

# **A CONCEPTUAL AND OPERATIONAL FRAMEWORK FOR PRO-POOR ASSET ADAPTATION TO URBAN CLIMATE CHANGE**

Caroline Moser

Professor of Urban Development / Director Global Urban Research Centre  
University of Manchester

[Caroline.Moser@manchester.ac.uk](mailto:Caroline.Moser@manchester.ac.uk)

**Summary:** This paper introduces an asset-focused framework whose objective is both analytically to better understand, and operationally to more appropriately address, the different phases of urban climate change (CC) as it impacts on poor urban communities. After an overview of current CC adaptation approaches, it describes the two asset adaptation framework components; first, an asset vulnerability analytical framework that appraises the vulnerability groups most affected by CC-related disasters, and second, an asset adaptation operational framework that identifies CC strategies at individual, household and community level in four ‘phases’ of long-term resilience; pre-disaster damage limitation; immediate post-disaster response; and rebuilding. It concludes by describing its associated methodology. The paper aims to assist CC researchers and those supporting the poor protect and rebuild assets during CC-related disaster processes.

**Key words:** Climate change asset adaptation framework, climate change asset vulnerability

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## **I. INTRODUCTION<sup>1</sup>**

This paper introduces a new asset-focused framework whose objective is both analytically to better understand, and operationally to more appropriately and effectively address, the different phases of urban climate change (CC) as they impact on the lives of poor urban communities. The framework builds on earlier research on asset vulnerability, asset adaptation and urban poverty reduction (see Moser 1998; 2007; 2008; Moser and Felton 2008), as well as preliminary climate change-related work (see Moser and Satterthwaite 2008).

By way of background, the paper briefly reviews current approaches to CC adaptation. It then describes the asset adaptation framework in terms of two components; first, an asset vulnerability analytical framework that appraises the types of socio-economic vulnerability and groups most affected by CC-related disasters; and secondly, an asset adaptation operational framework that identifies a range of ‘bottom-up’ climate CC strategies at individual, household and community level. Complementing this, it also highlights some of the ‘top down’ interventions of external actors such as municipalities, civil society organizations, and the private sector. These are discussed in terms of four closely inter-related ‘phases’ of urban CC, namely long-term resilience; pre-disaster damage limitation; immediate post-disaster response; and rebuilding. Given the importance of robust methodology for both research and practice the paper concludes with a brief description of the research methodology for an asset adaptation appraisal, as well as techniques associated with action planning implementation strategies. Again these are contextualized within current methodological approaches to community-focused CC research and practice.

The paper is intended to provide a useful theoretical framework for researchers seeking to better understand the link between CC adaptation and the erosion of assets of the poor in cities of the South. In addition the operational framework seeks to set out guidelines for the development of specific tools which can be used to support pro-poor adaptation strategies in urban areas. These may assist local authorities, community organizations and other relevant institutions to design strategies to support the poor’s existing coping strategies to protect assets, as well as to rebuild them after climate change-related disasters.

## **II. BACKGROUND**

### **1. The context: The urgency of recognizing CC in cities of the South**

Urban centers of low and middle-income countries concentrate a large proportion of those most at risk from the effects of CC – as lives, assets, environmental quality and future prosperity are threatened by the increasing risk of storms, flooding, landslides,

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<sup>1</sup> This paper draws heavily on a number of recent papers. These include Moser and Satterthwaite (2008); Simatele (2009) and Moser, Stein and Wamsler (2009). I would like to express my gratitude to David Satterthwaite, Danny Simatele, Alfredo Stein and Christine Wamsler for their generosity in allowing me to cite from these documents and for their substantive contribution to this paper.

heat waves and drought and by overloading water, drainage and energy supply systems.<sup>2</sup>The evidence that demonstrates the vulnerability of urban populations to CC is based on data collected over the last 30 years, which shows a dramatic upward trend in the numbers killed or seriously impacted by extreme weather events (UN-Habitat 2007; Hoeppe and Gurenko 2007). Within cities and towns almost all serious disaster-related injuries and deaths occur among low-income groups. The principal driver of increasing loss of life as well as social and economic vulnerability is poverty (limiting individual, household and community investments) and exclusion (limiting public investments and services). CC not only exacerbates existing risks but also reveals new hidden vulnerabilities as more locations are exposed to more intense floods and storms (Moser and Satterthwaite 2008, 4).

## **2. Current approaches to CC and their associated methodologies**

To date CC mitigation has been the main focus of attention, given the importance of getting governments to accept the scientific evidence for human-induced climate change. Nevertheless, increasing concern with the complementary issue of adaptation has led to an increased focus on this aspect of CC. Approaches have ranged from disaster risk reduction that have broadened their scope to include CC, as well as the emergence of new specific CC adaptation approaches. The diversity of approaches to CC adaptation is complex, interrelated and often overlapping, and therefore difficult to disentangle.

Table 1, therefore seeks to summarize some of these different adaptation approaches in terms of the historical period when developed, the key objectives and current emphases, as well as other characteristics. It shows, first, the critical importance that the Disaster Risk Reduction (DDR) and Disaster Risk Management (DRM) communities have played in addressing disasters over the past 30 years long before climate change *per se* had even become identified as a global development priority; second, the emergence of newer CC-specific approaches such as Climate Risk Management; and third, the increasing convergences between in the disaster risk and CC communities with such approaches such as Climate Change Vulnerability Resilience. While community-based approaches to poverty reduction have again been widely implemented in the past decades as a consequence of the work of CBOs, NGOs and participatory rural developmentalists such as Robert Chambers (see Chamber 1992), recently this approach has also turned its focus to CC adaptation.

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<sup>2</sup> While it is difficult to generalize about likely risks of urban CC with the scale and nature of risk varies greatly between and within centres, and between different population groups or locations. The following grouping, according to certain shared physical characteristics that relate to CC risk was identified by Moser and Satterthwaite (2008, 4). This includes already facing serious impacts from heavy rainstorms and cyclones (including hurricanes and typhoons) and heatwaves; coastal location, and so impacted by sea-level rise; location by a river that may flood more frequently; and location dependent on freshwater sources whose supply may diminish or whose quality may be compromised.

Table No. 1 Summary of selected approaches to climate change adaptation

Name of approach	Period of Development	Key objectives and current emphasis	Examples of institution using the approach	Origin	Focus on assets
<b>Disaster Risk Reduction (DRR)/Disaster Risk Management (DRM)</b>	1980s	Reduction of underlying factors of risk, intensity &/or frequency of disaster occurrence in the pre-disaster & post-disaster context (i.e. development, relief and response) including climate-related and non-climate-related disasters. Current emphasis is on the integration of DRR into sustainable development through a management perspective	Tearfund, Environment, Climate Change & Bio-energy Division of FAO, GTZ; IDS, Sida, Dfid, etc.	DRM (emergency/relief organisations, social scientists)	In the context of strengthening capacities & resilience of h/holds, communities & institutions assets are a major theme.
<b>Climate Risk Management (CRM)</b>	1990s/00s	Reduction of vulnerability to climate risk by maximising positive & minimizing negative outcomes caused by climate change with the final aim to promote sustainable development.	IDS, Energy for Sustainable Development Africa, UN Secretariat of ISDR, ADPC	Climate change adaptation community/DRM	Due to its orientation towards community adaptation and institutional capacity building, assets are addressed.
<b>Climate Change Adaptation</b>	1990s/00s	Reduction of vulnerability to climate risk developed as a reaction to the 1990s greenhouse gas debate that promoted the mitigation agenda. Emphasis of adaptation is here on dealing with physical impacts of climate change.	South South North, Acclimatise; TCPA, IIED, ADPC and ACTS.	DRM/climate change adaptation.	Assets addressed through the interest in local knowledge & competence.
<b>Climate Change Vulnerability Resilience</b>	2000s	Increasing the ability of communities to withstand and recover from climate change related external shocks & stresses with an emphasis on economic well-being, stability of a community, social & political factors, institutional capacity, global interconnectivity, & natural resource dependence.	IDS, Tyndall Research Centre, Acclimatise, IIED, Practical Action, ITDG	DRM/climate change adaptation	Assets addressed implicitly as approach attaches significance to governance quality at municipal & local levels.
<b>Community-Based Adaptation</b>	2007 (adapted from poverty-focused CBA of 1990s)	Support of knowledge & coping strategies of individuals & communities to reduce vulnerabilities to climate risk, based on individual & community knowledge of climate variability.	IDS, Eldis, ACTS, ADPC, IISD, IIED, & Practical Action' ITGD	DRM/climate change adaptation (influenced by development experts such as Robert Chambers)	Assets form a central theme due to its bottom-up approach emphasising people's capabilities and abilities.
<b>Asset-Based Vulnerability &amp; Adaptation</b>	2008 (building on asset vulnerability of 1990s)	Analysis of asset vulnerability and asset adaptation relating to the erosion and/or protection of human, social, physical and financial assets at individual, household and community level for resilience, pre-disaster damage limitation, immediate post-disaster response, and rebuilding	Global Urban Research Centre (GURC); IIED.	Asset vulnerability and asset accumulation framework ; climate change adaptation	Assets main basis of focus at different levels including role of external institutions such as municipalities, NGOs and private sector

Source: Adapted from Simatele, 2009

As identified in Table 1, all these approaches to varying extents focus on assets primarily from the perspective of vulnerability. The following section, as identified in the last row of Table 1, elaborates on an approach that focuses primarily and directly on assets.

### **III. AN ASSET ADAPTATION FRAMEWORK: FROM ASSET VULNERABILITY TO ASSET ADAPTATION**

The asset adaptation framework comprises two components that can be summarized as follows, with each briefly described below:

- *An asset vulnerability analytical framework* that identifies the types of socio-economic vulnerability and groups most affected in four closely inter-related ‘phases’ or ‘stages’ that can occur during urban climate change.
- *An asset adaptation operational framework*, linked to the conceptual framework the operational framework identifies the range of ‘bottom-up’ climate change adaptation strategies that individuals, households and communities have developed to cope with the different phases of climate change. It also identifies the range of ‘top down’ interventions of external actors at city and national level – such as municipalities, civil society organizations, and the private sector.

#### **1. Asset vulnerability**

Analysis of the risks arising from climate change to low-income urban households and communities is grounded in the concept of vulnerability. This draws on an the development debate that recognizes poverty as more than income- or consumption poverty and that captures the multidimensional aspects of changing socioeconomic wellbeing<sup>3</sup>. Moser (1998) in an urban study defines vulnerability as insecurity in the wellbeing of individuals, households and communities, including sensitivity to change. Vulnerability can be understood in terms of a lack of resilience to changes that threaten welfare; these can be environmental, economic, social and political, and they can take the form of sudden shocks, long-term trends, or seasonal cycles. Such changes usually bring increasing risk and uncertainty. Although the concept of vulnerability has focused mainly on its social and economic components, in applying it to CC, vulnerability to physical hazards is often more important.

Also of CC operational relevance is the distinction between vulnerability and capacity/capability with its links to resilience. The emergency relief literature has shown that people are not ‘helpless victims’ but have many resources even at times of emergency, and that these should form the basis for responses (Longhurst 1994; ACHR 2005); there is also widespread recognition of the resources that grassroots organizations can bring to adaptation (Satterthwaite et al. 2007; Huq and Reid 2007). When sudden shocks or disasters occur, the capabilities of individuals and households are deeply influenced by factors ranging from the damage or destruction of their homes/assets to constraints on prospects of earning a living, to the social and

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<sup>3</sup> Sen’s (1981) work on famines and entitlements, assets and capabilities, as well as that of Chambers (1992; 1994) and others on risk and vulnerability influenced an extensive debate that defined concepts such as capabilities and endowments, and distinguished between poverty as a static concept, and vulnerability as a dynamic one that better captures change processes as ‘people move in and out of poverty’ (Lipton and Maxwell 1992, 10).

psychological effects of deprivation and exclusion including the socially generated sense of helplessness that often accompanies crisis.

The fact that vulnerability can be applied to a range of hazards, stresses and shocks offers a particular advantage to the analysis of CC-related risks in urban contexts. Urban poor populations live with multiple risks and manage the costs and benefits of overlapping hazards from a range of environmental sources under conditions of economic, political and social constraints. CC also brings a futures dimension to understanding vulnerability. It highlights the uncertainty of future risk and, associated with this, an insecurity concerning the bundle of assets that will enable adaptation and greater resilience, or lead to increased vulnerability. An asset-based vulnerability approach that incorporates social, economic, political, physical, human and environmental resources allows for flexibility in the analysis and planning of interventions that is harder to maintain within a hazard-specific approach. It also highlights how many assets serve to reduce vulnerability to a range of hazards.

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*Box 1: Definition of the most important capital assets for individuals, households and communities*

- Physical capital: the stock of plant, equipment, infrastructure and other productive resources owned by individuals, the business sector or the country itself.
- Financial capital: the financial resources available to people (savings, supplies of credit).
- Human capital: investments in education, health and nutrition of individuals. Labour is linked to investments in human capital; health status influences people's capacity to work, and skill and education determine the returns from their labour.
- Social capital: an intangible asset, defined as the rules, norms, obligations, reciprocity and trust embedded in social relations, social structures, and societies' institutional arrangements. It is embedded at the micro-institutional level (communities and households) as well as in the rules and regulations governing formalized institutions in the marketplace, political system and civil society.
- Natural capital: the stock of environmentally provided assets such as soil, atmosphere, forests, minerals, water and wetlands. In rural communities land is a critical productive asset for the poor; in urban areas, land for shelter is also a critical productive asset.

*Source: Moser 2007*

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Vulnerability is closely linked to a lack of assets. The more assets people have, the less vulnerable they generally are; the greater the erosion of people's assets, the greater their insecurity. Therefore it is useful to define assets as well as to identify those of particular importance in the context of climate change. Generally, an asset is identified as a "stock of financial, human, natural or social resources that can be acquired, developed, improved and transferred across generations. It generates flows of consumption, as well as additional stock" (Ford Foundation 2004, p. 9). In the current poverty-related development debates, the concept of assets or capital endowments includes both tangible and intangible assets, with the assets of the poor commonly identified as natural, physical, social, financial and human capital (Box 1)<sup>4</sup>. In impact assessments after disasters, assets are shown to be both a significant factor in self-recovery and to be influenced by the response and reconstruction process. Where survivors participate in decision-making, psychological recovery

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<sup>4</sup> In addition to these five assets, which are already grounded in empirically measured research, more 'nuanced' asset categories have been identified. These include the aspirational (Appadurai 2004), psychological (Alsop, Bertelsen and Holland 2006), productive and political assets, increasingly associated with human rights (Ferguson, Moser and Norton 2007; Moser, Sparr and Pickett 2007).

strengthens the recovery of livelihoods and wellbeing. Reconstruction is a period in which either entitlement can be re-negotiated to improve the capacity and wellbeing of the poor, or poverty and inequality can be entrenched through the corresponding reconstruction of vulnerability.

## **2. Asset-based adaptation**

Asset-based approaches to development are not new and, as with poverty, definitions are rooted in the 1990s international debates. Assets are closely linked to the concept of capabilities. Thus assets “are not simply resources that people use to build livelihoods: they give them the capability to be and act” (Bebbington 1999, p. 2029). As such, assets are identified as the basis of agents’ power to act to reproduce, challenge or change the rules that govern the control, use and transformation of resources (Sen 1997). Moser (2007) distinguishes between an asset-index conceptual framework as a diagnostic tool for understanding asset dynamics and mobility, and an asset-accumulation policy as an operational approach for designing and implementing sustainable asset-accumulation interventions (see also Moser and Felton 2007; 20089).

To get beyond vulnerability and focus on strategies and solutions, this paper introduces an asset-based framework of adaptation to CC that identifies the role of assets in increasing the adaptive capacity of low-income households and communities to this increasing phenomenon. Asset-based frameworks include a concern for long-term accumulation strategies (see Moser 2007; Carter 2007). Clearly the asset-portfolios of individuals, households and communities are a key determinant of their adaptive capacity both to reduce risk and to cope with and adapt to increased risk levels. As discussed below, they also influence capacity to make demands on, and work with, local governments.

An asset-based adaptation strategy in the context of climate change includes three basic principles. First, the process by which the assets held by individuals and households are protected or adapted does not take place in a vacuum. External factors such as government policy, political institutions, and nongovernmental organizations (NGOs) all play important roles. Institutions include the laws, norms and regulatory and legal frameworks that either block or enable access, or indeed positively facilitate asset adaptation, in a variety of ways. Second, the formal and informal context within which actors operate can provide an enabling environment for protecting or adapting assets. The adaptation of one asset often affects other assets that are highly interrelated; similarly, insecurity and erosion in one can also affect other assets. Third, household asset portfolios change over time, sometimes rapidly, such as death or incapacity of an income earner. Thus households can quickly move into security/vulnerability through internal changes linked to life cycle as well as in response to external economic, political and institutional variability.

An asset-based focus on CC requires, first and foremost, the identification and analysis of the connection between vulnerability and the erosion of assets. Following this, an asset-based adaptation framework then seeks to identify asset adaptation or resilience strategies as households and communities exploit opportunities to resist, or recover from, the negative effects of climate change.

## IV. AN ASSET VULNERABILITY ANALYTICAL FRAMEWORK

Hazards created or magnified by climate change combine with vulnerabilities to produce impacts on the urban poor's human capital (health) and physical capital (housing and capital goods) and their capacity to generate financial and productive assets. Some impacts are direct, such as more frequent and more intense floods. Those that are less direct include reduced availability of freshwater supplies. Finally, others that are indirect for urban populations include constraints on agriculture and thus on food supplies and increased prices that are likely in many places.

To assess the vulnerability of local population to CC it is necessary to identify the variation, in terms of both the hazards to which they are exposed and their capacity to cope and adapt. These include settlements variations in terms of the quality of physical capital and homes, the provision for infrastructure (much of which should reduce risks), and the risks from flooding or landslides. In addition, a local population's interest in risk-reduction through building improvements will vary depending on ownership status, with tenants often less interested, especially if their stay is temporary, for example as seasonal migrants (Andreasen 1989).

There may also be differences in people's knowledge and capacity to act. These include issues such as gender, with differences between women's and men's exposure to hazards, and their capacities to avoid, cope with or adapt to them. Age is also important, with young children and older groups facing particular risks from some impacts, and with reduced coping capacities. Individual health status is also crucial, regardless of age and gender (Bartlett 2008).

To systematize the broad range of vulnerability and 'unpack' these generalizations, it is useful to identify different aspects or types of vulnerability to climate change in terms of four *interrelated* "phases" as follows:

### 1. Long-term resilience

This requires identification of those who lives or works in the locations most at risk from the direct or indirect impacts of CC and/or lacking the infrastructure necessary to reduce risk. Among those most at risk are lower-income groups living in environmentally hazardous areas, lacking protective infrastructure. These include concentrations of illegal settlements that often exist on hills prone to landslides. Risks faced in such sites have often been exacerbated by damage to natural systems including the loss of mangroves, or hillside vegetation and deforestation – yet areas constantly exposed to flooding still attract low-income groups because of cheaper land and housing costs. Extreme-weather impacts frequently relate more to the lack of protective infrastructure and services than to the hazards inherent to urban sites. The lack of attention to building long-term resilience (and thus disaster-prevention) may simply be the result more of government inertia than of any policy.

### 2. Pre-disaster damage limitation

Here it is important to clarify who lacks knowledge and capacity to take immediate short-term measures to limit impact. Generally high-income groups with good-quality buildings and safe, protected sites do not require 'emergency preparedness' measures in response to forecasts for storms and high tides. For groups living in less resilient buildings, and more dangerous sites, risks to health and assets can be reduced by



appropriate actions in response to warnings. However, to be effective, reliable information needs to reach those most at risk in advance, to be considered credible, and to contain supportive measures that allow them to take risk-reducing actions. This includes the identification of known safer locations, and provision of transport to assist them to move.

Effective community-based pre-disaster measures to limit damage require levels of trust and cohesion – community social capital – that are often not present. Such social capital depends on a complex set of factors including length of time in the settlement, pattern of occupation (including tenure) and state infrastructure-delivery mechanisms (see Moser and Felton 2007). There are also differences in knowledge and the capacity to act to limit risk based on age, gender and health status. This includes differentials as simple as the capacity to run or to swim, with speed variations relating to different groups; infants, younger children, adults caring for them, the disabled and older people all move more slowly when responding to impending risks. In societies where women are constrained by social norms from leaving the home, they may move less rapidly to avoid floodwater, as many women who take responsibility for young children.

### **3. Immediate post-disaster responses**

This concerns groups less able to cope with impacts. When disasters occur they often separate communities, inhibiting responses by established community organizations. Particular groups, differentiated by age, gender, health status, and other forms of exclusion such as ethnicity or religion, face particular difficulties in coping with the immediate effects of extreme-weather-related disasters. Infants, young children and older age groups are at greater risk from the disruption they bring to, for instance, supplies of safe water and food. Disaster events can also endanger the personal safety of girls and women, with higher risk of gender-based violence, abuse and maltreatment associated with displacement and/or household stress (Bartlett 2008).

### **4. Rebuilding**

Poorer groups not only get hit hardest by the combination of greater exposure to hazards and a lack of hazard-removing infrastructure, but also have less capacity to adapt after disaster; they also generally receive less support from the state and very rarely have insurance protection. Post-disaster reconstruction processes rarely allow the poorest groups and those most affected to take central roles in determining locations and forms of reconstruction. In many instances, poorest groups fail to get back the land from which they were displaced, as this is acquired by commercial developers (ACHR 2005). When populations are forced to move, gender inequalities that exist prior to a disaster can manifest themselves in the resources and services available to support recovery and reconstruction.

Women's needs and priorities are rarely addressed in resettlement accommodation, with particular problems faced by women-headed households and widows (Enarson 2004). Women generally assume most child-rearing and domestic responsibilities. At the same time they often “struggle in the fast-closing post-disaster ‘window of opportunity’ for personal security, land rights, secure housing, employment, job training, decision-making power, mobility, autonomy, and a voice in the reconstruction process” (Enarson and Meyreles 2004, 69). Equally problematic is the failure to recognize women's individual and collective capacities for recovery and

reconstruction. Finally, children often experience greater physiological and psychosocial vulnerability to a range of associated stresses, as well as the long-term developmental implications of these vulnerabilities. Thus, many of the well-documented pathways between poverty and poor developmental outcomes for children are intensified by the added pressures of climate change.

## **V. COMMUNITY RESPONSES TO CLIMATE CHANGE: AN ASSET-BASED ADAPTATION FRAMEWORK FOR STORMS AND FLOODS**

Where city or municipal governments have proved unable or unwilling to provide the infrastructure, services, institutions and regulations to reduce risks from extreme weather events for much of their populations, they are unlikely to develop the capacity necessary to adapt to CC. Therefore adaptation frameworks need to be developed to support household- and community-based responses, as well as supporting citizen capacity to negotiate and work with government– and if needed to contest government. This section outlines such an adaptation framework, focusing on one set of likely climate-change impacts: the increased intensity and/or frequency of floods and storms.

As with the earlier section on vulnerability, it is useful to distinguish between the four closely related aspects of adaptation: long-term resilience; pre-disaster damage limitation; immediate post-disaster response; and rebuilding. For each of these, asset-based actions and associated institutions or social actors at household, community and government level are identified. Obviously, the greater the success in building long-term resilience, the less is the need for intervention in the second, third and fourth aspects; similarly, good pre-disaster damage limitation can greatly reduce the impacts (especially deaths and injuries) and reduce the scale of the required post-disaster response and rebuilding.

### **1. Asset-based adaptation to build long-term resilience**

In most instances, the most effective adaptation in terms of avoiding disasters is establishing the infrastructure and institutions that prevent storms or floods becoming disasters. But for most urban centres in low- and middle-income countries, this is also the most difficult to implement, because of the lack of funding and government capacity and the large deficits in infrastructure provision that need to be remedied. This often relates to the way higher levels of government have retained the power, resources and fundraising capacities that urban governments need.

It is important to start by recognizing that most low-income urban groups already have a range of measures by which they adapt to risk and to changing circumstances. At the same time their survival needs and economic priorities often conflict with risk reduction.

Table 2 highlights the importance of a number of issues including the following:

- For poor urban households, housing is the first and most important asset they seek to acquire (see Moser and Felton 2007). The relocation of existing houses and settlements away from areas which cannot be protected from floods and storms, coupled with land-use management strategies to prevent new

settlements in such areas, is an important component of an asset-based strategy.

- But homeowners and renters alike will often resist relocation, because it can result in a decline in financial capital and social networks, as well as the loss of the physical asset itself, the housing. Thus those who have built their own homes are more likely to opt for housing improvements and risk reduction rather than relocation.
- Home and possession insurance is one of the main means by which middle- and upper-income groups protect their asset base from extreme weather events. But this is often not affordable for low-income groups living in poor-quality housing at high risk.
- Climate often decreases the availability of safe, residential sites as it increase the sites at risk of subsidence, mud-slides, wind-damage, flooding and (for coastal cities) sea-level rise.

*Table 2: Asset-based adaptation framework for long-term resilience against floods and storms*

<b>Asset-based actions</b>	<b>Institutions/actors</b>
<b><i>Household and neighbourhood level</i></b>	
Households choose to move to safer sites (perhaps resulting in erosion of financial and social capital)	Households, housing finance agencies
Households improve housing (providing better protection against hazards); risk reduction through community space management to reduce local hazards (e.g. install drains, keep drains clear)	Households, CBOs, NGOs
Households protect productive assets	Households
Households get insurance (property and possessions) with implications for financial capital	Insurance companies, NGOs, community based micro-insurance
Community-based disaster-response and preparedness training including early-warning systems, safe sites and routes to them identified as preventative measures for human capital and family first aid	NGOs; CBOs
<b><i>Municipal or city level</i></b>	
Local government provide or upgrade protective infrastructure and adjust official standards for building and land use	In partnership with CBOs and NGOs
Local/city government support for household and neighbourhood action to improve dwellings and infrastructure (including slum and squatter upgrading)	Government agencies and households, CBOs, NGOs...
City/municipal hazard mapping and vulnerability analysis as basis for identifying adaptation strategy. Also land-use planning so settlements do not end up in the most risky sites, and, where needed, wetlands and floodplains are retained and can fulfil their natural protective functions	Government agencies working with NGOs and CBOs
<b><i>At regional and national level</i></b>	
Risk-reduction investments and actions that are needed beyond city boundaries (e.g. upstream or within watershed)	Local and extra-local government
State framework to support the above	Regional and national government

- Although there is often scope for community-level action to build more resilience to extreme-weather events, this is difficult to manage without representative, inclusive community-based organizations.
- There are issues community organizations cannot address, however well organized and representative they are. Much of what is needed for long term

resilience in cities is large-scale, expensive infrastructure that is part of city-wide systems – for instance storm and surface drains (and measures to keep them free of silt and solid waste) and components of an effective piped water system which includes getting the bulk water for distribution and its treatment.

- In addition, most sites at high risk from extreme weather can have risks reduced if building quality is improved and infrastructure and services provided. But this requires government agencies to reach agreements with residents over the transfer of land tenure.
- Often those require resettling will not want to move if the sites offered to them are too peripheral. Meanwhile, non-poor groups will generally object to the resettlement of low-income groups close to them.
- Conflicts can develop with forced relocation, including standoffs, physical resistance and even personal injury to those trying to defend informal property and associated livelihoods. This is exacerbated when alternative sites are inadequate or not provided at all.

## 2. Asset-based adaptation for pre-disaster damage limitation

Turning to the second phase, the immediate period prior to an extreme event, well-conceived interventions can greatly reduce loss of life, serious injury and loss of possessions, while also having the potential to moderate damage to homes. This is particularly important in cities at high risk from extreme weather events that lack the capacity to invest in long-term resilience measures mentioned above. Households and communities may have well-developed immediate measures to cope with storms and flooding, based on past experience with these events and their timing. However CC can alter the frequency, timing, and severity and intensity of such events.

*Table 3: Asset-based framework for pre-disaster damage limitation*

<b>Asset-based actions</b>	<b>Institutions/actors</b>
<b><i>At household and neighbourhood level</i></b>	
Social assets in place to facilitate the dissemination of early warning and knowledge of how to respond	CBOs, NGOs, coordination with state agencies for early warning and responses, including where needed identification of safe sites and routes to them
Households temporarily move away from high-risk sites or settlements	State provides transport to safe sites to those without access to private transport. Police and civil defence prepare to protect assets left behind after the disaster has passed (e.g. from looting)
Households prepare property to withstand event (protecting physical capital)	Households, CBOs, NGOs
Households protect or move productive assets	Households, CBOs
Community-based disaster-response and preparedness training including early-warning systems, safe sites and routes	CBOs, NGOs
<b><i>At municipal or city level</i></b>	
Preparation of safe spaces with services to which people can move temporarily	Government, NGOs, CBOs. Oversight in early warning to ensure communication between state agencies and local focal points
Organizing corridors for mass evacuation	Police and civil defence clear main routes to enable fast evacuation and also to prepare for the distribution of relief aid
<b><i>At regional and national level</i></b>	
Flood management upstream	Private and state-owned flood-management infrastructure
Disaster early-warning system	State at national and regional level

Table 3 summarizes an extensive range of interventions not only by households but also by local government, CBOs and NGOs. This highlights as one of the most important initiatives the following:

- One of the foundations of pre-disaster damage limitation is an early warning system that not only identifies the risk but also communicates the information to all neighbourhoods at risk.
- This is not something that low-income communities can provide for themselves, but depends on government institutions. Many low-income countries do not have an adequate weather-monitoring system, although the importance of this is now more widely recognized.
- However, a warning system does not in itself necessarily generate the required response, if local communities and household do not trust the information provided.

### 3. Asset-based adaptation for immediate post-disaster response

After any disaster, two separate intervention points are the immediate response, and then the longer-term follow up. The two are separated largely because responsibility for them is generally divided between different institutions, both within low- and middle-income countries and within international agencies.

*Table 4: Asset-adaptation framework for immediate post-disaster response*

<b>Asset-based actions</b>	<b>Institutions/actors</b>
<b><i>At household and neighbourhood level</i></b>	
Reducing risks in affected areas (e.g. draining flooded areas, clearing roads); recovering assets	Government (mainly agencies responsible for disaster response), perhaps international agencies
Adopt cash-based social protection measures	Donors, NGOs
Help restore infrastructure and services	Utilities, disaster-response agencies
Support for households to restore livelihoods with gender-disaggregated analysis	Local governments? NGOs?
Planning and implementing repairs	Households, insurance companies, local contractors
<b><i>At municipal or city level</i></b>	
Rapid repairs to key infrastructure and services such as healthcare, safe water provision	Government and utilities
Human capital social protection of displaced especially for elderly and children	Government ministries of health/education/welfare, NGOs
Protection of physical capital to prevent looting and further erosion of assets	Police and security services
Support for community-action	Local government, NGOs
<b><i>At regional and national level</i></b>	Funding and institutional support for the above

One of the main influences on low-income groups' capacity to address their post-disaster needs is the effectiveness of their pre-disaster efforts to protect their assets. In addition, growing awareness of the assets and capabilities of women, men, youth and children affected by a disaster, and their importance in immediate post-disaster response, has resulted in more community-focused approaches that include the following.

- Maternal and child healthcare and nutritional supplementation are among the first supports set up in the immediate aftermath of disaster.
- To address the needs of human capital, health interventions beyond the

availability of health services and provision for personal safety and environmental health in post-disaster situations is often very inadequate, especially for children and girls/women. Awareness of the heightened potential for injury is also critical after an extreme event, especially where children are concerned – requiring careful assessment.

Many of the problems experienced after disasters are related to delivery systems for emergency and transitional assistance. Local people frequently feel little or no control of their lives, and no role in decisions that affect them. The resources, skills and social capital within local communities are often overlooked in the rush to assess risks and needs. Therefore, among the key guidelines for responses are the following<sup>5</sup>.

- The emergency response stage should be kept as short as possible, with a shift to cash transfers and microfinance projects rather than direct supply of goods and services.
- Where people are displaced, shelter should be organized with the aim of keeping family members and communities together, with a tracing service established to reunite people and families. Normal cultural and religious events should be maintained or re-established
- Adults, including women, as well as men and adolescents should participate in concrete, purposeful, common-interest activities, such as emergency relief activities. As soon as resources permit, school-aged children should have access to schooling and to recreational activities.
- The community should be consulted regarding decisions on where to locate religious places, schools, water points and sanitation facilities. The design of settlements for displaced people should include recreational and cultural space.
- Where ethnic or other excluded groups are affected by disaster, they should be included in all post-disaster responses.

#### **4. Asset-based adaptation for rebuilding and transformation**

While the reconstruction process can be an opportunity for transformation to address both short- and longer-term development issues, it frequently fails to do this, simply replacing old problems with new ones. There tends to be limited understanding of how reconstruction can be turned to better advantage to rebuild social as well as physical assets. Table 5 outlines the key asset-based actions for rebuilding after a disaster. Again this highlights a number of important interventions.

- For poor households the most urgent issue is their housing - whether they can get back their previous home or the site on which to rebuild. But lack of land title, and government decisions that prevent rebuilding in affected areas, can both act as constraints.
- Solid gender analysis should be included in rebuilding. Often, individual reconstruction does not work well, while community-led development works better.
- The location of rebuilt settlements has obvious implications for livelihoods as well as for access to such amenities as schools, markets and health facilities.
- Housing in new settlements is often placed in a grid pattern on leveled land which can fail to make optimal use of space from a social perspective.

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<sup>5</sup> See Batniji, van Ommeren and Saraceno (2006) and Sphere Project (2004), cited in Bartlett 2008.

- Recovering the household and local economy is a cornerstone of progressive adaptation post-disaster. Without this, recovery and reconstruction can easily reproduce or even exaggerate the social inequality and asset poverty that led to disaster in the first place (UNDP 2004).

*Table 5: Asset-adaptation framework for rebuilding after a disaster*

<b>Asset-based actions</b>	<b>Institutions/actors</b>
<b><i>At household and neighbourhood level</i></b>	
Displaced households seeking land rights and titles associated with political capital; rebuilding physical capital	Households and government agencies, NGOs
Building/rebuilding homes and physical capital undertaken with community involvement that also rebuilds trust and collaboration relating to social capital	Households, NGOs, CBOs, government
Households rebuild productive capital relating to income-generating activities	Relatives sending remittances Financial service institutions
Building/rebuilding houses and neighbourhood infrastructure such as transport links, and water and sanitation infrastructure	Households, CBOs and government
Securing provision of infrastructure to enhance wellbeing for affected and host populations where relocation has been necessary	Affected and host households, local government, NGOs
Recovering the household and local economy	Households, CBOs, NGOs, municipal and national governments
<b><i>At municipal or city level</i></b>	
Building/rebuilding infrastructure (to more resilient standards)	Government agencies working with CBOs, NGOs
Rebuilding of systems of safety and security in communities to ensure accumulation of assets	Police and security systems
Building/rebuilding livelihoods and productive capital	Government working with households
<b><i>At regional or national level</i></b>	
Rebuilding productive capital of region	Financial services and banks
Regional reconstruction of natural and physical capital – such as water systems	Contributions of state/provincial governments and national governments to this reconstruction

- To assist it, where possible, local sourcing of materials and skills should be promoted, with decision-making powers transferred to survivors. The recovery of the local economy and landownership are interdependent. Loss of rights over land and forced resettlement during reconstruction, under the guise of ‘adaptation’ or ‘risk reduction’, serves to transfer land rights from the poor to the rich.

Given space constraints this section has highlighted a few of the most important interventions during the four phase, prioritizing those focusing on local communities – even though, as shown in the tables, city and municipal governments play an equally important complementary role in adaptation. Obviously, effective adaptation strategies depend on more competent, better-resourced, accountable urban governments that are willing and able to work with poorer groups. This also means that urban governments need support from national governments and international agencies.

## 6. RESEARCH METHODOLOGY FOR TESTING AN ASSET-BASED ADAPTATION FRAMEWORK FOR STORMS AND FLOODS

To date the asset adaptation framework described above is largely hypothetical in nature. Although each phase is backed up by empirical evidence, as a holistic comprehensive framework it still requires testing in practice. This final section, therefore, provides a description of one such potential methodology. By way of background, as with approaches to climate change, this is contextualized within a range of community-focused methodologies.

*Table 6: Summary of selected community-focused methodologies applied to climate change adaptation*

<b>Method</b>	<b>Main users</b>	<b>Main objective</b>	<b>Priority tools</b>
<b>Community-wide vulnerability &amp; capacity assessment (CVCA)</b>	Emergency/relief institutions. E.g. the Red Cross, city municipalities, NGOs & CBOs	Analysis & mapping of vulnerabilities and capacities to identify risk reduction measures and action plans (including non-climate-related risks)	Participatory methodologies for sustainable livelihoods including mapping, focus group discussion, needs assessment, key informants, institutional & network analysis
<b>Participatory vulnerability assessment (PVA)</b>	Emergency/relief & development institutions, e.g. Action-aid International	Analysis & mapping of vulnerabilities to identify risk reduction measures and action plans (including non-climate-related risks)	Participatory methodological tools including focus group discussion, historical profile, vulnerability maps, seasonal calendar, venn diagrams, livelihood analysis.
<b>Vulnerability mapping</b>	Emergency/relief & development institutions, e.g. Tearfund	Analysis & mapping of vulnerabilities to identify risk reduction measures and action plans (including non-climate-related risks)	Participatory tools including focus group discussion, semi-structured interviews, key informants & ground-truthing.
<b>Local options for communities to adapt &amp; technologies to enhance capacity (LOCATE)</b>	Emergency/relief & development institutions. E.g. The African City for Technology (ACTS) & IDRC	Identification and implementation of context specificity adaptation action plans (part of methodology development for community-based adaptation to climate change, thus only including climate-related risks)	Participatory monitoring & evaluation tools including discussion groups, needs assessments and mapping
<b>Participatory impact assessment (PIA)</b>	Development institutions, NGOs & CBOs, and researchers	Identifying intervention measures & action plans	Participatory tools including needs assessments, well-being ranking, focus group discussion, key informants, historical profiling, mapping
<b>Asset Adaptation</b>	Research institution (GURC)	Identification of adaptation measures, & implementation of community focused action planning processes to address climate-related risks	Participatory urban climate change asset adaptation appraisal tools including community maps, historical profiles, causal flow diagrams, venn diagrams

Source: Adapted from Simatele 2009

### 1. Current community-focused methodologies

As shown in Table 6, within community-focused methodologies, a range of different methods exist. Many originate in emergency or relief with objectives that are quite similar. Essentially they seek to map vulnerabilities and capabilities of local populations as the basis for then identifying risk reduction measures and action plans. Equally they all use a range of participatory rural / urban appraisal tools, first



developed for poverty analysis and the implementation of poverty reduction measures (see Chambers 1992; 1994). The differences in their names; these range from community-wide vulnerability and capacity assessment (CVCA), through participatory vulnerability assessment (PVA) to participatory impact assessment (PIA). The differences appear to be more a question of institutional branding, such as from Red Cross, through Action Aid to Tearfund. The extent to which participatory methodologies are specifically adapted to focus on climate change as against being applied generically, as suggested in table 6, may ultimately be what distinguishes them (if at all). Interestingly none of the methodologies appear to focus specifically on assets, which is the unique feature of the participatory methodology for asset adaptation described below.

## **2. Towards a participatory methodology for climate change asset adaptation**

This methodology combines three components: first, ‘bottom-up’ participatory research undertaken in poor communities in each research city; second, a rapid appraisal of policies, programs and institutions; third the triangulation of results using a micro-action planning or consultation process. These are briefly described below:

### *2.1. Participatory climate change adaptation appraisal (PCCAA)*

This is intended to appraise the mechanisms through which climate change directly or indirectly leads to the erosion of assets. It is undertaken with different social groups of the urban poor in the research cities or towns. This includes community, household and individual perceptions of current policies, programs and institutions that directly or indirectly constrain their adaptive capacity, as well as their recommendations concerning pro-poor adaptation policies. It comprises two parts:

First, an *asset vulnerability analytical framework* identifies the links between vulnerabilities and assets. These relate both to external shocks and stresses, as well as to internal capacities to resist or withstand them. This framework identifies the groups most affected and types of socio-economic vulnerability in four closely inter-related phases or stages that can occur during urban climate change, namely long term resilience; immediate pre-damage limitation, immediate post-disaster (including disaster emergency) and rebuilding (long term).

Second, an *asset adaptation operational framework* identifies concrete measures to increase resilience and reduce vulnerability in the face of long-term changes as well as immediate shocks that result from global climate change. This framework identifies the range of ‘bottom-up’ climate change adaptation strategies that individuals, households and communities have developed to increase their resilience to cope with the different phases of climate change (see above).

### *2.2. PCCAA tools*

A range of PUA techniques (see Moser and McIlwaine 1999) are adapted specifically for use in the PCCA which will be undertaken with a range of groups within communities, identified by age, gender, economic status and other appropriate criteria. PCCAA tools include:

- *Participatory community maps*: To identify most vulnerable sites and households
- *Historical profile/time lines*: To list key historical events especially relating to past climate change-related events.

- *Seasonality calendars*; To identify CC issues such patterns of severe droughts (water scarcity), issues around food security, heat waves, floods, and peaks and troughs of diseases.
- *Well-being ranking*; To enable local people to identify different social and economic categories in the community that will help identify the people most vulnerable to climate change within a community
- *Listings and rankings*: Both general problems to see the prioritisation of climate change issues as well as the CC priority problems. These tools will help identify the assets different groups consider important in adapting to climate change as well as the major climate change issues that the local people consider to be most severe.
- *CC / disaster / community problem time lines*: These will be essential to identify community perceptions of changing phases in the weather (and whether these coincide with those identified above)
- *Causal flow diagrams*: to identify perceptions of causes and consequences of CC asset related problems (identified in the problem listing and ranking); causal flow diagrams will also be used to identify individual, household and community solutions
- *Institutional (Venn) diagrams*: to identify institutions both in and outside the community that play a role in climate change adaptation strategies; these may be positive and negative, and differentiated by level of importance
- *Diagrammatic representations of strategies and solutions*: that identifies the type of danger, strategies, solutions and institutions required

The PCCAA is intended to be undertaken by two local research teams over a four week period. Teams need to be selected in terms of their prior knowledge of participatory appraisal techniques, though almost certainly not on its application to climate change issues. As in other participatory appraisals the following components need to be undertaken in this time frame: training; piloting (one community); PCCAA in two communities; analysis and report writing.

### **3. A rapid appraisal of current policies, programs and institutions**

This includes an analysis of the institutional landscape, evaluation of relevant national, municipal and institutional policies, regulations and mandates, as well as scientific studies (e.g. weather forecasts, mapping and research), and evaluation of relevant programmes and practice from the perspectives of the different-level stakeholders.

The *asset adaptation operational framework* mentioned above, is here used to identify institutions, policies and programs that directly or indirectly

- Constrain the adaptive capacity of the urban poor, or
- Are instrumental in designing, implementing and monitoring pro-poor adaptation policies, or have the potential to do so.

#### *3.1 Appraisal tools*

These include a range of appraisal techniques such as the following:

- *Structured and semi-structured interviews*: To be undertaken with officials, programme managers, and operational and technical staff of different institutions. Chain or purposeful sampling will be used to select the interviewees working at municipal level, such as Ministries of Housing,

Environment, Education and Health, local-level authorities, NGOs, multilateral and bilateral aid agencies, and private sector (e.g. construction and insurance companies). 'Rapid Assessment Check Lists' will be used, followed up with more open questions guided by interview protocols.

- *Focused interviews:* These will be undertaken with identified key informants.
- *Secondary data reviews:* Review of 'grey' and 'white' literature, including programme documentation, national, municipal and institutional policies, regulations and mandates, as well as research studies. The aim is to identify key stakeholders and to analyse relevant policies and programmes.
- *Observation:* To identify and analyse key measures of selected programs. This will be carried out together with operational/technical staff of the respective implementing institutions. Recording of data is in form of pictures and field memos.
- *Participatory research workshops:* To generate additional insights about inter-institutional cooperation and barriers in the interactions between selected key institutions workshops, if possible, workshops will be organized with institutions working in the selected communities together with community groups participating in the PCCAA. These will use a range of participatory appraisal techniques

This research is undertaken simultaneously as the PCCAA by 1-2 team members

#### **4. Triangulation and validation**

Triangulation and validation of results of (1) and (2) above is undertaken through one of the following two processes:

##### *4.1. Action planning*

An action planning exercise can be used to triangulate the results from the different actors. This is a participatory exercise that allows urban poor communities and public authorities together to articulate and identify common problems, define and structure strategies and solutions, reach consensus, and negotiate collaboration (Hamdi and Goethert 1997).

The micro-planning exercise involves first a General Assembly of the community to explain the purpose of the workshop and select participants for the exercise; and second, a micro-planning workshop; this takes one day in which participants from the community and the local authority identify and prioritize problems, identify and prioritize solutions, and reach consensus on the major activities that could be executed in order to strengthen the asset adaptation strategies of the community. The results of the workshop can then be taken both to the municipal council and the general assembly of the community for ratification (although this is not part of the work that we will do)

##### *4.2. Consultation process*

In other contexts a formal consultation process may be appropriate. This will involve representatives of the communities in which the research took place, the local government as well as other local governments, NGOs, national authorities, and members of the international donor community. The results of the study will be discussed in groups.

## **5. Collaborative partners to undertake participatory climate change asset adaptation research.**

To undertake such research requires a number of research partners with comparative advantages in working at different levels. These may include the following:

### *5.1. Primary Research Counterpart*

A national / regional or local level institution is needed to take responsibility for carrying out the research and administering resources. They will need to train and supervise local researchers who will carry out the PCCAA methodology research in the designated communities as well as the action planning process. In addition they will be responsible for systematizing and analyzing results of the participatory research, the institutional analysis and the planning workshop results

### *5.2. Research centre with links into local communities*

It may also be necessary to identify a local research centre with community level trust and contacts. Their physical installations may be used during the entire exercise; for the working session the first week; as a logistical centre during the piloting and application of the PCCAA in two additional communities; and afterwards, for the week of systematizing the results.

### *5.3. Local government linkages*

Personnel from the Municipality are often needed to help identify the communities where the PCCAA and micro-planning exercise can be undertaken. The action plan needs to identify potential concrete projects to be co-financed by the Municipality, and the local community.

### *5.4. Scaling-up of research results and replication of methodology*

To scale up research results it may be helpful to involve a second tier organization whose staff undertakes the PCCAA in order that it, as a second tier institution that works through local governments and microfinance institutions, it can replicate this methodology in other municipalities in which it works.

## **7. CONCLUDING COMMENT**

The Global Urban Research Centre (GURC) as part of its research, teaching and training programme on “Community empowerment and asset based- adaptation to urban climate change” is currently in the process of finalizing a number of case studies to test the research and action planning framework in various Southern African, Latin American and Asian cities. In totality this comparative research project will undoubtedly modify and CC asset adaptation framework described in this paper. The outcome then is intended to be a more robust theoretical framework both for researchers seeking to better understand the link between climate change and the erosion of assets of the poor in cities of the South as well as an operational framework that sets out guidelines for the development of specific tools and methods which can be used to support the development of pro-poor adaptation strategies in urban areas.

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