Briefing Paper:
Climate Change and Assets

Caroline Moser, Gemma Sou and Alfredo Stein
Global Urban Research Centre, University of Manchester

Introduction

In recent years, evidence of changes in climate has grown, as well as recognition that the poor in the global South are most likely to experience the severe impacts of the variations of weather patterns. During the 2009 Copenhagen Climate Change Conference the majority of governments of the world agreed that reducing and avoiding greenhouse emissions was not enough, and that one of the challenges facing all countries was how to adapt to the adverse effects of climate change (CC). This required the implementation of adaptation actions aimed at reducing vulnerability and building resilience especially in developing countries (UNFCCC 2010:6). A debate is now emerging as to how best to achieve an enabling environment for CC adaptation.

This paper outlines the importance of moving from an asset accumulation to an asset adaptation framework in order to better understand the constraints and opportunities that the poor face in addressing the impacts of climate change. The paper starts by briefly describing the shift in the CC agenda from mitigation to adaptation, as well as the difference between Disaster Risk Reduction (DRR) and CC adaptation approaches. It then defines what an asset accumulation framework is, and the extent to which it helps to understand how the poor are already coping with the effects of weather variations. Finally, it shows the potential opportunities for incorporating an asset adaptation framework into policy and programmatic interventions that could assist the poor in building long term resilience to climate change.

Background

Although a matter of recent controversy (The Guardian 2010), there is growing evidence that the climate is changing, observed directly through increasing global average air and ocean temperatures, changes in the frequency and severity of storms, as well as in precipitation patterns (IPCC 2007). Long term trends for more than three decades show variations in the frequency of storms with heavy precipitation over most land areas: in eastern parts of North and South America, northern Europe, and northern and central Asia. During this period, parts of the African Sahel, the Mediterranean, Southern Africa, and Southern Asia have become drier and droughts have become longer and more intense, affecting larger areas especially in the tropics and subtropics.

Though climate patterns naturally fluctuate over time (Burroughs 2007), scientists attribute Greenhouse Gas (GHG) emissions to be the main cause of climate change (CC). The rise of global atmospheric CO2 levels, with a rapid rise from around 1950 onwards has been accompanied by a rapid increase in the global surface temperature over the last 100 years (IPCC 2007). To face the challenges posed by CC, especially in reducing and avoiding GHG emissions, two international initiatives were set: the Kyoto Protocol and the Intergovernmental Panel on Climate Change (IPCC) (see Box1).

Box 1: International initiatives on Climate Change

Kyoto Protocol: Adopted in 1997 and entered into force in 2005, the treaty binds industrialized countries to reduce greenhouse gas emissions over a five-year period 2008-2012. Countries have to meet their targets primarily through national measures however, it offers global market-based mechanisms to help parties meet their emission targets in a cost-effective way including emissions trading ('the carbon market') and clean development mechanisms.

IPCC: Established in 1998 as a scientific body tasked with evaluating the risk of CC caused by human activity, it aims to asses scientific information relevant to human-induced CC, the impacts of human-induced CC, and options for mitigation and adaptation. The IPCC publishes special reports on topics relevant to the implementation of the United Nations Framework Convention on CC (UNFCCC) and it bases its assessment mainly on peer reviewed and published scientific literature. IPCC is only open to member states of the World Meteorological Organisation (WMO) and the United Nations Environment Programme (UNEP).

Sources: United Nations (1998) and IPCC (2010).

As CC has now become a major global concern there is also growing recognition that cities in low and middle-income countries contain a large proportion of those most at risk from its effects (Moser and Stein 2010). Not only do these countries contain about three quarters of the world population, but also have most of the urban population at greatest risk from increased intensity and/or frequency of storms, flooding, landslides, heat waves, constraints on fresh water and vector-borne diseases, as well as an increased concentration of people in low-lying coastal zones at risk from sea-level rises (McGranahan et al 2007). This is particularly true for hundreds of millions living in slums and informal settlements in cities and towns in Asia, Africa and Latin America (Wamsler 2007).

To date the majority of climate change adaptation strategies in developing countries have focused on the impacts of CC on agricultural and natural resources, favouring therefore 'rural livelihood-focused activities', while ignoring, or not paying sufficient attention on what is happening in urban areas' (Tanner et al 2009). Thus, the lack of understanding of how CC is affecting urban areas, as well as the weak institutional structures and financial resources dedicated to urban climate change adaptation are a constraint to effectively building cities' resilience to severe weather (Moser et al 2010).

Changing approaches to address climate change[1]

Over the past decade a diversity of complex, interrelated and often overlapping approaches have sought to address the impacts of climate change as a consequence of increased acknowledgement of the need to enable human and natural systems to adjust to actual or expected climate *stimuli* and their effects which are now irreversible (McCarthy et al 2001). Within this field it is useful to clarify the distinctions between mitigation and adaptation approaches (see Table 1)[2]; and between disaster risk reduction/management (DRR/DRM) and climate change adaptation (see Annex 1). The following section briefly summarises relevant background issues relating to each.

[1] This section draws heavily on Moser et al (2010).

[2] Ideally, adaptation and mitigation should be considered jointly, as some adaptation measures can contribute to reducing greenhouse gas emissions, while conversely mitigation measures can be planned to help reduce, and not inadvertently exacerbate, disaster risks.

From mitigation to adaptation

Mitigation was the first approach to CC to receive widespread attention, with countries within the UNFCCC actively discussing and negotiating ways to deal with the problem.[3] To address the root cause, the reduction in green house gas (GHG) emissions from human activity was identified as the priority task. But the means to achieve this were considered contentious, requiring radical changes in the way many societies are organised, especially in relation to fossil fuel use, industry operations, urban development and land use (Klein et al 2007).

Table 1: Key differences between mitigation and adaptation

Issue	Dominant focus of mitigation	Dominant focus of adaptation
Cause/effect	Primarily addresses causes	Primarily addresses consequences
Spatial scale	Main objective: avoiding global changes	Main objective: local damage avoidance
Time-scale	Long-term benefits from avoided CC	Often main driver short-term benefit due to reducing vulnerability to CC
Beneficiaries	Mainly benefits others	Mainly benefits those who implement it
Incentives	Usually incentives needed	Often incentives not needed
Urgency	Lower political urgency/legitimacy	Higher political urgency/legitimacy
Monitoring	Relatively easy	More difficult

Source: Adapted from Swart and Raes 2007.

Equally important have been approaches to reduce the impact of climate change, and associated with this an often contentious debate occurring about the nature and time frame of the threat (Thomalla et al 2006). While the disaster risk reduction/management (DRR/DRM) approach suggests climate change is an increase in the magnitude and frequency of short-term extreme events or disasters, similar to an earthquake or tsunami, the more recent climate change adaptation (CCA) approach maintains the phenomenon is more one of slow trends in the increasing variability and intensity of weather (and associated precipitation and temperature regimes). Associated with this, are contrasting responses that focus on top-down disaster relief during or after extreme weather events (Sperling and Szekely 2005), as against incremental responses to the slow impacts of long-term trends in increasing severity of weather, both of which are sometimes invidious and imperceptible (Hellmuth et al 2007; Moser et al 2010).

Despite increasing convergence between these two approaches to adaptation, they differ in terms of historical period when developed, key objectives and current emphases (see Annex 1) and have operated largely in isolation from each other (Tearfund 2008:3). DRR, subsequently transformed into Disaster Risk Management (DRM), with its origins in humanitarian emergency relief, has a 30-year track record in addressing disasters. As a consequence of the Hyogo Framework for Action[4], DRM underwent a paradigm shift to include the pre-disaster stages of hazards (FAO 2008), with its overall focus expanding to encompass emergency response, prevention, mitigation and preparedness of neighborhoods for natural disasters (Wamsler 2007). Closely linked was Climate Risk Management, which sought to bridge the management of risk to

[3] In the context of disasters, 'mitigation' is defined as 'any structural measures (such as engineering techniques and hazard-resistant construction) or non-structural measures (such as improved policies, legislation, public awareness, training and education, public commitment and operating practices) undertaken to limit the adverse impacts of natural hazards, environmental degradation and technological hazards' (Wamsler 2007).

[4] The Hyogo Framework for Action (HFA) 2005-2012 was agreed by 168 governments in Kobe, Japan in 2005, to facilitate a comprehensive system-wide, risk-reducing approach to climate change adaptation.

climate change.[5]

More recent approaches with environmental climate science as their centre of concern have focused specifically on both vulnerability and adaptation, as suggested by approaches such as Climate Change Adaptation (CCA) and Climate Change Vulnerability Resilience. Spearheaded by the fact that mitigation responses have been slow and inadequate (Reid and Huq 2007), CCA with its scope narrower than DRM, deal only with climate-related or 'hydro-meteorological' hazards. However, such approaches have a far longer time dimension that DRM, and one that factors in the impacts of climate change on biodiversity, changes in ecosystem service and the spread of climate-sensitive diseases (Tearfund 2008). In addition they prioritise the building up of long-term resilience, rather than planning for dramatic climate shocks (Van Aalst et al 2006).

In the CCA approach, a further useful distinction has been made between *ex ante* (anticipatory) and *ex-post* (reactive) adaptation, as well as between planned and autonomous adaptation. Most initial climate change adaptation has been *ex-ante* and top-down, lending itself to large-scale, technological solutions (Tanner and Mitchell 2008). However, criticism of this approach as tending to ignore the social determinants of vulnerability (Prowse and Scott 2008), has resulted in a range of more inductive community-based approaches to adaptation, that build on existing risk-coping strategies of individuals and communities (Reid and Huq 2007).

While community-based approaches to poverty reduction have been widely implemented in the past decades as a consequence of the work of community-based organizations (CBOs), NGOs and participatory approaches to development, (Chambers 1992), recently, this approach has also turned its focus to climate change adaptation. Principles include the fact that outside agencies must gain the trust of local communities, and that future adaptation initiatives as a form of action-research must be embedded in local communities existing knowledge and must be based on local community members' participation (Prowse and Scott 2008).

Defining the asset adaptation framework[6]

As background to this paper it is also necessary to briefly summarise the main characteristics of an asset accumulation framework in terms of the following questions:

What is an asset?

An asset is a "stock of financial, human, natural or social resources that can be acquired, developed, improved and transferred across generations. It generates flows or consumptions as well as additional stock" (Ford Foundation 2004). Assets are not simply resources that people use to build livelihoods. As Bebbington (1999) argues, assets give people the capability to be and act. Thus the acquisition of assets is not a passive act but one that creates agency and is linked to the empowerment of individuals and communities (Sen 1997). The concept of asset accumulation draws on theoretical and policy-focused literature on asset-based development approaches (see for instance Sherraden 1991; Carter and Barrett 2006).

[5] See for instance, ORCHID (Opportunities and Risks of Climate Change and Disasters), identified as a 'managerial response to mainstreaming climate risk management' (Tanner and Conway 2006).
[6] This section draws from the asset accumulation framework developed by Moser (2007; 2009).

The concept of asset or capital endowments includes both tangible and intangible assets. The most widely known assets are natural, physical, social, financial and human capital (see Annex 2). Recently researchers and practitioners have expanded the notion of assets to include a broader range of particular intangible assets such as aspirational, psychological, civic and political assets. Assets can be both individual and collective in nature. This means they can be possessed by individuals, households, communities or entire societies, depending on the asset type.

What is an asset accumulation framework?

An asset accumulation framework has the following two components:

- An *asset index:* This is an analytical and diagnostic tool for understanding poverty dynamics and mobility. It quantitatively, or qualitatively, measures the accumulation or erosion of different assets over time and clarifies the interrelationship between different assets. This may, or may not, mirror changes in income or consumption poverty.
- An *asset accumulation policy:* This is an associated operational approach that focuses directly on creating opportunities for poor people to accumulate and sustain complex asset portfolios.

Asset accumulation policy is not a set of top-down interventions. Though it may include interventions that focus on strengthening individual assets, it is essentially a framework that provides an enabling environment with clear rules, norms, regulations and support structures to allow households and communities to identify and take advantage of opportunities to accumulate assets.

What are the components of an asset accumulation policy?

To facilitate asset accumulation it is necessary to simultaneously address components at the following three interrelated levels:

1. Structural level: The fact that structural factors can have direct and indirect impacts on assets at the local level demonstrates that development is not just a technocratic process but a structural one. The process of accumulating assets involves complex political contestation, as well as the negotiation of social power relations as much as technocratic solutions. Asset accumulation does not occur in a vacuum. Opportunities are influenced by *complex causal relationships* between both external and internal structural factors and internal social processes – both of which require addressing.

2. Institutional level: International, national and local public, private and civil society organisations are critical in providing an 'enabling environment' for the accumulation of assets. While the state establishes the normative and legal frameworks that can either block initiatives or provide incentives, private sector entities, including banks and microfinance institutions, support the opportunities and facilitate access to promote asset accumulation.

3. Operational level: Assets are not static. In a changing global political, socioeconomic and environmental situation it is important to recognise their constant revalorisation, transformation, and renegotiation. In addition, the accumulation of one asset often results in the accumulation of others, while insecurity in one can also affect other assets. This means that at the operational level, an asset accumulation policy framework recognises prioritisation, sequencing, trade-offs, and negotiation potential, and combines a range of context-specific strategy options:

What are the stages or 'generations' of asset strategy implementation?
Finally, it is important to distinguish different stages or 'generations' of asset accumulation strategies (see Table 2). First-generation asset accumulation strategy is by far the most widespread, is intended to access assets and focuses on the provision of 'basic needs' including water, roads, electricity, housing plots, better heath care and education, and microfinance. Essential for getting out of poverty is this primary emphasis on human, physical and financial capital.

Table 2: Aims and programmes of different asset generation strategies

	First generation	Second generation	Third generation
Policy aims	Accessing an asset portfolio	Consolidating assets and preventing erosion	Maximising linkages between interdependent assets
Programmes	Provision of land, housing, basic services and infrastructure and microfinance	Citizen rights and security, good governance and accountability, including intergenerational transfer of assets	Securing long term financial and institutional sustainability of agencies, economic growth, permanent employment and income.

Source: Based on Moser (2009).

Once provided it is assumed that individual well-being improves and 'development' occurs. However, the conditions for accessing assets do not necessarily bring the expected development outcomes. Second-generation asset accumulation strategies therefore are intended to ensure their further consolidation and prevent erosion – including the intergenerational transfer of assets. Such strategies go beyond the provision of basic services to embrace a range of concerns relating to citizen rights and security, governance and the accountability of institutions. Third-generation asset accumulation strategies, still very nascent, need to explore interventions that can maximise the linkages between different types of inter-dependent asset, thereby ensuring 'added value' and long-term sustainability.

Does climate change require a shift from asset accumulation to asset adaptation?
Of particular significance to this paper is the shift from an asset accumulation to asset adaptation framework, specifically to address climate change.[7] This framework has two objectives;

1. At the analytical level to understand the sources of asset vulnerability of poor households, businesses and community organizations in terms of the mechanisms through which variability associated with climate change impacts leads to the erosion of assets.
2. At the operational level to classify the types of asset adaptation strategies and sources of reliance that enable households and communities to protect themselves, or to recover from, the negative effects of severe weather associated with climate change.

Linked to these objectives, the framework comprises two associated components:

An asset vulnerability analytical framework:
This identifies the links between different vulnerabilities and the poor's capital assets. These relate both to external shocks and stresses, as well as to internal capacities to resist or withstand

[7] This is the result of recent conceptual and empirical research on climate change and assets undertaken by GURC with fieldwork in Mombasa, Kenya and Estelí, Nicaragua (see Moser and Satterthwaite 2008; Moser and Stein 2010; Moser et al 2010).

them. While vulnerability has long been recognised as an important constraint for asset accumulation, CC also requires a consideration of 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. In the case of climate change it can be identified in terms of two specific dimensions: first, an external dimension that comprises the potential damage caused by shocks (such as sudden climatic events like hurricanes), trends (such as environmental degradation over time) or stresses to which people are subject; and second, an internal dimension that encompasses their capacity and associated means to withstand, or adjust, to damaging losses.

The social dimensions of vulnerability to climate change predominantly focus on the internal dimension — namely how assets, institutions, and people's relationships are affected by such external threats. Climate change vulnerability, therefore, is closely linked to assets. The more and diverse assets people have, the less vulnerable they are, and the greater the erosion of people's assets, the greater their insecurity (see Moser 1998). Poor populations are particularly vulnerable to climate change not only in terms of individual assets such as human and social capital, but also in terms of household, small business and community assets such as financial and productive assets. The capacity of individuals, households and communities to deal with such impacts in turn determines their resilience to weather stress.

An asset adaptation operational framework:

This explores and classifies the asset adaptation strategies as households, small businesses and communities exploit opportunities to develop resilience, cope and resist, or to recover from, the negative effects of climate extremes. Three closely interrelated phases of asset-based adaptation comprise:

- Asset adaptation to build long-term resilience
- Asset damage limitation and protection during severe weather events
- Asset rebuilding after extreme weather and disasters

Complementing this is an appraisal of the current climate change institutional policy domain at both national and local level. Together both sources of information provide the basis for local-level policy-makers and other local stakeholders (civil and community organisations) to propose concrete climate change adaptation policies and to provide specific strategies and programmatic interventions that can be adopted and implemented by local authorities and institutions with positive impacts on poor households and their local communities.

Thus, climate change asset adaptation strategies are based on a number of basic principles which include the following:

- Adaptation does not take place in a vacuum and is constantly shaped by government policy, political institutions, and non-governmental actors. Laws, norms and regulatory and legal frameworks either block or enable access, or indeed positively facilitate asset adaptation, in a variety of ways (Moser and Satterthwaite, 2008);
- Assets are highly interrelated and facilitating the adaptation of one may affect others and vice versa — the erosion of one may impact others;
- Household asset portfolios are not stable and may change — either over time or abruptly — in response to external shocks or internal changes e.g. death, marriage, etc. It focuses, on the one

hand, on local government adaptation policy, and on the other on community, small business and household responses, their ability to negotiate and be active in decision-making. Clearly the asset-portfolios of individuals, households and communities are a key determinant of their adaptive capacity not only to reduce risk and to cope with and adapt to increased risk levels, but also to influence, make demands on, and work with, local governments.

Assets and current climate change adaptation programmes

The description of both climate change adaptation and asset adaption provides a useful background to examine the extent to which current approaches to CC adaptation incorporate assets. Here it is useful to distinguish between measures to address CC vulnerability as against those focusing on CC adaptation strategies.

Climate change vulnerability assessments

To date CC adaptation interventions have focused primarily on vulnerability assessments undertaken at different spatial and social levels. Annex 3 summarizes a range of recent urban vulnerability assessments undertaken by International NGOs (INGOs), Urban Networks and regional-level World Bank programmes. The majority have not focused on asset vulnerability in their diagnostic components but rather on areas, social groups or types of hazard. All have the objective of influencing local policy planning – either directly by creating local action plans, or indirectly through sharing their results with local authorities. They also include a knowledge-sharing goal, a number of them being structured as regional city networks.

Despite similarities in objectives their methodologies differ; some seek to identify vulnerability 'hot spots', using climate data scenarios and downscaling methods to the city level (World Bank, ICLEI); others seek to estimate damage costs of potential hazards (The World Bank/ADB/JICA initiative on coastal cities); while still others combine scientific vulnerability mapping with policy and institutional mapping at the city level to assess the capacity of local authorities to deal with projected hazards. Some assessment methodologies are research-oriented aiming to share results with local partners (Action Aid, ICLEI, World Bank/ADB/JICA) while others are intended for the development of local action plans (ACCRN, World Bank East Asia and North African regions).

With the exception of the Asia Cities CC Resilience Network and Action Aid International, such assessments provide little guidance to urban and rural authorities about including household and community perspectives on the effects of climate. Consequently such assessments have focused disproportionately on physical and institutional vulnerability at local government level, rather than social vulnerability. This has resulted in a focus on top-down technocratic, command-and-control measures such as engineering structures, technology-based warning systems, hazard-based land-use planning and hazard-based risk awareness campaigns (Hewitt 1995, de Waal 1997). Finally, most vulnerability assessments either implicitly or explicitly focus on climate disaster projections such as flooding. Their methodology is not equipped to assess the incremental shifts in weather which take place over lengthy periods of up to 30 years e.g. higher intensity of rainfall causing seasonal flooding or gradually rising temperatures.

In contrast to these assessments, a small number of development institutions include assets in their CC vulnerability assessments. Examples of these include the INGO CARE with its Climate

Vulnerability and Capacity Analysis (CVCA) (see Box 2), The Asian Disaster Preparedness Center (ADPC), the International Union for the Conservation of Nature (IUCN) and the Global Urban Research Centre's (GURC) Participatory Climate Change Adaptation Appraisal (PCCAA).

Box 2: CARE: Identification of asset-based vulnerability at the community level

CARE applied their Climate Vulnerability and Capacity Analysis (CVCA) methodology to analyse the asset-based vulnerability and capacity to adapt to climate change in Bansi Village in Bawku District in Northern Ghana.

A group of ten adult women formed a focus group and were used to assess the asset-based vulnerability to climate change at the community level. A matrix was drawn on a large piece of paper and participants were asked to list the most important assts within the community. The women then identified the five greatest hazards to their livelihoods; they identified natural and man-made hazards. The discussion was not limited to climate change, but CARE facilitators prompted the group when they did not identify environmental hazards during the initial stages. Participants then ranked the impact of each identified hazard on their assets using a ranking system of 1-5.

This simple research tool revealed that the women identified animals, food resources, well fed children, children going to school with clothes/shoes etc, and income generation as the most important assets within the community. Furthermore, by looking at vulnerability through an asset lens CARE was able to establish that drought, flooding and erratic rain were perceived as the greatest environmental hazards to their assets. The matrix was also able to gather information on which assets experienced the impacts of environmental hazards most severely. In this particular case, flooding was identified as the most damaging to animals, food resources and children attending school.

Source: CARE (2009).

All share several methodological characteristics which add value to understanding CC-related vulnerability. These include the following:

- Households and communities are the unit of analysis. Since CC impacts are experienced most severely at this level, and often are highly context specific, this is particularly insightful.
- Data is gathered on how climate disasters directly, or indirectly, lead to the erosion of household and community assets, including the poor's perception of this process.
- Bottom-up participatory appraisal techniques allow local focus groups to provide local people's voices. This helps to ensure that information is obtained from individuals with local knowledge.
- The CVCA and PCCAA gather household perceptions on current policies, programmes and institutions that directly or indirectly help or constrain their adaptive capacity. This includes not only the local government level, but also community level institutions, such as community leaders and churches.

The PCCAA extends the assessment of asset vulnerability in a number of ways.[8] First, the asset adaptation framework identifies CC-related vulnerability at household, community, but also the local business level. Second, it uses a range of participatory tools to explore people's perceptions

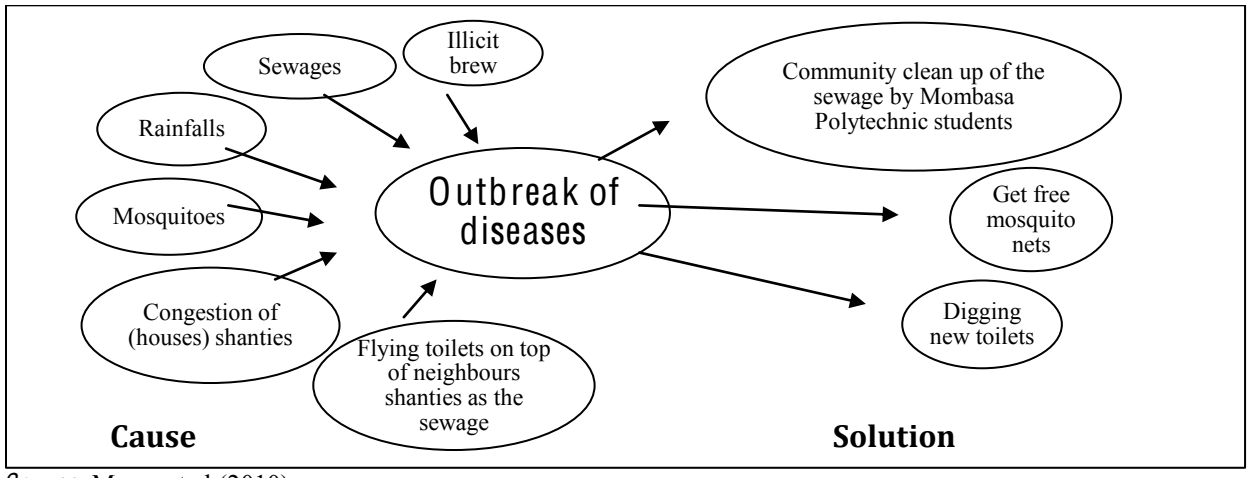
[8] The PCCAA was tested in a study commissioned by the World Bank and undertaken by GURC with institutional counterparts in Kenya and Nicaragua See Moser and Stein (2010) for a detailed description of the research methodology and Moser et al (2010) for the main results of the study.

of incremental and invidious changes in severe weather patterns – rather than focusing entirely on extreme weather disasters[9]. Third, it allowed for focus groups to identify different types of vulnerability in an open-ended manner. Data analysis then identified less obvious as well as well-known types of vulnerability. These included:

- *physical vulnerability* relating to the inadequate, or lack of provision of three types of physical infrastructure, sewerage, drainage and garbage collection, with the interrelationship presenting particular health-related hazards
- *legal vulnerability* linked to the lack of land tenure rights with implications for settlement location, lack of settlement planning and post-extreme weather infrastructure support,
- *social vulnerability* of those groups most at risk to increasing intensity of severe weather.

Finally, this study shows how causal flow diagrams drawn by focus groups can identify local perceptions not only the effects of severe weather events on assets, but also proposals for potential solutions. Figure 1, for example, illustrates perceptions of a group of the relationship between severe weather events and human capital in the form of health.

Figure 1: Perceptions of the causes of the outbreak of diseases and potential solutions in Tudor, Mombasa



Source: Moser et al (2010).

Existing climate change adaptation strategies

With few exceptions, a review of the literature shows that the majority of current operational adaptation strategies to climate change do not incorporate an asset adaptation approach. Indeed, some donor-supported climate change projects clearly linked to climate change do not sufficiently acknowledge the importance of adaptation strategies *per se*. This is well illustrated in the case of bilateral agencies such as JICA and GTZ (see Box 3).

[9] In the study (see Moser et al 2010), to ensure consistent terminology for a climatic event which would register with the international community as a disaster were referred to as *extreme weather* (in line with the common description of 'extreme weather event' for cyclones/hurricanes with associated fatalities). In contrast, the negative impacts of an extensive range of climate trends/events which would not register as a disaster with the international community were referred to as *severe weather*. This includes storms and flooding (at a local level), drought and heat stress.

Box 3: Climate change adaptation by bilateral development agencies: the cases of JICA and GTZ

The issue of adaptation to climate change is relatively new for donors. A desk study of the Japan International Cooperation Agency (JICA) and the German Association for Technical Cooperation (GTZ), two influential bilateral donor agencies that focus strongly on addressing climate change related issues, revealed that both agencies do not explicitly incorporate adaptation within their climate change policies. At the same time, both agencies support programmes which contribute to adaptation. For instance, JICA's participatory water resources management programme in Iran and its poverty reduction programme through the development of rain-fed lowland rice production in Ghana are both designed to contribute directly to sustainable development. Although not described as such, they are reducing social vulnerabilities and building adaptive capacities to climate change at the local level. Similarly, GTZ through prevention against flooding (e.g. in Thailand) and promotion of a sustainable use of natural resources (e.g. in Laos, Niger, the Dominican Republic and Haiti) programmes have introduced adaptation mechanisms.

Source: Arioka 2010.

Other climate change adaptation strategies do recognise adaptation but prioritise urban governance to build long term resilience – and again fail to incorporate a focus on asset adaptation (see Box 4). In contrast, Kim (2010) in a recent review of the role of microfinance in climate change adaptation strategies identified the potential role that micro insurance can play in preventing asset erosion. At the outset, the majority of approaches concentrated on 'life and health micro insurance' (Churchill 2007; GTZ 2007) and, more recently they have shifted their focus on climate change (Hammil et al 2008). Yet, disaster rather than slow incremental change is the priority. Even the micro insurance products developed by the Self Employed Women Association (SEWA) in Gujarat, India are strongly linked to the impacts that disasters associated with extreme weather events have over the vulnerabilities of the urban poor (Kim 2010).

Box 4: Climate resilient urban governance assessment framework

A recent study of 10 South and Southeast Asian cities (Bangkok, Chennai, Chittagong, Cochin, Dalian, Da Nang, Hangzhou, Ho Chi Minh, Ningbo and Surat) showed that the existence, or lack, of good governance practices were key factors in ensuring strategies aimed to build long term resilience to climate change. These practices included:

- *Decentralisation and autonomy*: to avoid cyclical political stalemates and to generate the conditions in which central, state and city ruling parties could work together or address conflicts and delays in the implementation of climate change adaptation strategies;
- *Accountability and transparency*: the more open local governments are to their citizens in terms of financial management and information, the more articulated 'climate sensitive' sectors such as waste, water and disaster management can become;
- *Responsiveness and flexibility:* cities with more flexible agencies and management systems can respond more suitably to emergencies and climate change related disasters, and. mainstreaming climate risk assessments among different population groups helps raise awareness on climate change;
- *Participation and inclusion:* integration of the poor in decision making and policy processes is crucial in building long term resilience and it requires balancing citizen-led processes with timely and efficient implementation;
- *Experience and support*: cities with previous experience of developing integrated, people-centred early warning systems are well placed to make progress toward climate change resilience. External donor agencies and the availability of project financing for climate change resilience programmes can also help to engage city authorities.

Source: Tanner, Mitchell, Polac and Guenther (2009).

Opportunities for the incorporation of a climate change asset adaptation framework to build long term resilience

Although the climate change asset adaptation (CCAA) framework as yet has had little influence over adaptation policies and programmes, it can be an important strategy to open new opportunities for the urban poor. The PCCAA in Nicaragua and Kenya, for instance, highlighted the following opportunities:

- First, it showed what poor households, small businesses and communities are already doing to cope with such CC impacts experienced as increasingly variable and capricious weather patterns including invidious and almost invisible changes;
- Second, it identified which formal and informal institutions inside and outside the community are developing pro-poor urban CC adaptation actions, particularly relating to long term resilience (see Box 5).

Box 5 Identifying asset adaptation strategies in Estelí (Nicaragua) and Mombasa (Kenya):

The study aimed to better understand what poor households, small businesses and communities are doing to cope with CC impacts, as well as identifying how policy and institutional systems can build on local realities to develop pro-poor urban climate change adaptation actions. Despite the absence of detailed 'downscaled' models of future CC impacts, the PCCAA was able to gather several major findings concerning asset-based adaptation strategies being implemented within these communities which can be used to inform CC policy:

- The most significant asset of the urban poor (as listed by themselves) was housing;
- There was a variety of responses to increasingly severe weather patterns at household, small business and community level;
- Three types of asset-based adaptation strategies were identified: strategies to build long-term resilience, asset damage limitation and protection during severe weather events, and asset rebuilding after such weather;
- Households with more secure tenure status were more likely to invest in asset-based climate change adaptation strategies.

Source: Moser et al 2010.

- Finally, it identified and differentiated between asset adaptation strategies being initiated at the household, community and small businesses level and those taking place before, during and after a severe weather event at different units of analysis (see Table 3).

Table 3 Asset adaptation strategies, by unit of analysis, during flooding in four communities of Mombasa

Unit of analysis	Strategies adopted		
	Before	During	After
Household/ Individual	• Repair roof • Build strong foundations • Dig trenches around the houses • Clear drainage	• Seal leaking areas • Vacate flooding houses • Open up water passage routes	• Block water passage routes • Repair houses
Small business	• Placed sandbags to prevent water entering premises • Moved business assets to safer areas	• Motorbike mechanics checked fuel tanks were correctly sealed	• Fishmongers cease to sell fish and divested in other forms of business • Motorbike mechanics repaired bikes once floods ended
Community	• Built strong walls in the different buildings at schools	• Took school children to safer places as a form of rescue • Dig small water passages fill sacks with sand and arrange them to break water flow • Fill sand and stones on the paths	• Renovation of school buildings and assets affected • Filling sand bags and putting them in paths • Dig drainage tunnels • Spread sand and stones to the affected areas • Seek assistance from NGOs

Source: Adapted from Moser et al (2010).

A climate change asset adaptation framework (if both PCCAA and the Rapid Risk Institutional Appraisal RRIA[10] are used) is also highly effective for informing policies and programmatic interventions:

- First, it identifies which of the 'traditional' physical infrastructure concerns, such as housing, water, sanitation, roads and drainage (the majority of which are part the responsibilities of local governments) are most affected by climate change.
- Second, it allows donors, governments and NGOs to better understand the crucial roles that households, small businesses, and communities are already playing in their adaptation processes, independent of government interventions or NGO support.

The outcome is a shift from a problem-oriented to a solution-oriented approach based on the adaptive capacity and the asset portfolio that households, small business and communities command and control. This is crucial as it ensures that the social consequences of CC are both recognised and receive institutional support (Moser and Satterthwaite, 2008). Table 4 illustrates how a climate change asset adaptation framework can be used to inform policy makers, local governments and microfinance institutions about the different mechanisms that households, small business and communities are already doing, and more importantly, the type of programmes and actions that could be done to help build long term resilience.

[10] The RRIA was used in Mombasa and Estelí and provided a 'top down' review of the policy domain, in terms of the institutions tasked to deal with CC, the relevant national, regional, and municipal level policies, regulations and mandates relating to CC, as well as associated programmes – and budgetary allocations. The PCCAA and the RRIA also used a process of validation on the level of commitment by different social actors.

Table 4 Possible application of a climate change asset adaptation framework

Level	Individual households	Small businesses	Communities
What are they doing	Small measures to protect roofs, walls, floors, furniture and household goods, plots of land and basic infrastructure. Family networks in-kind and cash transfers and labour assistance during different climatic scenarios	Adapting stocks and goods they store and sell, and physical structures Independent masons modifying traditional constructing methods and techniques, and when building takes place	Protecting levies, pathways, cleaning ravines and preparedness in case of major flooding. Transfer of information on what external institutions are doing
What local governments and public institutions can do	Improve secure land tenure, and basic infrastructure works that individual households cannot afford.	Provide access to information on supportive governmental institutions in case of emergencies, and diversification of markets Contacts with central government to ensure policies that protect small businesses	Improve tenure, and basic infrastructure and services. Action planning with communities based on their asset portfolio.
What MFIs and NGOs can do	Credit lines and technical support for housing improvements taking into account different CC and severe weather scenarios: i.e. (winds, intense rains, possible flooding, heat etc). Micro insurance	Micro credits and micro insurance taking into consideration small invidious changes and not only disasters by extreme weather events	Loans to community groups with solidarity guarantees to improve their infrastructure and basic services

Source: Adapted from Moser et al (2010), Tanner et al 2010 and Boram (2010).

Conclusions

This briefing paper highlights the importance of shifting from an asset accumulation to an asset adaptation framework to better understand the opportunities that the urban poor have to build long term resilience to the impacts of climate change. The paper shows the analytical importance of having an asset vulnerability framework to understand the sources of asset vulnerability of poor households, small business and communities. It also illustrates the significance of an asset adaptation operational framework to classify the asset adaptation strategies that poor households, small business and communities are developing, as well as the formal and informal institutional sources of reliance that enable them to protect themselves, or to recover from, the negative effects of slow invidious changes of weather associated with climate change. The outcome of this climate change asset adaptation framework is a shift from a problem-oriented to a solution-oriented approach based on the adaptive capacity and the asset portfolio that households, small business and communities command and control. This is crucial as it ensures that the social consequences of CC as well as the demands of these urban poor groups are both recognised and receive the institutional and financial support from donors, national and local governments as well as NGOs and microfinance institutions.

Annexes

Annex 1: Summary of key differences between CC adaptation and DRR

Differences		Signs of Convergence
DRR	CC Adaptation	
Relevant to all hazard types	Relevant to all climate-related hazards	n/a
Origin and culture in humanitarian assistance following a disaster event	Origin and culture in scientific theory	CC adaptation specialists now being recruited from engineering, water and sanitation, agriculture, health and DRR sectors
Most concerned with the present – i.e. addressing existing risks	Most concerned with the future – i.e. addressing uncertainty/new risks	DRR increasingly forward-looking Existing climate variability is an entry point for CC adaptation
Historical perspective	Future perspective	As above
Traditional/indigenous knowledge at community level is basis for resilience	Traditional/indigenous knowledge at community level may be insufficient for resilience against types and scales of risk yet to be experienced	Examples where integration of scientific knowledge and traditional knowledge for DRR provides learning opportunities
Structural measures designed for safety levels modeled on current and historical evidence	Structural measures designed for safety levels modeled on current and historical evidence and predicted changes	DRR increasingly forward-looking
Traditional focus on vulnerability reduction	Traditional focus on physical exposure	n/a
Community-based process stemming from experience	Community-based process stemming from policy agenda	n/a
Practical application at local level	Theoretical application at local level	CC adaptation gaining experience through practical local application
Full range of established and developing tools	Limited range of tools under development	None, except increasing recognition that more adaptation tools are needed
Incremental development	New and emerging agenda	n/a
Political and widespread recognition often quite weak	Political and widespread recognition increasingly strong	None, except that climate-related disaster events are now more likely to be analysed and debated with reference to CC
Funding streams ad hoc and insufficient	Funding streams sizeable and increasing	DRR community engaging in CC adaptation funding mechanisms

Source: Tearfund 2008, 10.

Annex 2: Definition of most important capital assets

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, such as savings and supplies of credit.

Human Capital: investments in education, health and the nutrition of individuals. Labour is linked to investments in human capital, health status determines people's capacity to work, and skills 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 rules and regulations governing formalised institutions in the marketplace, the 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 2009.

Annex 3: Approaches to Vulnerability Assessments

Organization	Program/Initiative	Approach	Where has it been applied?
Action Aid International	Cities and CC *CC, Urban Flooding and the Rights of the Urban Poor in Africa (2006)*	Participatory vulnerability assessment Interviews with communities and stakeholders at the city level Aim to understand the impact of flooding and current adaptation strategies	Accra, Freetown, Kampala, Lagos, Maputo, Nairobi
ICLEI – Local Government for Sustainability	*Preparing for CC: A Guidebook for Local, Regional and State Governments (2007)*	Three step vulnerability assessment i. Sensitivity analysis in the planning area based on observed and projected climate data, available resources and an assessment of the impact threshold of the urban system ii. Evaluation of the city's adaptive capacity including legal and regulatory, economic, governance and biophysical factors; and iii. Combning findings from i. and ii. To prioritise vulnerable locations or communities and suggest adaptation measures	Disseminated through ICLEI's network, which includes over 1,100 cities, towns and counties mostly in Europe, North America, Australia and Oceania
Asian Cities CC Resilience Network (ACCCRN)	Asian Cities CC Resilience Network (ACCCRN) *(sponsored by the Rockefeller Foundation)*	Mobilize key stakeholders in each city (CBOs, local governments, etc. to: i. identify vulnerable locations and groups; ii. Develop locally-appropriate resilience plans; iii. Share learning within the network of Asian cities	Mid-size Asian cities. The first pilots are: Surat, Indore, Gorakphur (India); Da Nang, Quy Nhon, Can tho (Vietnam); Chiang Rai, Hat Yai (Thailand); Bandar Lampung, Semerang (Indonesia)
World Bank, East Asia Region	Climate Resilient Cities *Climate resilient Cities: 2008 Primer*	Combines a participatory self-assessment by local authorities with an external spatial analysis that identifies spots of risk and subsequently – the drawing of detailed maps of the 'hot spot' areas. Looks at existing city policies to identify gaps in policy and institutional capacity Creates Local Resilience Action Plans including a list of priority adaptation measures, actors who can implement them, expected cost and financing opportunities, as well as an expected time frame for putting them in practice	Can Tho, Dong Hoi, Hanoi (Vietnam)
World Bank, Environment Department Asian Development Bank JICA	Coastal Cities and Adaptation to CC	Assess potential impacts of flooding for the year 2050: i. downscale climate impacts to the city/river basin level; ii. map hydrology of urban watershed in GIS maps; iii. estimate damage costs; conduct cost benefit analysis of adaptation options	Manila, Ho Chi Minh city, Bangkok, Kolkata
World Bank, Middle East and North Africa Region	CC Adaptation and Disaster Preparedness in Coastal Cities of North Africa	Assess vulnerability for the year 2030 in five areas: i. sea level rise, coastal erosion and submersion; ii. urban flooding; iii. water resource availability; iv. increase in room temperature; v. earthquakes and tsunamis. Develop action plans to improve cities' adaptation	Alexandria, Casablanca, Tunis
World Bank / University of Manchester GURC	Asset-based Climate Change Adaptation Framework	A participatory research methodology with three components: (i) Participatory Climate Change Adaptation Appraisal; (ii) Rapid Risk and Institutional Appraisal; (iii) Consultation and validation of results	Estelí (Nicaragua), Mombasa (Kenya)

Source: Moser et al (2010).

References

Arioka, T. 2010. *Mainstreaming Adaptation to Climate Change into Official Development Assistance: A Comparative Assessment of JICA's and GTZ's Policies and Practice in the Agricultural Sector.* Draft MA Dissertation. Manchester: University of Manchester.

Bebbington, A. 1999. 'Capitals and Capabilities: A Framework for Analyzing Peasant Viability, Rural Livelihoods and Poverty.' *World Development* 27, no. 12: 2021-44.

Burroughs, W.J. 2007. *Climate Change: A Multidisciplinary Approach (2nd ed),* Cambridge: Cambridge University Press.

CARE, Christian Action Research and Education. 2009. *Climate vulnerability and Capacity Analysis Handbook*, Accessed on September 29, 2010: http://www.careclimatechange.org/files/adaptation/CARE_CVCAHandbook.pdf.

Carter, M.R. and C.B. Barrett. 2006. 'The Economics of Poverty Traps and Persistent Poverty: An Asset-Based Approach'. *Journal of Development Studies* 42, no. 2: 178-99.

Chambers, R. 1992. 'Rural appraisal: rapid, relaxed and participatory'. *IDS Discussion Paper 311*. Accessed on September 29, 2010: http://community.eldis.org/.59b4ab37/Dp311.pdf.

Churchill, C. 2006. 'What is insurance for the poor?'. In *Protecting the Poor: Microinsurance Compendium*, edited by C. Churchill, pp. 12-24. Geneva: International Labour Office with Munich Re Foundation.

de Waal A. 1997. *Famine Crimes: Politics and the Disaster Relief Industry in Africa.* Oxford, Bloomington: James Currey/Indiana University Press.

FAO, Food and Agriculture Organisation. 2008. *Disaster Risk Management Systems Analysis: A guide book.* Rome: United Nations, Climate Change and Bioenergy Division.

Ford Foundation. 2004. *Building Assets to Reduce Poverty and Injustice*. New York: Ford Foundation.

GTZ, Deutsche Gesellschaft für technische Zusammenarbeit. 2007. *Needs Assessment and Feasibility Study on Disaster Microinsurance: Empirical Findings from Four Provinces in Indonesia.* Eschborn: Deutsche Gesellschaft für technische Zusammenarbeit.

Hellmuth, E., A. Moorhead, M. Thomson and J. Williams. 2007. *Climate Risk Management in Africa: Learning from Practice*. New York: The International Research Institute for Climate and Society.

Hewitt K. 1995. 'Sustainable disasters? Perspectives and powers in the discourse of calamity'. In *Power of Development,* edited by J. Crush, pp. 115-128. Routledge: London.

IPCC, Intergovernmental Panel on Climate Change. 2007. 'Summary for Policymakers'. In *Climate Change 2007: The Physical Science Basis. Contribution of Working Group I to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change*, edited by S. Solomon, D. Qin, M. Manning, Z. Chen, M. Marquis, K.B. Averyt, M. Tignor and H.L. Miller. Cambridge: Cambridge University Press.

IPCC, Intergovernmental Panel on Climate Change. 2010. *Intergovernmental Panel on Climate Change History*, available at http://www.ipcc.ch/organization/organization_history.htm.

Kim, B. 2010 *Using Microinsurance to adapt the urban poor to climate change: A case study of Microinsurance in Gujarat, India.* Draft MA Dissertation. Manchester: University of Manchester.

Klein, R.J.T., S. Huq, F. Denton, T.E. Downing, R.G. Richels, J.B. Robinson, and F.L. Toth. 2007. 'Inter-relationships between adaptation and mitigation'. In *Climate Change 2007: Impacts, Adaptation and Vulnerability.*

Contribution of Working Group II to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change, edited by M.L. Parry, O.F. Canziani, J.P. Palutikof, P.J. van der Linden and C.E. Hanson, pp. 745-777. Cambridge: Cambridge University Press.

McCarthy, J.J., O.F. Canziani, N.A. Leary, D.J. Dokken, K.S. White (eds.), IPCC. 2001. *Climate Change 2001: Impacts, Adaptation and Vulnerability*. Contribution of Working Group II to the Third Assessment Report of the IPCC. Cambridge: Cambridge University Press.

McCranahan, G., Balk, D. and Anderson, B. 2007. 'The rising tide: assessing the risks of climate change and human settlements in low-elevation coastal zones'. *Environment and Urbanization* 19, no. 1: 11-37.

Mitchell, T. and T. Tanner. 2008. 'Entrenchment or Enhancement: Could Climate Change Adaptation Help to Reduce Chronic Poverty?'. *IDS Bulletin* 39, no. 4: 6 – 15.

Moser, C.O.N. 1998. 'The Asset Vulnerability Framework: Reassessing Urban Poverty Reduction Strategies', *World Development* 26, no 1: 1-19.

Moser, C.O.N., ed. 2007. *Reducing Global Poverty: The Case of Asset Accumulation*. Washington: Brookings Press.

Moser, C.O.N. and Satterthwaite, D. 2008. 'Towards pro-poor adaptation to climate change in the urban centers of low and middle-income countries'. International Institute for Environment and Development: Human Settlements Discussion Paper Series, Theme: Climate Change and Cities – 3.

Moser, C.O.N. 2009. *Ordinary Families, Extraordinary Lives: Assets and Poverty Reduction in Guayaquil, 1978-2004*. Washington: Brookings Press.

Moser, C.O.N. and A. Stein. 2010. 'Implementing Urban Participatory Climate change Adaptation Appraisals: A Methodological Guideline'. Global Urban Research Centre Working Paper Series, Global Urban Research Centre, Manchester: University of Manchester.

Moser, C.O.N., A. Norton, A. Stein and S. Georgieva. 2010. *Pro-Poor Adaptation to Climate Change in Urban Centres: Case Study of Vulnerability and Resilience in Kenya and Nicaragua*. Washington: The World Bank.

Prowse, M., and Scott, L. 2008. 'Assets and Adaptation: An Emerging Debate'. *IDS Bulletin* 39, no 4.

Reid, H., and Huq, S. 2007. *How we are set to cope with the impacts*. IIED Briefing, London: International Institute of Environment and Development.

Sen, A. 1997. 'Editorial: Human Capital and Human Capability'. *World Development* 25, no. 12: 1959-1961.

Sherraden, M.W. 1991. *Assets and the Poor: A New American Welfare Policy*. Armonk, N.Y.: M.E. Sharpe.

Sperling, F. and F. Szekely. 2005. *Disaster Risk Management in a Changing Climate. Discussion Paper prepared for the World Conference on Disaster Reduction on behalf of the Vulnerability and Adaptation Resource Group (VARG).* Reprint with Addendum on Conference outcomes. Washington, D.C.

Swart, R. J., and F. Raes. 2007. 'Making integration of adaptation and mitigation work: mainstreaming into sustainable development policies?'. *Climate Policy* 7, no 4: 288–303.

Tanner, T.M., and D. Conway. 2006. *Assessing and Addressing Adaptation: Opportunities and Risks from Climate Change and Disasters.* Institute of Development Studies, Brighton: University of Sussex.

Tanner, T.M., Mitchell, T., Polack, E., and B. Guenther. 2009. Urban Governance for Adaptation: Assessing Climate Change Resilience in Ten Asian Cities. Institute of Development Studies, IDS, Working Paper Volume 2009, Number 315, Brighton: University of Sussex.

Tearfund. 2008. *Linking Climate Change Adaptation and Disaster Risk Reduction*. London: Tearfund.

The Guardian. 2010. How has 'Climategate' affected the battle against climate change? In http://www.guardian.co.uk/environment/cif-green/2010/jul/08/hacked-climate-science-emails-climate-change . Accessed the 1st October 2010.

Thomalla, F. et al. 2006. 'Reducing hazard vulnerability: towards a common approach between disaster risk reduction and climate adaptation'. *Disasters* 30, no 1: 39-48.

UN, United Nations. 1998. '*Kyoto Protocol to the United Nations Framework Convention on Climate Change'*, Accessed on September 29, 2010: http://unfccc.int/resource/docs/convkp/kpeng.pdf.

UNFCC, United Nations Framework Convention on Climate Change. 2010. *Report of the Conference of the Parties on its fifteenth session, held in Copenhagen from 7 to 19 December 2009.* Accessed on October 3, 2010: http://unfccc.int/resource/docs/2009/cop15/eng/11.pdf.

van Aalst, M.K., T. Cannon and I. Burton. 2006. 'Community level adaptation to climate change: The potential role of participatory community risk assessment'. *Global Environmental Change* 18, no 1: 165 – 179.

Wamsler, C. 2007. *Managing urban disaster risk: analysis and adaptation frameworks for integrated settlement development programming for the urban poor*. PhD thesis, December 2007, Lund: Lund University.