urban climate change resilience, and often very good solutions are local ones. Rigid planning is unlikely to provide for an effective, or sustainable or responsive approach. Many of the issues confronting urban areas in the coming decades are by their very nature unpredictable. This means cities will need to incorporate this uncertainty into their own localised strategies and strategic plans.

This is not an easy task, as planning necessarily involves projections and assumptions, as well as the allocation of resources. But cities should nevertheless consider ways to allow changes and adjustments as the context demands. The development of high cost, long life infrastructure, for example, may bring benefits but these should be designed with adaptability in mind so they do not become a burden to future generations.





### DYNAMIC CITY

View of Metro Manila,  
the Philippines  
(Donovan Storey)

### 3. Enable participation and promote partnerships:

urban resilience is dependent on social cohesion and community involvement. Technical or financial resources, while important, are not sufficient in themselves to ensure effective adaptation - particularly for the urban poor, who are frequently excluded from these benefits. This is why proper processes of consultation, knowledge sharing and community-led development should be mainstreamed into every aspect of decision-making.

It may seem that the primary barrier to boosting resilience is environmental or economic. But often one of the most important steps a city can take is to promote more inclusive and collaborate decision-making processes. In particular, this means allowing marginalized urban communities to contribute to urban planning and policies as well as their implementation at a grassroots level. After all, local authorities cannot achieve resilience alone - so participation will benefit them as well as poor communities.

## AVOIDING MALADAPTATION!

One of the dangers of not taking a holistic approach when guiding a city's development is 'maladaptation' - that is, an action taken to address a particular problem has the unintended effect of undermining resilience. What are some key lessons here?

**Don't focus on a narrow or isolated outcome:** Some programmes fail to consider the effects of one action on others. This often results from the lack of coordination between different government departments and the prioritization of self-contained 'targets' without reference to the effects on other sectors.

**Don't make your planning unnecessarily rigid and without taking account of risk:** Climate change and urbanization are both highly unpredictable, yet many development projects fail to incorporate any uncertainty into their design. This leaves them unable to adapt to unexpected circumstances in the future. This is a particular weakness of large-scale megaprojects, which may last for generations.

**Don't sideline or disregard those who will be most affected:** Many cases of maladaptation could have been avoided if communities had themselves been involved in the solution. Without participation, it is far too easy to develop programmes with disastrous impacts for the urban poor. Even well intentioned programmes can wrongly assume that specialists 'know best' and so leave the poor out of the discussion.

The issue of maladaptation is particularly common with the construction of hard infrastructure and overly formal or rigid urban planning, particularly when developed in a 'top down' manner to address a single issue. One example might be a dam built to manage water flows, but which displaces poor communities to environmentally sensitive locations and which also has the effect of worsening flooding in surrounding areas. Furthermore, once constructed the dam may have little or no adaptive ability - meaning there is little that can be done to alleviate any unwanted impacts.





## IV. SELECTED ISSUE-BASED ENTRY POINTS

Cities are dynamic, inter-dependent systems. While overarching 'whole-of-city' approaches are preferable, the reality is that most planning and interventions take place through sectors. Rather than seeing this as a trade-off, this section outlines where, for effective resilience building, cities can combine sectoral initiatives within a coherent and system-wide adaptation framework. It presents some of the main entry points for urban resilience within specific sectors, such as health, infrastructure and housing. Finally it outlines the overarching elements that need to be in place - in particular, clearly defined and collaborative urban governance - to maximize the impact of these different initiatives.

One notable characteristic of sector-specific interventions is that, while boosting urban resilience, they can also address the pressing broader development challenges facing many Asia-Pacific cities. Importantly, resilience building does not need to divert resources away from other priority areas such as housing and poverty reduction. Instead, it can provide a more strategic framework to coordinate efforts across different areas. Resilience building, then, enables cities to achieve positive social and economic outcomes while ensuring their long-term development and sustainability.

An added value of these initiatives is that a positive impact in one sector can also produce advantages elsewhere. These 'co-benefits' mean that the cumulative effect of a number of parallel initiatives can, if well coordinated, amount to more than the sum of their parts. Urban agriculture, to take one example, can not only provide residents with a source of livelihood but also diversify diets, improve health, provide an urban flood barrier, and create more green space.

## 4.1 Basic services and infrastructure

### What are the challenges?

Cities, because of their density and scale, typically provide higher levels of access to services and infrastructure. Viewed at the national level, access to clean water, sanitation, education and other basic needs is almost always higher in urban than rural areas. However, disparities in access and quality of provision are pronounced in many cities. As a result, for a significant proportion of the poor, life is still defined by the absence of essential services and limited quality of infrastructure.

Gaps in basic services and infrastructure entrench poverty and undermine urban livelihoods. In many poorer communities this gap both reflects and contributes to poverty and vulnerability. In Bangladesh, for instance, 54% of urban residents have access to improved sanitation, but this falls to just 9% for slum populations.<sup>13</sup> In Dhaka, it is estimated that almost 60% of the city's slums lack effective drainage and are exposed to regular flooding.

Such vulnerability and exposure becomes especially evident in the case of a natural disaster, as without a well-functioning infrastructure in place the impacts and aftermath can be devastating. The service and infrastructure gap in many poorer urban areas is a majority contributor to the severity of natural disasters, and can leave communities and cities struggling for years to recover from the impacts.

### Why is climate change making the situation worse?

- **The increasing number of natural disasters threatens the basic functioning of urban systems:** More frequent and more severe flooding, storms and other extreme weather events can damage and disable infrastructure, with many services effectively becoming 'unoperational' in high risk areas. There is an additional danger that at risk communities may not receive necessary infrastructure development because of their level of exposure to risk - thereby increasing their future vulnerability and marginalization.
- **Slow onset changes create additional strains:** Higher temperatures, rising sea levels and unpredictable and more intense rainfall patterns will increase pressure on existing services and infrastructure, with disproportionate impacts on poorer populations and communities. Drought, for example, will threaten water supply and increase the price of clean water, while heavy rain may exceed the existing capacity of urban drainage systems and result in negative environmental and health conditions, especially for vulnerable groups such as persons with disabilities, older persons and children.



## How can we improve resilience?

### INFRASTRUCTURE

Busan, South Korea  
(Kibae Park)

- Mainstream disaster preparedness and resilience planning:** Implementing simple and affordable community-level design and flood protection measures can help ensure essential infrastructure such as roads and schools remain safe and operational during disasters. This includes using appropriate locations where the environmental risk is lower.
- Adopt a 'last first' perspective on service delivery:** A key factor in the absence of services in many poor communities, particularly slums, is their exclusion from urban planning and decision making processes – including necessary investment. Cities should prioritize these areas by focusing on the resource and rights gaps, which undermine affordable access.
- Develop alternative systems of service delivery:** One of the potential weaknesses of standard urban service models is their limited flexibility and centralized structures. However, partnerships and other innovative models can leverage the skills and resources of different actors, including private operators and communities, to finance, design and manage services and infrastructure.

## 4.2 Housing

### What are the challenges?

A home is much more than just a physical structure. It provides a household with security and is often the biggest financial investment a household will make. Secure and well-located shelter can be the foundation for a range of co-benefits, such as enhanced livelihoods and employment opportunities (especially for women), access to public services, and social cohesion. However, the reverse is also true - without access to adequate housing, low income households struggle to emerge from poverty, partly as a consequence of greater vulnerability to natural disasters and other shocks. Unfortunately, cities across the region are facing a shelter crisis, which is projected to become a much greater problem. An increasing number of poor are forced into low quality, unsanitary and even unsafe housing.

In a context of deepening inequality, the growth of slums is a reflection of the failure of formal markets to provide affordable and decent housing for the urban poor. A house in Vientiane (Lao PDR) for example, costs more than 23 times the average annual income.<sup>14</sup> Such affordability problems have forced low income families into peripheral or vulnerable areas, reducing their already tenuous access to services and livelihoods. In spite of these challenges and the constant threat of eviction, many choose to remain in illegal or informal areas, as this is the only available and affordable option.

### Why is climate change making the situation worse?

- **Inadequate shelter is especially susceptible to climate effects:** Much of the urban poor reside in low quality housing composed of makeshift materials. Often poorly designed and constructed, overcrowded and with little or no amenities, these structures are particularly exposed to the effects of rising temperatures and the impacts of natural disasters such as high winds, storms or flooding.
- **Informal settlements are generally located in high-risk areas:** These include the most sensitive urban ecosystems such as riverbanks, on flood plains, slopes or on coastlines. As a result, the increasing incidence of natural disasters will have a disproportionate effect on many urban poor. Perversely, a lack of tenure security makes such populations less likely to invest in upgrading measures than other communities due to the higher potential risk of loss or eviction.

### How can we improve resilience?

- **Support pro-poor housing finance:** By making formal markets and credit mechanisms more accessible to the urban poor, and where possible supporting successful alternatives, low income households and communities will enjoy greater social and financial stability.
- **Promote tenure security for poor households:** Authorities can support a range of different frameworks, from full regularization or community land banks to extended leases, to provide greater certainty for residents and so enable them to develop long term resilience strategies. These include physical upgrading, discussed further below.



- **Engage in on-site upgrading:** Communities can undertake a range of measures to improve the resilience of their housing, such as disaster resistant design and the use of building materials. Authorities can provide loans, expertise and other resources to support this. Housing in high risk areas can be moved to other sites within the settlement through reblocking, or near site relocation. In general, given the investment households have made in their community and development of social networks, it is preferable that residents are not moved to distant relocation sites.

- **Assist voluntary resettlements:** In some cases, housing may be so poorly situated that the safest option is to move residents elsewhere. However, relocation should be seen as a last resort and must be undertaken with the 'free, prior and informed consent' of the communities and not used as a pretext for eviction.

## Community led disaster proofing in Thua Thien-Hu , Viet Nam

Vietnam is one of the most vulnerable countries in the Asia-Pacific to natural disasters - and few areas of the country are more so than the coastal province of Thua Thien-Hu . This area regularly experiences major disruptions from storms and flooding. The impact of these events on the poor has increased with the gradual shift in building materials from traditional bamboo constructions to more permanent concrete structures. The latter, while representing a significant investment for low-income households, are also more susceptible to expensive damage from a natural disaster. The impacts, however, can be dramatically reduced through the adoption of a number of simple design measures, as evidenced by an intervention led by the local government and the NGO Development Workshop France (DWF).

Drawing on previous research undertaken by DWF, with support from UN-Habitat and UNDP, local communities have been instructed through simple rules to strengthen the resilience of their housing - for example, by adjusting the angles of roofs and planting trees around houses. Through participatory training of residents and an extensive awareness raising campaign using schools, radio, television and other platforms, local understanding of the importance of more disaster resilient housing has been significantly improved. This is accompanied by a system of affordable revolving loans that have so far assisted 480 low-income households with the upfront costs of upgrading. Though at over US \$700 the upfront costs are significant, this investment is soon paid back through avoided damage. When Typhoon Xangsane hit Viet Nam in 2006, for instance, only 5% of the DRW houses were affected, and most of these with minor damage only.

Source: UN ESCAP

## Community resettlement in Iloilo, the Philippines

The low-lying coastal city of Iloilo, the Philippines, is highly vulnerable to high tides, storm surges and overflow of the Iloilo, Tigum and Aganan rivers. Its exposure is compounded by poor solid waste management, blocking drainage, and the development of informal settlements alongside riverbanks and coastlines. Flooding from typhoons and sudden downpours has also become more frequent in recent years, with troubling implications for many of the poorest households. This situation culminated in the disastrous events of 2008, when a landslide submerged a large portion of the city, resulting in 25 deaths and affecting more than 260,000 people.

To reduce the threat of natural disasters to communities, the local government has partnered with the Iloilo City Urban Poor Network to relocate communities to less exposed areas. Importantly, while part of the programme involved technical activities such as dredging and drainage, social considerations were also factored into the process. For example, besides ensuring that communities were not moved more than a few kilometres from the original site, the resettlement was accompanied by a range of preparatory activities such as stakeholder consultations, awareness raising and a survey of potential impacts. Because many of those affected had limited resources, compensation and a variety of support services were also provided, including microfinance, skill development and recapitalization of local businesses to help residents maintain and develop livelihood opportunities. This multistakeholder partnership was an effective example of reaching beyond post-disaster response towards more permanent and long-lasting solutions.

Source: HPFPI-PACSI

## 4.3 Land use planning and tenure security

### What are the challenges?

Many Asia-Pacific cities lack the capacity or resources to effectively plan and implement land use strategies. As a result, due to limited land or short-term economic interests, urban areas have greater exposure to disaster risk through unplanned and inappropriate development in locations such as floodplains or watersheds. Managing land resources for enhanced resilience to climate change and disasters is both an urban and regional concern – but examples of coordinated land planning are rare in the region. The destruction of peri-urban forests, mangroves and agricultural land, for example, is commonplace when planning regulations are not enforced.

Urban land development and conversion often occurs beyond formal and legal systems, and is commonplace across the region. The cost of land often can drive real estate investors and even local authorities to go beyond planning frameworks, through the expansion of private housing estates, for example. Coupled by the failure of the formal market to provide affordable land, pressure on land is intense. In Karachi, for example, approximately 62% of the urban population lives in informal settlements covering a fraction (8%) of the city's total land area. The city's most vulnerable populations are also likely to live in areas with the greatest levels of risk and exposure. Female-headed households, youth, older persons, persons with disabilities and migrant populations are less likely to have security of tenure in many cities in the region, and therefore face a greater risk of being sidelined from recovery assistance or compensated in times of disaster.

### Why is climate change making the situation worse?

- **Vulnerable land will be even more exposed to disasters and other threats:** Land use planning will need to anticipate increased threats from more frequent and severe flooding, storms and landslides, and this will need to specifically include an assessment of areas facing greater vulnerability through lack of tenure security.

- **It is likely that such risks will also spread:** With previously secure areas becoming increasingly vulnerable, urban managers will need to enhance capacity to forecast future threats, and adapt land use plans to these.
- **Increased rural migration, a lack of land use planning and land conversion will all intensify pressure on urban land – and especially marginal land:** Climate impacts could reduce agricultural livelihoods and therefore accelerate the movement of rural residents into cities. This will increase the demand for land and could, without an adequate planning framework, intensify development in illegal or sensitive locations, including local ecosystems.

## How can we improve resilience?

- **Prioritise and promote land use planning inclusive of at-risk populations:** To avoid imposing narrow or inappropriate land frameworks, authorities should conduct a broad process of consultation inclusive of all stakeholders.
- **Embrace a holistic approach:** Land use plans should combine social, economic and environmental concerns, protecting sensitive areas while supporting local needs. They should therefore be comprehensive and creative, balancing zoning and other regulations with positive incentives. If cities focus only on restrictions, poorer communities and the informal sector are more likely to be adversely affected.
- **Integrate climate projections and vulnerability assessments into future land use planning:** Cities can move beyond a reactive approach to disasters and other impacts by developing detailed climate projections and hazard assessments to map out likely conditions in the coming decades. This will enable them to adopt a proactive approach to future development. Potential flood plains, for example, can be designated as agricultural land or public green space for urban agriculture to minimize the possible impacts of a disaster. Community mapping can be a valuable process and resource to support city-wide planning.

## Promoting community participation in the Philippines

Land use planning, if well implemented, can bring significant benefits to poor communities. However, it is important that it is not treated as a 'top down' or disempowering process from which communities are excluded. Though hazard mapping and other tools may require technical expertise, this information must also be passed on to communities so they can make informed decisions to either relocate or take appropriate steps to reduce their risk. This is why clear and accessible information on environmental risk is so important - but the barriers between specialists and local residents can be considerable.

One positive example of bridging specialist and community knowledge is the work of the NGO Environmental Science for Social Change (ESSC). The organization has undertaken an extensive programme of participatory research and consultation to exchange perceptions and knowledge of environmental risks in poor urban communities. By working closely with members of the Homeless Peoples Federation Philippines (HFPI) and other representatives, they developed an accessible toolkit to help residents recognize unsafe areas and major risks. This helps support a process of informed relocation and adaptation where communities are themselves actively involved in decision making. This is very different to the treatment of resettlement as a 'technical' issue from which the urban poor, as non-specialists, are excluded. Source: ESSC



### COMMUNITY BASE MAP

Cavite,  
The Philippines  
(ESSC/HFPI)



## 4.4 Livelihoods

### What are the challenges?

One of the main drivers of urbanization are the economic possibilities that cities offer. This is why, every year, millions of rural residents migrate in search of employment or poorer populations choose to stay in urban areas, rather than return or relocate to rural communities. Nevertheless, formal job creation lags behind demand. Even cities with well performing economies have not been able to match rising levels of wealth with livelihood opportunities, particularly for the urban poor. Furthermore, urban labour markets are increasingly oriented towards temporary or informal employment that locks the poor into a state of working poverty, with little in the way of insurance, access to credit or social protection.

### Why is climate change making the situation worse?

- **Local natural resources are adversely affected by climate change:** Many of the urban poor depend directly or indirectly (through their consumption) on fishing, forestry, agriculture and other activities that are especially susceptible to environmental impacts. Altered weather patterns such as droughts, or the impacts of climate change, such as rising sea levels will undermine their ability to earn a sustainable income as well as access affordable and quality nutrition.
- **Livelihoods of the poor are especially vulnerable to natural disasters and other climate shocks:** Many low income urban households are dependent on home-based activities or employment in environmentally sensitive locations that are particularly exposed to storms and flooding. This exposure is made worse by their lack of protection and support in the event that their source of income is suddenly disrupted.
- **Climate change is disrupting and undermining traditional employment opportunities outside cities:** Agriculture is especially vulnerable to environmental change and the expansion of urban development into rural areas. Besides impacting heavily on farming communities, climate change



could accelerate migration into urban areas, placing further demand on labour markets.

## How can we improve resilience?

- **Promote green livelihoods and 'green jobs':** From ecosystem management to waste recycling, there is considerable opportunity, which supports both livelihoods and more resilient cities. There are considerable future benefits in supporting businesses and SMEs with a positive environmental impact through training, incentives and credit assistance.
- **Understand the potential impacts of climate change on employment and livelihoods and promote diversification to offset impacts:** While climate change will impact negatively on some livelihoods, other opportunities will need to be sought to provide alternative income sources. Greater attention should be given to the nexus between climate change, resilience and changing livelihoods.
- **Expand credit opportunities and support for informal sector businesses:** Even though small businesses or livelihoods often require limited upfront costs, many poor households lack the funds to make this initial investment. Improving their access to these opportunities through small loans transfers, microfinance schemes and community savings groups can support the development of local entrepreneurialism, including through opportunities to diversify livelihoods.
- **Extend social protection and insurance systems to the poor:** Not only are poorer populations more vulnerable to the impacts of climate change and disasters, but they also have the least capacity to 'bounce back'. Individual and community resilience could be greatly strengthened through the extension of social protection and insurance systems to the most vulnerable urban populations, providing a basis for recovery, which does not necessitate selling of assets or borrowing of money. Livelihoods for the poor and those in the informal sector are often limited and vulnerable.

## Environmental protection and economic development in Tangalle, Sri Lanka

The small town of Tangalle, Sri Lanka, was heavily affected by the 2004 tsunami, with hundreds of residents killed and thousands more displaced. In the aftermath, the authorities decided that new development would need to be directed away from the worst hit areas to prevent similar devastation in the event of a future natural disaster. However, while safety was a major priority, the community was also concerned that any planning restrictions would not undermine tourism, fishing and other important economic activities. The challenge was therefore to design an effective framework that restricted development in high-risk areas without adversely impacting on local livelihoods.

In partnership with volunteers from the Planning Institute of Australia and the Institute of Town Planners of Sri Lanka, a detailed SWOT (Strengths, Weaknesses, Opportunities, Threats) analysis was undertaken together with extensive consultation with community members. As a result, Tangalle was able to develop a comprehensive Urban Development Framework that balanced the need for strict zoning with an awareness of livelihoods. Though the town's zoning now includes a 100 metre buffer zone from the coast where residential and commercial development is prohibited, recreational activities are permitted and the area can serve as a green belt for both tourists and local residents. Other measures include revegetation and improved drainage. As a result, besides reducing Tangalle's exposure, the framework has preserved the beach for tourism and fishing - so maintaining the local environment as source of income for the poor community.

Source: PIA

## Creating livelihoods with 'coconets' in Metro Manila, the Philippines

Approximately 25,000 households live in the tributary Estero de Paco in Metro Manila, the Philippines. Contaminated by the constant flow of domestic sewage and with little in the way of waste management or rehabilitation, it is projected that without a major intervention, the river's pollution levels could double over the next 15 years. Thousands of households are regularly exposed to flooding as a result of sudden downpours - events that in recent years have become more frequent. In response, the government has been undertaking an ambitious programme of rehabilitation, dredging waste and creating a riverside park.

One of the positive aspects of the programme has involved on-site upgrading of the area - in particular, the use of 'coconets' to strengthen riverbanks and reduce erosion. Made out of natural coir fibre by the company Cocotech, drawing from a supply base of around 2,000 farming families, this innovative and low cost technology offers an alternative to conventional approaches and also supports rehabilitation of damaged or degraded landscapes. Besides being 90% cheaper than non-permeable concrete infrastructure, it promotes the recycling of agricultural waste and provides local farmers with an additional source of income - an excellent example of a resilience measure with both environmental and livelihood benefits.

Source: UN ESCAP



(UN ESCAP)

## 4.5 Health

### What are the challenges?

Urban areas have traditionally been associated with better health indices. However, the picture can be very different when disaggregated for income, gender and age. Those populations living in slums typically have less access to health care services than other urban groups, and health outcomes may even be inferior to those in rural areas.<sup>15</sup> In Bangladesh, for example, under-five mortality rates are 44% higher in informal settlements than rural areas. This is in part because health care, like other services, is unavailable for many of the poorest due to lack of access and affordability.

Overcrowding and the absence of basic sanitation or waste disposal in many settlements, particularly slums, create the ideal conditions for the spread of communicable illnesses such as cholera. Lack of access to green public space and exposure to pollution, including stagnant water, also contributes to poor health outcomes and increased incidence of disease. Migrant communities, including those without legal recognition, are often in the most critical need.

### Why is climate change making the situation worse?

- **Climate change scenarios indicate a greater threat of waterborne disease:** Changing patterns of rainfall and temperatures can change the “normal” seasons of vector-borne diseases, like malaria and dengue. Additionally, flood-related disasters will make outbreaks of dysentery and other diseases such as cholera more commonplace, with both drought and floods reducing safe water access due to scarcity or contamination of supplies with waste.
- **Rising temperatures will be magnified in urban environments:** Heat waves – coupled with the effects of urban heat islands - are projected to have a pronounced effect on the incidence of cardiac and respiratory illness in cities. This is especially likely for those populations dependent on outside work for their livelihood.
- **Basic health systems could be undermined:** Climate effects, both slow onset changes and sudden impacts such as storms, could weaken urban support systems and strain even adequate urban health systems through increased demand on resources.

### How can we improve resilience?

- **Address the underlying and changing determinants of urban health:** Health outcomes are determined by a range of conditions, from housing and food security to clean water and sanitation. Cities should identify which areas are the most important and use these as entry points. Environmental upgrading, for example, such as drainage and waste disposal, can reduce the spread of disease.
- **Focus on extending service coverage to vulnerable areas:** Conventional care systems often fail to reach the most marginalized due to financial, institutional or legal constraints. These can be addressed through targeted subsidies, affordable pricing and community-based service delivery. Health systems can also benefit from local participation, such as the use of trained community workers, and community education – especially in relation to prevention.
- **Examine public system capacity and protocols in relation to projected changes:** Some cities in

Asia-Pacific have dengue detection and prevention programs as well as other activities to reduce risks of malaria. However, if these programs are not timed to correspond with changes in mosquito and other vector breeding cycles, then the resources will be poorly deployed.

- **Mainstream disaster preparedness:** Flooding and other forms of extreme weather are likely to intensify health challenges in cities. Urban services therefore need to be disaster sensitive by incorporating preparedness and recovery mechanisms, from early warning systems and flood resilient hospital design to emergency drills and community response teams.

## Using health data surveillance to guide environmental upgrading in Indore, India



The city of Indore, India, has enjoyed a sustained period of economic growth as a major hub of industry and trading. However, commercial expansion and migration have placed a heavy strain on the city's resources, particularly its limited water supply. The city has also been unable to keep up with its rapid expansion and is struggling with inadequate drainage and sanitation. The result is a rising incidence of water and vector borne diseases, such as typhoid and diarrhoea.

To tackle this threat, the local government is now implementing an innovative citywide disease surveillance and information system to address the current gaps in monitoring and responding to outbreaks, particularly in poor or marginalized areas. By gathering data from public and private clinics and hospitals, the city is able to identify and respond to potential outbreaks in real time, including through SMS. Besides providing an accurate real-time picture of their prevalence and location, the system also provides authorities with a solid evidence base of high-risk areas to guide their future sanitation development. These investments, targeted in the most vulnerable areas, will help lower the incidence of disease by eliminating the stagnant environmental conditions that encourage its spread.<sup>16</sup>

Source: TARU Leading Edge / District Health Department, Indore

## INVESTING IN GREEN SPACE AND FOOD SECURITY

Urban agriculture in Da Nang, Viet Nam (Donovan Storey) and paddy field in Dhaka, Bangladesh (Alejandro Hita)



## Dengue prevention in Jakarta, Indonesia

In Jakarta, Indonesia, the growing incidence of dengue fever has been linked with climate change. Regular outbreaks of this mosquito-borne disease have occurred in the capital in recent years, aided by the city's network of canals and lack of information about the disease. In just four months of 2007, for example, there were more than 4,400 reported cases and 41 fatalities.<sup>17</sup> In response, a locally managed early warning system has been developed to tackle the threat. To prevent its spread at an early stage, taskforces of informed local women visit households in the community to locate the presence of any dengue larvae. If these are found, then homes are sprayed with insecticide to exterminate them before they develop into a health hazard.<sup>18</sup>

Source: BBC





## 4.6 Food security, urban agriculture and ecosystems

### What are the challenges?

In a context of rapid and unplanned growth, agricultural land and peri-urban environments are often on the frontline of urban expansion. Every year thousands of hectares of farmland are lost, in the process undermining regional food systems. As much as 23% of Delhi's National Capital Region, for example, was consumed by development and urbanization between 1999 and 2012,<sup>19</sup> including 32,769 hectares of green space. Unmanaged land conversion also eliminates valuable ecosystems, with potentially catastrophic consequences as 'buffer' systems are degraded. The destruction of mangroves and wetlands, for example, not only deprives cities of important environmental services, including livelihood opportunities in fishing and ecotourism but also the capacity of these natural resources to reduce the impact of flooding, storms and other forms of extreme weather. In addition, the conversion of agricultural land in urban areas can exacerbate the impacts of intense rainfall and flooding.

Degradation of urban and peri-urban ecosystems through a lack of planning and enforcement also has a direct impact on food security. Many residents do not have access to their own food or local production and so are dependent on external supply chains. The urban poor face particular challenges in securing an adequate and affordable food supply. For the poorest urban households in Bangladesh, for instance, food accounts for more than 60% of their budget.<sup>20</sup> The complex transportation and logistics involved also means that diets are increasingly dominated by processed foodstuffs, with implications for long term health.

### Why is climate change making the situation worse?

- **Unpredictable weather patterns disrupt food systems:** Altered rainfall and rising temperatures

could undermine production and lead to extreme weather such as drought that could decimate crops and livestock. This is likely to raise food prices and put the poor in particular at risk. It could also trigger increased migration from rural areas to cities.

- **Rising temperatures and water scarcity exacerbate food safety issues:** As there is an extended supply chain between agricultural production and city markets, involving storage, refrigeration, transport and retail, climate stresses such as heatwaves and drought could compromise the quality and hygiene of urban produce.
- **Ecosystems face a greater risk of damage and contamination:** In addition to the risk of more frequent storms, flooding and heat waves, other climate effects such as depleted water resources and the spread of weeds or pests could pose a serious threat to local environments. If not effectively managed, sensitive ecosystems are especially vulnerable to any fluctuation in weather conditions.

## How can we improve resilience?

- **Develop effective environmental planning, including enforcement for sensitive ecosystems:** Enforced zoning and planning restrictions can prevent degradation of ecosystem services through inappropriate development. These can be combined with awareness raising on their benefits and positive incentives so communities have a clear stake in their protection.
- **Support regional food systems:** Cities need to look beyond their own boundaries and work with neighbouring authorities in the management of ecosystem services and in support of peri-urban agriculture, especially for staple crops. Urban authorities can contribute by ensuring development does not impact on farmland and natural systems. Through developing local markets, cities can also promote healthier food supply and positive rural-urban food networks.
- **Promote urban agriculture:** Households can become more resilient by growing at least part of their own food consumption. Authorities can support these activities by providing credit assistance and training, as well as providing underutilized urban land for farming. Alternatives such as rooftop or hanging gardens can also be supported, as can home composting utilizing organic household waste. Urban policies to ensure a minimum percentage of staple crops relevant to the locality are produced within the greater urban system can help reduce the impacts of price shocks if these staples face shortages or price fluctuations.



### WETLANDS

Hong Kong,  
China  
(Donovan Storey)



## Food, livelihoods and waste disposal - the benefits of urban agriculture in Gampaha, Sri Lanka

Rapid urbanization in the fertile agricultural district of Gampaha, Sri Lanka, has brought a range of challenges for the local population. As much of the land has been redeveloped, the city now faces increasing stress from pollution, inadequate waste disposal and rising food prices. However, these challenges have been turned into opportunities, thanks to Gampaha's ambitious programme to transform itself into 'a cleaner, greener and more food secure city' through urban agriculture.

Farming in the city is not a new phenomenon, but it received a major boost in 2007 when local government, civil society, schools and businesses came together to form an 'Urban Green Force'. The subsequent City Strategic Agenda on Urban Agriculture has, among other activities, provided training for community leaders on cultivation and recycling. It has also promoted recycling through the distribution of thousands of composting bins as part of a 'Money for your Waste' programme, and supported the creation of household gardens by providing basic information on the use of low-space technologies. Given the high price of land in cities, making urban farming cost effective can sometimes be a challenge. However, value can be added by integrating agriculture into other areas, such as recycling. Gampaha, for instance, in addition to improved diets and average household savings of 15% as a result of home-grown food, has enjoyed a 10 tonne reduction in daily waste collection. The viability of the project is demonstrated by its planned replication in other cities in the country, including areas of Colombo.<sup>21</sup> Source: RUAF Foundation

# 4.7 Disaster risk management

## What are the challenges?

Asia and the Pacific is considered the most environmentally vulnerable region in the world, accounting for 91% of all deaths and 49% of all damage globally from natural disasters during the twentieth century.<sup>22</sup> This trend has been accentuated by population and asset concentration

through urbanization, with many of its cities based in vulnerable locations such as flood deltas and coastlines.

Rapid and poorly managed urban growth is making the situation worse by driving development into environmentally sensitive areas. Slums and informal settlements in particular are often situated in inappropriate areas such as marshlands, landslide prone slopes, foreshores or mangroves. This means the urban poor are usually the worst hit by a disaster, while also lacking the capacity to recover. Nevertheless, despite pressing need including for more investment, building capacity for disaster risk reduction is falling far short of what is required.



## Why is climate change making the situation worse?

- **Cities are more exposed to natural disasters and this exposure is spreading:** Because urban areas hold a concentration of people, infrastructure, other assets, and services, the economic and development costs of a disaster can be high as a result of shocks and stresses. Besides their greater frequency, the increasing severity of storms and flooding may mean that urban areas that are currently relatively secure from the threat of disasters may be vulnerable in future. Altered weather patterns may also mean that cities previously outside storm paths are soon themselves at risk.
- **Urban populations face particular resilience challenges:** Besides the rising incidence of extreme weather events, cities face slow onset climate effects that will raise their levels of risk and expose their vulnerability. This is particularly the case with poorer communities, and within those communities there are vulnerable communities at greater risk again. Greater attention is needed for such groups, including persons with disabilities, older persons, children, and undocumented migrants.



## How can we improve resilience?

- **Know the risks you are up against:** Disaster monitoring and surveillance can provide a clearer picture of the challenges cities may face which can then be incorporated into early warning systems and other tools. Involve specialists from a range of sectors so the information is as comprehensive as possible, but ensure the inclusion of communities and their knowledge alongside specialist outside interventions.
- **Take steps to minimize the impact:** Using information from these assessments, develop a range of strategies to reduce exposure, from early warning systems and flood risk maps and to flood-resistant housing design and land use regulations in particularly sensitive areas. Investing in social systems, such as mutual support groups, can strengthen overall urban resilience through more robust community networks.
- **Design your recovery before the disaster, not after:** Even with considerable preparation and protection, urban areas still face some level of potential threat. This can be reduced by making sure that an emergency response is already established, with the necessary resources and systems in place.
- **Learn from previous disasters:** While the effects of an extreme weather event are often devastating, it can present an opportunity for communities and local authorities to improve their resilience against future shocks. To do this, however, cities need to document the impacts of disasters and change, and be open to adapt in light of new information and lessons learned. This includes opportunities, which allow local communities to contribute their own experiences, know-how and resources.







## Community based disaster protection in Metro Manila, the Philippines

Though the Philippines is one of the most vulnerable countries in the Asia-Pacific to natural disasters, this adversity has also produced some of the most innovative resilience strategies. One of the best examples has come from the Banaba community, located close to Metro Manila in the municipality of San Mateo. For local residents, situated in a flood plain close to two large rivers, flooding is not a potential threat but an unavoidable reality. While floods routinely take place on an almost annual basis, some years have produced almost total inundation. For a period in 2009, for instance, 96% of the neighbourhood was covered in water.<sup>23</sup>

Buklod Tao - literally meaning 'group of people' - began in the 1980s as a religious meeting before evolving into a broader community organization that brought residents together to tackle different developmental challenges. Having developed savings groups for livelihood creation and campaigned against forced evictions, Buklod Tao is now working to protect the community from the increasing threat of flooding. Rather than trying to reduce environmental vulnerability, however, the programme works within it to reduce the impact of a disaster to acceptable levels. Using trained 'river watchers' from the community to monitor

water levels and with the help of online rainfall data, leaders are then able to provide residents with live updates by SMS and issue an evacuation warning once the water reaches a certain level. There are also specially trained rescue teams to provide emergency relief to stranded households. As a result of this 'safe fail' early warning system the worst effects of a disaster have been avoided - including, remarkably, any loss of life.<sup>24</sup>

Source: Buklod Tao, Inc.



### DISASTER INTERVENTION

Community-driven disaster intervention in Iloilo City, The Philippines (UN ESCAP)

# V. CLOSING THE LOOP FOR PRO-POOR URBAN CLIMATE RESILIENCE

## 5.1 Towards comprehensive planning and governance

While much can be achieved through sector-based approaches, more concerted attention needs to be paid to the specific benefits of comprehensive city-wide approaches.

The previous section outlined some of the key entry points to improve urban resilience. As climate change and disasters pose multiple and interrelated challenges across urban systems and populations, cities should pursue a variety of interventions and allow different stakeholders to be involved. At the same time, however, it is essential that these efforts are well integrated and coordinated, working with rather than against each other.

The goal of an overarching resilience framework is to ensure integrated planning and response. A well-functioning citywide governance strategy can help support and coordinate activities at multiple levels while allowing each actor to contribute their skills and resources. There are a number of key elements that should underline this, informed by a holistic approach to urban governance that connects high-level policies and investments with community programmes.

**1. Vertical coordination:** There are often limited opportunities for urban authorities and communities to interact, and this is particularly so in reference to the urban poor. Furthermore, many decisions that determine a city's policies and practices are affected by actors at other scales, including state/provincial and national governments, neighbouring municipalities, and local bodies sharing control over a particular resource such as a watershed. As a result, governments and communities often fail to align or communicate their strategies, and resources, resulting in replication, inefficiencies and even conflicting efforts. By improving communication and knowledge exchange, on the other hand, cities can harmonize these different levels of activity.

**2. Horizontal collaboration:** Given the cross-sectoral nature of challenges facing cities in the region, institutional gaps and divisions can be counterproductive. Cities should promote dialogue and cooperation among government departments and agencies, including budget sharing and decision making, to create value added interventions that address multiple needs and interests. This will result in a more holistic and efficient approach to developing resilience.

**3. Lesson learning:** A well-functioning system of urban resilience must be responsive to new ideas and flexible to changing circumstances. In particular, governments must be willing to reflect practical experiences and encourage community and broader stakeholder feedback into strategies, drawing on both successes and failures. Even a well thought-out framework can become rigid and miss opportunities, if it is not open to critique and change.

**4. Whole-of-system thinking:** Cities must take a holistic approach to resilience and consider the complex ways that different sectors interact. Ensuring the right regulations and incentives are in place will encourage effective decisions from all urban stakeholders, including business, industry, and civil society groups. It also means looking beyond municipal boundaries and recognizing the connections of the city with peri-urban and rural areas.



## INFORMAL SETTLEMENT

Kathmandu  
(De Visu/Shutterstock.com)

## 5.2 Developing a citywide resilience strategy

### 1. Identifying climate vulnerability

Understanding a city's level of vulnerability is the first step in the development of an effective strategy for resilience. This will give planners a stronger evidence base and also provide a clear 'business case' for investing in resilience. What is important is that all communities are included in decision making, including low-income areas and informal settlements where climate exposure is often especially acute.

As vulnerability is a complex condition that involves a range of social, economic and environmental factors, cities should use a holistic approach to measure local conditions and the potential impacts of climate change on a particular group or location. This means including livelihoods, risk associated with informal housing, capacity of local organizations and other assets in the assessment. It is also vital that this process is grounded in participation, with poor communities actively contributing to and even leading in data collection and research.

There are a variety of tools available to gain a better idea of a city's vulnerabilities. While some require specialized skills or technologies, such as Geographic Information System (GIS) imaging, a great deal of valuable information can be gathered using simple techniques such as community mapping and participatory enumerations. Ideally, these can be combined to develop a clearer picture of both the physical conditions of an area and the social context of the community.

It is likely that the vulnerabilities and risks identified will greatly exceed a city's capacity to address them. Cities must therefore be pragmatic about what can be done in the short term and allocate resources to those areas where the need is greatest. Again, these decisions should be undertaken in consultation with a wide range of stakeholders to ensure any adaptation strategy accurately reflects the priorities and capacities of local residents. These are the greater benefits that can be derived from integrated, cross-sectoral and partnership-based approaches, and more emphasis could be placed on them as effective entry points.

- Designated as a flagship 'eco-city' under the United Nations One Plan Fund, the city of Hoi An, Vietnam undertook a detailed Vulnerability and Adaptation Assessment (VAA) with the support of UN-Habitat, the involvement of community leaders, business representatives and academics, which highlighted key concerns, such as deteriorating water quality and reduced agricultural productivity, which were then mainstreamed into the Eco-City Development Plan through projects on waste management and revegetation of the coastal area.
- Bushfires, storms and drought regularly afflict Ku-ring-gai, Australia, but the local council had struggled to locate an appropriate planning tool to inform its investments in climate change adaptation. So, after completing its initial vulnerability assessment, staff members developed their own set of priorities by brainstorming and then evaluating a range of possible actions. These were then scored according to three main criteria - financial feasibility, social responsibility and environmental sustainability - that were then crosschecked by experts and the community. As a result, the council have a clear picture of which actions would deliver the best short and long term results to the area.

## 2. Developing and sustaining multi-stakeholder partnerships

Given the growing challenge of climate change and the resource gaps many cities are already facing, the need for effective and pro-poor partnerships is more urgent than ever. Combining skills and capacities is an essential dimension of successful adaptation. Local authorities should facilitate and empower communities in developing resilience at the local level, as well as act as 'first responders' in times of crisis. Partnerships can involve a variety of different stakeholders, from communities, governments and local businesses to regional city associations, development agencies and academic institutions, with each bringing something different to the table.

- **Local communities:** The urban poor are usually, but not always, the best placed to provide appropriate solutions to local challenges. Participatory programmes can tap into a community's skills and deliver low cost, accessible services. Through collaboration, residents can contribute to the design, delivery and funding of adaptation programmes.
- **Urban authorities:** With adequate resources, local authorities can draw on their knowledge and relationships with other stakeholders to implement effective and appropriate programmes for their city. They can also position themselves as intermediaries between urban stakeholders, and key facilitators of efforts by local communities and businesses, and national or international organizations.
- **National governments:** Central governments generally have more resources and capacity at their disposal than local authorities. This means that, among other roles, they can provide essential technical and financial support for the development of urban infrastructure and other specialized activities.
- **The private sector:** Private investors and businesses are playing an increasingly prominent role in the development and management of cities. In many cases, they have greater resources and capacity than government bodies to fund and operate infrastructure and essential services. With the right incentives, businesses can strengthen resilience by mainstreaming adaptation into their activities. They can also become advocates for more pro-active citywide resilience building.
- **Development agencies and multilateral banks:** International financial institutions have significant skills and financial assets to invest in urban adaptation. Improved cooperation with cities could help urban authorities fill critical gaps in local capacity or resources - for example, in the development of large-scale infrastructure.

However, developing the right platforms for collaboration in order to benefit from a range of stakeholders can be challenging. Cities must work towards the most effective models of facilitation, to bring different actors on board. While it is possible to get stakeholders with very different interests working together on resilience, these processes often require skilful management. Each city must find its own most effective strategy based on institutional and community resources – there is no simple model to borrow.

## The value of community based partnerships

From data collection and project design to programme financing and implementation, local communities can play a major role in strengthening urban resilience. By encouraging greater participation, cities may achieve the following benefits:

- **Community programmes provide excellent value for money:** Ho Chi Minh City, Viet Nam, struggles with regular flooding, urban heat island effects and blocked drainage as a result of plastic waste. To tackle this, the authorities and the NGO ENDA engaged communities to develop local adaptation strategies. By establishing project teams, made up of local residents, a variety of positive measures were promoted within the community to strengthen adaptation while delivering immediate benefits. These included advice on energy efficiency, bans on plastic bags, 'greening' programmes for balconies and loans for the installation of 'door dikes' - all delivered at low cost.
- **Communities can help design better programmes:** in Batticaloa, Sri Lanka, much of the coastal city is prone to flooding. Through a project funded by UN-Habitat and run by local authorities, residents were able to participate in the development of a green belt near the sea as a protective buffer against natural disasters and a recreational area for communities. By being directly involved in decision making about what facilities should be prioritized and the type of vegetation to support, they developed a much greater sense of ownership over the project, including a protected public space that is better suited to their needs.
- **Communities can take responsibility:** in Marikina, the Philippines, local volunteers have been organized into trained disaster prevention teams, with support from the Red Cross. Besides raising awareness among other residents about environmental issues, they also monitor the floodwater and communicate this information to other residents when it reaches critical levels. The programme shows how a little training

can go a very long way, with members using their knowledge to help the whole community improve its response to disasters.

- **Communities can teach resilience:** community organizations are providing many examples of best practice across Asia and the Pacific, offering governments and other stakeholders the chance to improve their own practices by learning from them. In Fiji, for instance, the People's Community Network's work on housing and evictions gained the interest of the national government. This has led to the creation of a MoU with the government to roll out citywide upgrading programmes in 15 urban centres across the country.<sup>25</sup>
- **In Ballina, Australia,** the NGO Wetland Care has been providing residents with the necessary skills and information to make a stand against the area's declining environmental quality in their own backyard. It encouraged households to come up with a personal action plan to begin improving their surroundings by reducing waste, planting native vegetation, recycling grey water, composting and other positive practices. With expert advice, residents were then able to develop their own programmes and pass on their knowledge to other people in the community.

Cities should not treat community partnerships as a quick fix, however. Working with communities, establishing trust and identifying the most excluded groups, often requires considerable time and effort. Local governments may need to revise their own approach to decision-making and programme delivery to achieve results. Furthermore, as communities may have a range of interests and capacities authorities may also need to be prepared to mediate to reach a consensus for action.



### 3. Promoting awareness and knowledge sharing

A well-informed urban population is essential to any resilience strategy. Public officials, communities, businesses and other stakeholders need to have a shared understanding of risks and choices in adaptation. Some of the most successful knowledge for action in the region on urban adaptation has been achieved through dialogue in which decision makers also have the opportunity to learn from the experiences of all stakeholders.

Information and action points on climate change can be communicated through a variety of channels. Some cities in Asia and the Pacific, for example, have launched successful campaigns in schools to educate children and youth. Local and national media can also play a role in providing accessible information on climate risks. Authorities can also work with community organizations, religious institutions, shopping centres and other local focal points to disseminate key messages among residents, as well as learn from their experiences and capacities.

#### Raising climate change awareness among local communities

- Mercy Corps, in partnership with local organizations and with support from The Rockefeller Foundation – funded ACCCRN, is piloting an innovative school initiative on climate change in the coastal city of Bandar Lampung, Indonesia. Working with educators, the programme is designing an urban resilience module to provide teachers and students with a practical understanding of the key issues. This will help communities to better prepare to tackle the effects of climate change. While it is initially being piloted in four schools, the aim is for the results to be replicated across the city and nationwide, with the materials integrated into the curriculum.<sup>26</sup>
- Communicating climate change through local media to reach a particular target audience can be challenging. However, a large variety of resources are available to support cities in engaging local communities with the key issues in a simple and effective way. The BBC's Climate Asia programme, for example, has produced a Communication Toolkit and other materials with important guidelines on how to present climate issues vividly to different groups.
- Information technologies have opened up an exciting new space for online knowledge sharing between different sectors, cities and stakeholders. This provides opportunities for contributors to post training programmes, case studies, guidelines and a range of useful materials for local authorities, communities and other actors. The Asia Pacific Adaptation Network and SEA Change both provide publications, best practice, discussion forums and project links that are readily accessible for cities to adapt to their own context.

## 4. Creating a supportive and empowering governance framework

Governance is a critical dimension of urban resilience. In general, the most successful forms of resilience have been achieved by cities with well-resourced, collaborative local governments who have managed to create a broader enabling environment for climate action at the local level. One of the main challenges in developing successful resilience strategies is that it necessarily involves a range of sectors and stakeholders to collaborate, both 'vertically' (from central government to local communities) and 'horizontally' (across different departments and ministries).

As urban governance involves a wide array of groups and interests, the role of city governments is also shifting from management and decision making to coordination and partnership. This means that cities cannot rely on their own activities, but must also create a facilitating environment to align the actions of all urban stakeholders with their own policies.

Without such leadership and facilitation it is very difficult to develop a coherent resilience strategy. The vulnerability of many slums and informal settlements - the lack of development regulations, the absence of basic services, and their highly exposed locations - is due in large part to the absence of many basic governance functions and systems. Cities need to find a way to connect their own strategies with community level adaptation and private sector investment in order to promote coherent and effective change. There are a number of steps that can be taken to achieve this:

- **Dedicated resilience platforms:** As resilience building requires collaboration and resource sharing between different departments, it is vital that local authorities develop appropriate platforms to ensure it remains on the agenda. Otherwise, without a clear mandate and ring-fenced funding, resilience may not be sufficiently prioritized by individual departments.

- **Adequate local capacity:** This is a particular challenge in the context of decentralization, where many responsibilities but limited resources have been devolved to cities. To be able to implement and enforce pro-poor policies on the ground, urban authorities need a range of technical and managerial skills in place. In some cases these will be beyond their own capabilities, meaning authorities must look to work with other urban actors or to national and international partners to fill gaps.

- **A clear and coherent policy framework:** Cities need to ensure that the right incentives and regulations are in place to encourage businesses, communities and other actors to adopt positive practices themselves. Government has a role in guiding these practices to benefit the city as a whole, recognizing that individual actions taken to respond to shocks and stresses may transfer risk elsewhere if a comprehensive view is not taken. An effective and coherent policy framework (e.g. land use planning) is essential.

## Mainstreaming disaster risk reduction into decision-making

- In Albay, the Philippines, the local government has made disaster risk reduction a core element in its decision-making by establishing a permanent unit tasked specifically with this as its mandate.<sup>27</sup> The Albay Public Safety and Emergency Management Office, set up in 1995, has an independent budget and permanent staff working across a number of divisions to mainstream risk reduction into local decision making. This ensures that, politically and financially, disaster risk management remains on the agenda. The organization's success in developing strong connections between sectors and among different stakeholders has been central to Albay's improved response. As a result, there have been no disaster related casualties in 15 of the 17 years since its creation.<sup>28</sup>



- Although the Vietnamese government passed the National Target Program to Respond to Climate Change in 2008, mandating local authorities to develop their own climate adaptation strategies, in practice many cities lacked the resources and capacity to do this. This was in part due to the absence of effective coordination within local government, with some departments now recognizing climate change as part of their responsibilities. In response, with support from The Rockefeller Foundation-funded ACCCRN, the three cities of Da Nang, Quy Nhon and Can Tho established City Climate Change Coordination Offices (CCCOs) as independent units to engage a variety of stakeholders. Among other activities, the CCCOs have provided capacity development and technical assistance to different government departments, set up an online information database of climate related information, undertaken research, engaged communities in awareness raising activities and overseen the creation of local adaptation plans.<sup>29</sup>

## 5. Strengthening the capacity of urban stakeholders

Though local communities and other actors have a great deal to contribute to resilience building, there are often significant economic and institutional barriers to their full participation. However, targeted capacity development and assistance can help minimize these obstacles and realize the potential of all stakeholders to contribute to resilience.

- **Technical support:** While adaptation involves a range of activities, some areas involve highly specialized skills that are not available to

local authorities and the urban poor, such as satellite mapping or advanced engineering. In these instances, central governments and international agencies may be required to provide these resources. Wherever possible, however, efforts should be made to cultivate knowledge and technical capacities locally since the ability to weather shocks and stresses will largely depend upon the ability of local actors and institutions to perform some of these functions themselves.

The Nationwide Operational Assessment of Hazards (NOAH) programme in the Philippines is a government-led initiative developed in response to demands from city authorities, businesses and civil society groups for more comprehensible and accurate information on potential extreme weather events. As local governments often lacked the resources or technical skills to develop detailed forecasts on storms and typhoons, NOAH was set up as an online portal to communicate updates through its website and Twitter account to the general public. Once completed, the project will provide users across the country with an accessible database of information on rainfall, temperature, potential flooding and projected cyclones.

- **Training and education:** A great deal of potential energy and initiative within communities is often left untapped because, due to lack of resources and marginalization, the urban poor do not have the opportunity to develop their capabilities. Nevertheless, many interventions by NGOs and agencies have demonstrated that community workshops and

trainings can reap considerable dividends in enhancing local capacity. In the end, resilient cities result from resilient communities.

- **Financial assistance:** Some partners, particularly the urban poor, may lack the ability to make upfront investments. Targeted grants and subsidies can help communities with the

initial costs, even if in the long term some or all of the expense is borne by residents themselves. This includes revolving loans, for example, where small sums are issued for upgrading and paid back over time.

- **Participatory platforms:** In many cities the urban poor are already highly organized and have developed an array of savings groups, CSOs and other forums. However, there is often a gap between their activities and the official decision making structures of local

government, particularly within the informal sector. Developing national and regional associations can provide communities with a visible platform to represent themselves to other stakeholders. In the process, it provides a stronger connection between community level activities and citywide or even global resilience strategies.

Like many towns and cities in the Pacific, Tawara, Kirabati has been undergoing a process of rapid urbanization without the institutional capacity to manage this growth effectively. Though extremely vulnerable to climate change impacts such as rising sea levels and fresh water scarcity, the lack of local resources has meant that there has been little in the way of adaptation. In 2011, however, at the invitation of Tawara's Urban Councils, the Melbourne School of Design in Australia set up a Travelling Design Studio where students developed a series of short, medium and long term measures for residents to strengthen their resilience. This included a land use plan to steer future development in less vulnerable areas, the development of low cost rainwater harvesting for households and improved housing design. These features were designed to use inexpensive, readily available materials, with simple instructions provided in an easy to read manual developed specifically for local residents.

## 5.3 Finance for resilience

### 1. Finding the funds

Across the world, the burden of adapting to climate change will be felt most strongly in urban areas. According to one estimate by the World Bank, as much as 80 per cent of global adaptation costs will be borne in urban areas.<sup>30</sup> However, at present many cities are struggling to fund these needed investments and those most vulnerable to climate change are also those least able to access and effectively utilize available finance. This has been made more complex by decentralization, as many national governments have transferred key responsibilities to local authorities but often without the resources necessary to undertake them.

### 2. A new approach to financing urban adaptation

As Asia-Pacific cities grow larger and more complex, traditional funding models have become increasingly inadequate. As finance is often one of the key challenges facing local authorities, there is an urgent need to better resource local governments to meet the challenges of climate change. For local governments, the need to generate local revenue as well as tap into external opportunities has never been more essential.

Despite constraints, there are considerable opportunities for local authorities to develop more innovative approaches to urban finance, in collaboration with international institutions, the private

sector and other stakeholders.

This section provides a brief overview of six different sources - local communities, international climate finance, overseas development assistance, national governments, urban authorities, the private sector - to highlight some of the steps that can be taken to mobilize investment. It should be noted, though, that the field is ever changing and new opportunities may emerge in the future.

**a) Local communities:** Resilience is impossible without the involvement of the urban poor themselves. Though they are the most vulnerable and the least protected, the evidence shows time and again that even with limited resources, communities can develop low cost, innovative solutions themselves, or in partnership. In fact, as communities and CSOs have become better at securing support from different sources, urban authorities could benefit from collaborating on jointly financed programmes.

× **The urban poor typically have limited assets** due to low incomes, informal employment and a lack of secure tenure. Most are also, due to their lack of legal title, unable to access formal credit. This directly affects their ability and willingness to invest in resilience measures themselves.

× **Communities are frequently excluded from public services and information such as early warning systems**, particularly when located in informal or peri-urban settlements outside formal city boundaries.

✓ **The urban poor have pioneered a variety of innovative financial mechanisms**, such as community savings and revolving loans which have provided them with access to affordable and reliable credit to undertake a range of resilience measures.

✓ **Community involvement can provide excellent value for money** because the urban poor have learnt to achieve impact with limited resources. Participation also allows them to contribute their skills and knowledge to upgrading.

## Case study: The power of community savings - Cambodia's Urban Poor Development Fund

One of the most successful examples of a community savings groups is the Urban Poor Development Fund (UPDF) in Cambodia. Set up in Phnom Penh in 1998 in partnership with the city municipality and the Asian Coalition for Housing Rights, which also provided US \$20,000 as seed money, within 12 years the total fund has spread to 2,000 savings groups in 26 cities across the country.<sup>31</sup> The UPDF now undertakes a range of activities, from promoting community participation and negotiating with authorities to financing land purchases and housing upgrading.

An important element in the programme's sustainability is its low cost approach, its use of repayable loans to finance much of its activities and its promotion of complimentary funding from communities and local government. While its projects focus on the immediate priorities of the community's priorities, adaptation occurs as a side effect of its investments in other sectors, such as sanitation, drainage and tree planting<sup>32</sup> - proof that urban resilience and poverty reduction can go hand in hand.

**b) International climate finance:** A number of instruments have been set up under the United Nations Framework Convention on Climate Change (UNFCCC), one of the central international agreements on climate change, with the specific aim of financing adaptation and mitigation projects.

× **Dedicated climate finance amounts to only a small fraction of the amounts required for adaptation.** Furthermore, much of what is available is earmarked for mitigation purposes: according to the World Bank of the US \$9 billion annual funds available globally, only US \$1 billion is allocated for adaptation.<sup>33</sup>

× **These funds are generally channelled to central governments rather than cities** through a variety of country level mechanisms; including the UNFCCC's National Adaptation Programme of Action (NAPA) for LDCs. Accessing these funds for urban projects and stakeholders can be difficult as a result.

✓ **There is growing commitment of national governments,** in sustainable urban management. For example, Bangladesh and Samoa have included components on resilient infrastructure (US \$2 million)<sup>34</sup> and urban management (US \$0.4 million)<sup>35</sup> in their respective NAPAs.<sup>36</sup>

✓ **There is increasing recognition of urban adaptation among climate finance bodies.** For example, the Adaptation Fund and the Pilot Programme for Climate Resilience, overseen by the World Bank, are now fielding proposals for city-based projects.

**c) Overseas Development Assistance:** Overseas Development Assistance (ODA) can cover a wide range of sectors and may come in the form of a grant, subsidy or loan, provided bilaterally by a particular government or multilaterally through international financial institutions. It may also be disbursed through United Nations agency programmes. In some countries, such as Indonesia or Bangladesh, donors are now encouraged to channel finance into a single national fund. Cities may sometimes struggle to access these funds themselves. Nevertheless, some initiatives - such as UN-Habitat's Climate Change and Cities Initiative (CCCI) - specifically target urban adaptation. One important area in this regard is the growth of associations and networks of urban authorities as platforms for cities to mobilize these resources.

× Like climate finance, **ODA is channelled primarily to national governments rather than cities,** so any urban-based funding is dependent on country level initiatives.

× Furthermore, **direct climate adaptation does not constitute a significant part of ODA budgets.** This means that the amount of direct earmarked adaptation funding for cities from ODA is relatively limited.

✓ **Donor agencies are placing an increasing emphasis on urbanization,** including DFID<sup>37</sup> and USAID,<sup>38</sup> and this is reflected in a growth in funding for urban programmes.

✓ While direct adaptation funding is limited, **there are many 'indirect' opportunities in related areas** such as health and waste management that can boost urban resilience.

## Case study: the Urban Partnership for Poverty Reduction, Bangladesh

The Urban Partnership for Poverty Reduction (UPPR) in Bangladesh is one example of a government-led programme with a strong focus on cities that has benefitted from significant ODA support, including £68 million in financial support from DFID.<sup>39</sup> Led by local governments in partnership with United Nations agencies, the programme works directly with communities to improve infrastructure, health and livelihoods with the aim of lifting 3 million people in 23 selected communities out of poverty by 2015.<sup>40</sup> As of December 2013, among other achievements, the UPPR had provided 240,000 urban residents with access to clean water.<sup>41</sup>

**d) National governments:** In most developing countries in Asia-Pacific, the bulk of public resources is still controlled by the central government – but opportunities for cities have increased in recent decades through decentralization processes.

× **Many countries have been slow to prioritize urbanization in their national budgets** and also, despite some level of decentralization, lack an effective system of financial transfer to local authorities.

× **As adaptation falls within multiple sectors, lack of coordination can be a problem** if there is little integration between different departments - this can make resource sharing and leadership very difficult.

✓ **Some governments are developing ambitious national urbanization strategies**, in some cases informed by successful city level initiatives, with a strong emphasis on urban resilience.

✓ **Well managed decentralization and the increasing autonomy of cities** within some national structures offers the possibility of more targeted urban interventions with central financial support.

## Case study: A decentralized national adaptation strategy

The Republic of Korea shows how a strong, well-developed national adaptation strategy can be combined with a responsive and localized system of delivery. Having drafted its country strategy in collaboration with 13 agencies, the central government has enabled urban authorities to develop their own locally appropriate programmes. This is facilitated by a highly decentralized structure with 16 metropolitan level adaptation plans and a large number of city and district strategies. Crucially, this system is directly supported by grants and resource sharing from the central government.<sup>42</sup>

**e) Urban authorities:** Local governments are often best placed to deliver low cost and locally appropriate solutions, as well as reach out to other stakeholders for partnerships and collaboration. While financial decentralization has been less complete, there are still ways in which local governments are strengthening investment resources for resilience.

- × **Many cities are already overstretched with little access to central budgets**, particularly in smaller urban areas. This means they face serious resource shortages and may prioritize other issues over adaptation.
- × **Authorities are struggling to mobilize resources locally**. Besides lacking the capacity to raise funds or access international credit, many cities struggle to leverage assets such as public land.
- × **Many cities are unable to develop an adequate tax base**. In addition to resource shortfalls, large sections of the population are not registered on tax systems.
- × **City authorities often lack the resources to provide universal services**. This can mean informal settlements and slums in particular are excluded.
- ✓ **Some governments are developing ambitious national urbanization strategies**, in some cases informed by successful city level initiatives and scaling them up as part of their national urban strategies.
- ✓ **Well managed decentralization and the increasing autonomy of cities** within some national structures offer the possibility of more targeted urban interventions with central financial support.
- ✓ **Authorities can improve revenue through more effective land use planning**. Levies such as sales tax can also provide income.
- ✓ **Local governments can explore alternative pricing models**. Cross-subsidies and variable service fees enable authorities to balance cost recovery with pro-poor delivery.

## Case study: Leveraging public assets for community housing in Serey Sophoan, Cambodia

Local governments often have significant untapped resources such as land that can realize considerable benefits if leveraged effectively. For example, in Serey Sophoan, Cambodia, local authorities awarded concessions to private contractors to build on government owned land: some of the revenue from the sale was then reallocated, using a form of social cross-subsidy, to purchase a large plot of farmland for a community that was being relocated from a vulnerable riverside area.<sup>43</sup>

**f) The private sector:** Private sector and philanthropic organisations, including venture philanthropy actors have a central role to play in improving city resilience.<sup>44</sup> Mobilizing these assets effectively can therefore have a huge impact on pro-poor, climate resilient outcomes.

- × **Private investors usually require projects that generate a profit**. Many important adaptation measures, such as flood protection systems, are not easily commercialized. This can make it difficult to bring investors on board.
- ✓ **The private sector can be encouraged to support pro-poor services** through tax breaks, subsidies and other incentives, including Public Private Partnerships with urban authorities.

× **Without effective regulation, private sector actions can result in maldevelopment.**

Development in sensitive areas, for example, can be very lucrative in the short run - even if for the long term costs for the city are negative.

× **Poor communities are often not attractive investments for the private sector.**

For example, many mortgage lenders and other credit providers are reluctant to lend to communities with insecure tenure or households in informal employment.

✓ **Microloans and other products can benefit the poor while providing lenders with security.**

A number of private companies have successfully developed pro-poor financial mechanisms for communities in urban areas.

✓ **Corporate Social Responsibility (CSR) programmes allow companies to contribute to adaptation at low or no cost.**

For example, some insurance companies have provided pro-bono or low cost support to pro-poor programmes as part of their CSR contribution.

## Case study: Improving flood management in Kuala Lumpur, Malaysia through private partnerships

Urban adaptation can often be achieved as a 'co-benefit' or side effect of an investment elsewhere. When exploring the potential for partnerships with the private sector, cities should identify how resilience measures with little or no revenue generation capacity can be linked to other activities that can be commercialized. One example is the construction of a dual-purpose Stormwater Management and Road Tunnel in Kuala Lumpur, Malaysia. Combining US \$342 million of government funding and US \$163 million of corporate investment, the road is managed on a 40-year concession, funded by user fees, and has helped alleviate traffic congestion in the capital. However, during periods of heavy rainfall the tunnel can also be used to drain excess water away from the city.<sup>45</sup>

### 3. Six opportunities for funding urban resilience

**1. Focus first on what is most cost effective:** Quick wins and 'no regret' actions can be low cost and readily achievable. Many effective adaptation measures, particularly ecosystem-based solutions such as mangrove rehabilitation, can deliver high returns with little upfront investment. In Lami, Fiji, a detailed projection found that investments in ecosystem services provided a better long-term return than in hard infrastructure.<sup>46</sup> Cities should be realistic about what is possible and concentrate not only on expensive infrastructure development but also 'soft' or small-scale measures with a smaller price tag. Indeed mega-project investments may be as unnecessary as they are expensive.<sup>47</sup>

**2. Develop a clear business case:** A clear evidence base, demonstrating the long term economic and development gains of adaptation, will help reinforce popular support and political will for investment, including from national government and line Ministries. Vulnerability assessments and other measurements can help provide a clearer picture of the social, environmental and financial benefits and costs of a particular intervention.

**3. Mainstream adaptation into existing programmes to enhance co-benefits on investment:** Given that direct funding for adaptation is limited, cities need to be proactive about engaging activities in other sectors, such as health, livelihoods and land use planning, that also in the process strengthen resilience. These may be more aligned with national or donor priorities, making them easier to

finance than a specific climate change programme. Cities should therefore ensure climate sensitive, pro-poor design is incorporated into all development projects.

**4. Pool resources:** Urban adaptation and resilience spans a breadth of sectors and stakeholders, so it makes sense to pool funds and resources as much as possible through collaboration. This can also produce a more efficient and coherent use of resources. For example, many cities have established City Funds jointly managed by community federations and local governments.<sup>48</sup> This not only can increase total funding but can also bring different forms of funding mechanisms together.

**5. Link adaptation to pro-poor outcomes in other areas:** Wherever possible, cities should identify ways to connect adaptation to priority issues such as livelihoods, health or environmental improvements. In Ormoc, the Philippines, for example, communities were paid to undertake mangrove reforestation themselves and granted fishing rights in the area once it had been restored. More generally, development planning and assessments should make sure to include informal assets and poor livelihoods as these can be overlooked in official processes.

**6. Encourage communities to contribute to the process:** Allowing communities to contribute to the design and management of adaptation typically results in more efficient and financially sustainable projects, with residents taking on some of the costs or responsibilities themselves. In many cases, a dollar can go far further in the hands of a local community than through an external provider. In Myanmar, for example, during reconstruction efforts in the wake of Cyclone Nargis, communities which were given direct control of the resources were able to build 750 houses for the same cost as 100 houses produced by international agencies.<sup>49</sup>

## Making a little go a long way - lessons learned from the Asian Coalition for Community Action

The Asian Coalition for Community Action (ACCA) is an ambitious slum-upgrading programme, managed by the Asian Coalition for Housing Rights (ACHR) with support from the Bill and Melinda Gates Foundation. So far upgrading had been undertaken in 165 cities, with a total of US \$75.7 million leveraged in land, infrastructure and savings, driven by community groups with 274,000 savers worth approximately US \$22.5 million.<sup>50</sup> Their work has provided yet more evidence of the extraordinary effectiveness of community based processes - and some valuable lessons for other stakeholders working on adaptation.

- **Sustainability:** ACCA partners often use funding in the form of revolving funds, meaning that loans are repaid and then reused elsewhere. After Typhoon Ketsana hit Metro Manila in 2009, the Homeless People's Federation used US \$20,000 from ACCA to support affected families rebuild their homes. By providing small loans with a limit US \$150 and a regular schedule of repayments, the initial loan was eventually circulated three times to support 400 households with more than US \$60,000 in repairs. ACCA's community loans also enjoy a very high rate of repayment.
- **Affordability:** ACCA actively embraces its relatively limited funding as an opportunity. In fact, it sets a ceiling of US \$58,000 for every city to undertake a single large housing programme together with a number of smaller scale upgrading projects. The principle is that this will encourage a creative and efficient use of resources. As a result, they are often able to make a little go a much longer way than other organizations with much greater resources at their disposal.
- **Flexibility:** Even within slum communities, income levels may vary considerably. So, to be



affordable as well as economically sustainable, programmes should have varied pricing structures for different groups. After Typhoon Miranae hit the Vietnamese city of Quy Nhon, women's saving groups used US \$25,000 of ACCA funding to develop a carefully scaled system of grants, zero interest and low interest loans for different households in the worst hit areas to repair their houses and recover their livelihoods.

ACCA demonstrates that it is not money alone that determines the effectiveness of urban adaptation, but also the processes through which that money is channelled. Participation, collaboration and knowledge sharing are all at the heart of ACCA's success and in themselves are valuable in mobilizing communities to improve their situation. *Source: ACHR*

#### 4. Insuring against climate change

The effects of climate change, in particular natural disasters, are not evenly distributed over time. A flash flood or a typhoon may last a few hours only, but its impacts on a vulnerable urban area can last for years. The financial costs of an extreme weather event can be devastating to a developing country city with limited resources, particularly for its poorest residents – many of whom, of course, are also the most exposed. In a worst case scenario, if a city lacks the funds to rebuild services and infrastructure, it may find itself locked into a long term state of recovery.



(UN ESCAP)

Traditional insurance frameworks may provide limited coverage to poor communities, especially informal settlements, which are often excluded from formal insurance mechanisms or do not have the resources to invest upfront in protection. As many slum households are also situated in the most vulnerable locations, the price of insurance may also be much greater – meaning that, as in other areas of their lives, the costs are borne disproportionately by those least able to afford them.

The limitations and opportunities of insurance must therefore be carefully assessed before it is incorporated into an urban adaptation plan. In Asia-Pacific, the insurance market is underdeveloped and this is especially the case among poor households. Developing an effective policy for a city and its communities will typically involve a sustained period of consultation between urban residents, insurance brokers, government and other intermediaries such as NGOs. In many cases, an effective pro-poor model is likely to look very different to a standard insurance approach.

## Climate insurance as a tool for urban adaptation – limitations and opportunities

### Limitations

**Insurance is not the same as adaptation.** It should never be treated as a solution in itself - after all, it does not prevent initial damage or loss of life, but simply cushions some of the costs of reconstruction. Furthermore, even when it covers the direct costs of physical damage, there may be indirect impacts that cannot be easily restored, such as reduced investor confidence.

**Insurance must not encourage bad decisions.** In particular, care must be taken not to validate or encourage continued development in environmentally sensitive areas through blanket protections. It is always better to avoid exposure rather than insure against it. At the same time, many informal settlements are in vulnerable locations and should not be excluded as a result.

**Insurance is not a replacement for resilience.** It can help ease the costs of recovery, but it does not reduce the likelihood of the disaster itself. Infrastructure, early warning systems and other mechanisms often provide better value by preventing the damage in the first place. The danger is that expensive insurance policies can direct financial resources and political will away from these investments.

**Much traditional insurance is not affordable or accessible to the poor.** Private operators may not be able or willing to provide coverage to informal settlements. Furthermore, as slums are often located in high risk areas, the premiums may be inflated - making payment yet another burden for resource-stretched households. Local governments may also disregard low income areas or be unwilling to guarantee development in environmentally unstable areas.

### Opportunities

**Insurance can help cities reframe climate risk as a measurable and manageable cost.** Natural disasters and other related effects, when they occur, can prove devastating because the impacts are concentrated. Many developing urban areas lack the resources to make the significant upfront investment needed for recovery. Insurance, by spreading out the liability, makes it more affordable for cities.

**Insurance can provide cities with a measure of security against unpredictable threats.** It is not possible to anticipate every direct and indirect effect of climate change, meaning some level of risk is likely to remain even after adaptation. Insurance can provide an additional safety net for urban areas in this context, helping to reduce uncertainty for communities and businesses.

**Pro-poor models of insurance have been developed that successfully boost resilience.** Communities have pioneered a range of self-managed systems of 'micro-finance' that build on social cooperation to provide effective, locally adapted protection around affordable monthly payments. However, private operators, NGOs and local authorities are also exploring ways to develop viable insurance mechanisms for the poor.

**Insurance can reward well adapted cities.** Resilient urban areas carry a lower level of risk, making them a safer investment for private brokers. This relative security will be reflected in reduced fees and positive approval ratings. If used well, then, insurance can avoid creating complacency by incentivizing cities to strengthen their adaptation.

## 5. Realizing the benefits of insurance for your city: some final points

Insurance, if appropriately designed and balanced with effective resilience and adaptation measures, has the potential to boost a city's resilience. Importantly, it can benefit poor communities too – and these are the people typically most affected. However, to ensure value for money, policy makers should take a number of steps when implementing programmes in their city.

- **Know what you are insuring your city against.** How exposed is a city to natural disasters and other effects of climate change? The first step is to assess a city's vulnerability, particularly in its poorest communities. Many developing cities lack the capacity or data to get an accurate picture of their exposure. This can lead to inappropriate coverage or higher costs as private insurers face greater uncertainty in their investment.

- **Adapt first, then insure.** Has adaptation and resilience been planned for, wherever possible? Insurance will not in itself stop climate change or alleviate its effects. Prevention is always better than cost recovery after the damage is done. Insurance is best seen as a way to handle unavoidable or outlying risk - it should not be used to mitigate the impacts of negative decisions, such as irresponsible urban development.

- **Ensure that insurance is socially conscious.** Where do the poor fit in to the framework? It is important that any workable system for vulnerable areas, particularly informal settlements, is priced affordably. It should also be locally appropriate and where possible build on the strengths of the communities themselves.



### The All India Disaster Mitigation Institute's Afat Vimo programme

The All India Disaster Mitigation Institute (AIDMI), an NGO based in Gujarat, India, led on the development of community micro-insurance scheme to provide coverage against loss of life and assets in the wake of the 2001 Gujarat earthquake. With surveys suggesting that only 2% of households had insurance, the programme was identified as an important step in bolstering their resilience to future natural disasters. The Afat Vimo ('Disaster insurance') scheme was developed as a result, together with an accompanying Child's Right to Safer Schools Campaign focusing on disaster prevention and resilience for school children and educators. It took two years of consultation between communities, insurance brokers, government and other stakeholders before a workable system was finalized, targeting the very poorest households. Importantly, this combined a low premium of US \$4.50 annually with potential payouts of up to US \$1,560. It was also carefully designed to incorporate a range of different risks that the poor were exposed to in their daily lives. Despite initial concerns about its long term sustainability, it has been in operation for a decade and has been replicated in 17 cities across the country. In addition to its insurance services it also provides other activities, such as awareness raising and capacity development, that support disaster prevention. Source: AIDMI.

## City-to-city partnerships

In recent years a number of initiatives which seek to form city-to-city partnerships have emerged in order to share experiences as well as gain knowledge and access to policy tools. Reflecting greater demand from cities themselves, regional organizations and their affiliates such as Local Governments for Sustainability (ICLEI), CITYNET, and the Commonwealth Local Government Forum (CLGF), to name a few, have increasingly focused on the impacts of climate change and disasters on cities.

This includes institutional strengthening, profiling of city vulnerabilities and capacities, and disseminating effective practices, for example through online materials and seminars, as well as other initiatives. Especially for smaller and more remote cities and their local governments, such partnerships offer great potential for bridging technical and other knowledge gaps and accessing resources in order to manage change and enhance resilience.

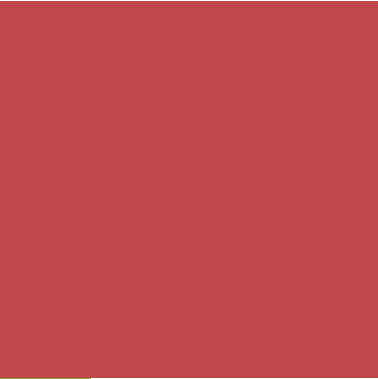
## References

1. Quoted at the launch of the Climate Asia India report in Delhi, 24 September 2013. Cited in Faris, Stephan, Steven Lipscombe, Sonia Whitehead and Damian Wilson. From the ground up: Changing the conversation about climate change. BBC News, June 2014. [http://downloads.bbc.co.uk/mediaaction/policybriefing/bbc\\_media\\_action\\_from\\_the\\_ground\\_up\\_climate\\_change.pdf](http://downloads.bbc.co.uk/mediaaction/policybriefing/bbc_media_action_from_the_ground_up_climate_change.pdf)
2. Remarks to the High-Level Delegation of Mayors and Regional Authorities, New York, 23 April 2012. Quoted in UN Meetings and Press Releases. "Our struggle for global sustainability will be won or lost in cities," says Secretary-General, at New York event". Press release, 23 April 2012. <http://www.un.org/press/en/2012/sgsm14249.doc.htm>
3. Asian Development Bank. Key Indicators for Asia and the Pacific 2012 - Special Chapter: Green Urbanization in Asia. Manila, 2012. <http://www.adb.org/sites/default/files/ki/2012/pdf/highlights.pdf>
4. International Federation of Red Cross and Red Crescent Societies. World Disasters Report 2010: Focus on Urban Risk. Geneva, 2010. <http://www.ifrc.org/Global/Publications/disasters/WDR/WDR2010-full.pdf>
5. UNESCAP. Statistical Yearbook for Asia and the Pacific 2011. Bangkok, 2011. <http://www.unescap.org/stat/data/syb2011/escap-syb>
6. UNESCAP and UNISDR. Reducing Vulnerability and Exposure to Disasters: The Asia-Pacific Disaster Report. Bangkok, 2012. [http://www.unisdr.org/files/29288\\_apdr2012finalowres.pdf](http://www.unisdr.org/files/29288_apdr2012finalowres.pdf)
7. UN-Habitat. "Slums: Some Definitions." Feature/Backgrounder to UN-Habitat. State of the World's Cities 2006/2007. Nairobi, 2006. <http://ww2.unhabitat.org/mediacentre/documents/sowcr2006/SOWCR%205.pdf> (accessed 15 October 2014)
8. Chambers, Robert. 1990. "Editorial Introduction: Vulnerability, Coping, and Policy". IDS Bulletin 20 (2):1-7. Cited in Schoon, Michael. A Short Historical Overview of the Concepts of Resilience, Vulnerability, and Adaptation. [http://michaelschoon.files.wordpress.com/2011/05/historical\\_critique-of-resilience-working-paper.pdf](http://michaelschoon.files.wordpress.com/2011/05/historical_critique-of-resilience-working-paper.pdf)
9. Adapted from Intergovernmental Panel on Climate Change (IPCC) report (2007), Fourth Assessment Report, with additional text from UN-Habitat
10. IPCC. Climate Change 2014: Impacts, Adaptation, and Vulnerability. Contribution of Working Group Two to the Fifth Assessment Report. Cambridge/New York: Cambridge University Press, 2014. [http://ipcc-wg2.gov/AR5/images/uploads/WGIIAR5-Chap8\\_FGDall.pdf](http://ipcc-wg2.gov/AR5/images/uploads/WGIIAR5-Chap8_FGDall.pdf)
11. Moser, Caroline. "Asset Accumulation Policy and Poverty Reduction." In Reducing Global Poverty: The Case for Asset Accumulation, edited by Caroline Moser, 83-103. Washington, DC: Brookings Institution, 2007.

12. Adger, W. Neil. "Building Resilience to Promote Sustainability: An Agenda for Coping with Globalisation and Promoting Justice." IHDP Update. 2:1-3.
13. UNICEF Bangladesh. Urban Water Challenges in Bangladesh. Updated 20 March 2011. [http://www.unicef.org/bangladesh/Urban\\_water\\_challenges\\_in\\_Bangladesh.pdf](http://www.unicef.org/bangladesh/Urban_water_challenges_in_Bangladesh.pdf)
14. UN-Habitat. Affordable Land and Housing in Asia. Nairobi, 2011. <http://mirror.unhabitat.org/pmss/listItemDetails.aspx?publicationID=3225>
15. UNICEF Bangladesh. Understanding Urban Inequalities in Bangladesh: A Prerequisite for Achieving Vision 2021 - A Study Based on the Results of the 2009 Multiple Indicator Cluster Survey. Dhaka, 2010. Cited in UNICEF (2012). State of the World's Children 2012: Children in an Urban World. New York, 2012. [http://www.unicef.org/sowc2012/pdfs/SOWC%202012-Main%20Report\\_EN\\_13Mar2012.pdf](http://www.unicef.org/sowc2012/pdfs/SOWC%202012-Main%20Report_EN_13Mar2012.pdf)
16. ACCCRN. Strengthening vector-borne disease surveillance and response systems. <http://www.acccrn.org/initiatives/india/indore/city-projects/strengthening-vector-borne-disease-surveillance-and-response-> (accessed 15 October 2014)
17. The Jakarta Post, Jakarta alerted to threat of dengue fever. 16 May 2013. <http://www.thejakartapost.com/news/2013/05/16/jakarta-alerted-threat-dengue-fever.html>
18. BBC. Hot Cities 29 - Jakarta Indonesia 1- Climate Bites. 7 November 2009.
19. Dash, Dipak Kumar. Green cover equal to 23% of Delhi lost in 13 years. The Times of India, 4 July 2013. <http://timesofindia.indiatimes.com/home/environment/flora-fauna/Green-cover-equal-to-23-of-Delhi-lost-in-13-years/articleshow/20903617.cms>
20. Ahmed, Akhter, Ruth Vargas Hill, Lisa C. Smith, Doris M. Wiesmann, and Tim Frankenberger. The World's Most Deprived: Characteristics and Causes of Extreme Hunger. Washington, DC: International Food Policy Research Institute, 2007. <http://www.ifpri.org/sites/default/files/publications/vp43.pdf> Cited in Cohen, Marc J. and James Garrett, J. The Food Price Crisis and Urban Food (In)Security. London/New York: IIED/UNFPA, 2009.
21. Dubbeling, Marielle, Henk de Zeeuw and René van Veenhuizen. Cities, Poverty and Food: Multistakeholder Policy and Planning in Urban Agriculture. Rugby: RUAF Foundation, 2011. <http://www.ruaf.org/sites/default/files/Chapter%203%20Case%20studies.pdf>
22. UN-Habitat. Cities and Climate Change Initiative - Asia-Pacific: Regional Strategy. 2011. [http://www.fukuoka.unhabitat.org/programmes/ccci/pdf/CCCI\\_ASIA\\_PACIFIC\\_REGIONAL\\_STRATEGY\\_end-March11.pdf](http://www.fukuoka.unhabitat.org/programmes/ccci/pdf/CCCI_ASIA_PACIFIC_REGIONAL_STRATEGY_end-March11.pdf)
23. Buklod Tao, Inc. "About Bukloa Tao Inc". <http://www.buklodtaoinc.org/#!about/ccjb> (accessed 15 October 2014)
24. Buklod Tao, Inc. "Community managed disaster and climate risk reduction". <http://www.buklodtaoinc.org/#!community-managed-disaster-risk-reduction/c1u19> (accessed 15 October 2014)
25. ACHR. ACCA Third Year Report. Bangkok, November 2012. <http://www.achr.net/upload/files/ACCA%203rd%20Yr%20Report%20Policy%20Change%2023.pdf>
26. ACCCRN. 'Building teachers and students climate change resilience strategy'. <http://www.acccrn.org/initiatives/indonesia/bandar-lampung/city-projects/building-teachers-and-students-climate-change-res> (accessed 15 October 2014)
27. UNISDR, ITC and UNDP. Local Governments and Disaster Risk Reduction: Good Practices and Lessons Learned. Geneva: United Nations, 2010. [http://www.unisdr.org/files/13627\\_LocalGovernmentsandDisasterRiskRedu.pdf](http://www.unisdr.org/files/13627_LocalGovernmentsandDisasterRiskRedu.pdf)
28. UNISDR. A Toolkit for Local Governments: The Ten Essentials. <http://www.unisdr.org/campaign/resilientcities/toolkit/essentials/view/1> (accessed 15 October 2014)
29. ACCCRN. Climate Change Resilience Coordination Offices. <http://www.acccrn.org/initiatives/vietnam/can-tho/city-projects/climate-change-resilience-coordination-offices> (accessed 15 October 2014)
30. World Bank. Climate Finance in the Urban Context. Washington, DC, November 2010. [http://www-wds.worldbank.org/external/default/WDSContentServer/WDSP/IB/2010/11/21/000333038\\_20101121222743/Rendered/PDF/578590revised0101Public10DCFIB0141A.pdf](http://www-wds.worldbank.org/external/default/WDSContentServer/WDSP/IB/2010/11/21/000333038_20101121222743/Rendered/PDF/578590revised0101Public10DCFIB0141A.pdf)
31. <http://www.achr.net/Countries%20ACCA/Cambodia%20ACCA.html>
32. <http://www.achr.net/Countries%20ACCA/Cambodia%20ACCA.html>

33. World Bank. Making the Most of Climate Finance for Climate Action. Washington, DC, 2010. [http://www-wds.worldbank.org/external/default/WDSContentServer/WDS/IB/2010/05/27/000334955\\_20100527052651/Rendered/PDF/547310BRIODCF10Box349424B01PUBLIC1.pdf](http://www-wds.worldbank.org/external/default/WDSContentServer/WDS/IB/2010/05/27/000334955_20100527052651/Rendered/PDF/547310BRIODCF10Box349424B01PUBLIC1.pdf)
34. Government of the People's Republic of Bangladesh. National Adaptation Programme of Action. November 2005. <http://unfccc.int/resource/docs/napa/ban01.pdf>
35. Government of Samoa. National Adaptation Programme of Action. 2005. <http://unfccc.int/resource/docs/napa/sam01.pdf>
36. World Bank. Climate Finance in the Urban Context. Washington, DC, November 2010. [http://www-wds.worldbank.org/external/default/WDSContentServer/WDS/IB/2010/11/21/000333038\\_20101121222743/Rendered/PDF/578590revised0101Public10DCFIB0141A.pdf](http://www-wds.worldbank.org/external/default/WDSContentServer/WDS/IB/2010/11/21/000333038_20101121222743/Rendered/PDF/578590revised0101Public10DCFIB0141A.pdf)
37. DFID. Cities: The New Frontier. Crown: London, 2010. [https://www.gov.uk/government/uploads/system/uploads/attachment\\_data/file/67689/cities-new-frontier.pdf](https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/67689/cities-new-frontier.pdf)
38. USAID. Sustainable Service Delivery in an Increasingly Urbanized World. Washington DC, October 2013. <http://www.usaid.gov/sites/default/files/documents/1870/USAIDSustainableUrbanServicesPolicy.pdf>
39. DFID. Development Tracker - Urban Partnerships for Poverty Reduction [GB-1-107467]. <http://devtracker.dfid.gov.uk/projects/GB-1-107467/transactions/> (accessed 15 October 2014)
40. UPPRBD. 'Areas of work'. <http://www.upprbd.org/areasofwork.aspx?ID=1> (accessed 15 March 2014)
41. UPPRBD. 'Key results'. <http://www.upprbd.org/keyresults.aspx> (accessed 15 March 2014)
42. Young-shin, Lim, Shin Ji-young, Lee Jungwon and Lee Minsoo. Local Adaptation Action Plans of Korea. Korean Adaptation Center for Climate Change, Korea Environment Institute. [http://resilient-cities.iclei.org/fileadmin/sites/resilient-cities/files/Frontend\\_user/Poster\\_KACCC\\_Korea\\_wdb.pdf](http://resilient-cities.iclei.org/fileadmin/sites/resilient-cities/files/Frontend_user/Poster_KACCC_Korea_wdb.pdf) (accessed 15 October 2014) See also Climate and Development Knowledge Network. "Exploring the theme of multi-level governance for urban adaptation." 17 May 2012. <http://cdkn.org/2012/05/postcard-from-resilient-cities-exploring-the-theme-of-multi-level-governance-for-urban-adaptation/>
43. ACHR. ACCA Third Year Report. Bangkok, November 2012. <http://www.achr.net/upload/files/ACCA%203rd%20Yr%20Report%20Govt%20Land%2019.pdf>
44. Brugmann, Jeb. Financing the Resilient City: A Demand Driven Approach to Development, Disaster Risk Reduction and Climate Adaptation. Bonn: ICLEI, 2009. [http://resilient-cities.iclei.org/fileadmin/sites/resilient-cities/files/Frontend\\_user/Report-Financing\\_Resilient\\_City-Final.pdf](http://resilient-cities.iclei.org/fileadmin/sites/resilient-cities/files/Frontend_user/Report-Financing_Resilient_City-Final.pdf)
45. The International Bank for Reconstruction and Development and the World Bank. Guide to Climate Change Adaptation in Cities. Washington DC, 2011. <http://siteresources.worldbank.org/INTURBANDEVELOPMENT/Resources/336387-1318995974398/GuideClimChangeAdaptCities.pdf>
46. Rao, Nalini, Tim Carruthers, Paul Anderson, Loraini Sivo, Tracey Saxby, Trevor Durbin, Vainuupo Jungblut, Terry Hills and Stuart Chape. An Economic Analysis of Ecosystem-based Adaptation and Engineering Options for Climate Change Adaptation in Lami Town, Republic of the Fiji Islands. Apia: Secretariat of the Pacific Regional Environment Programme (SPREP), 2013. [http://ian.umces.edu/pdfs/ian\\_report\\_392.pdf](http://ian.umces.edu/pdfs/ian_report_392.pdf)
47. Hasan, Arif. The Urban Resource Centre, Karachi. Environment and Urbanization, Vol. 19(1): 275-292. 2007. <http://eau.sagepub.com/content/19/1/275.full.pdf+html>
48. Satterthwaite, David. 8 Points on Financing Climate Change Adaptation in Urban Areas. IIED, 20 June 2013. <http://www.iied.org/8-points-financing-climate-change-adaptation-urban-areas>
49. ACHR. ACCA Third Year Report. Bangkok, November 2012. <http://www.achr.net/upload/files/ACCA%203rd%20Yr%20Report%20Disaster%2020.pdf>
50. ACHR, The Asian Coalition for Coumirty Action (ACCA) <http://www.achr.net/activities-acca.php>







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