Complementing Institutional with Localised Strategies for Climate Change Adaptation: A South–North Comparison

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Complementing institutional with localised strategies for climate change adaptation: a South–North comparison

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Abstract: Climate change and disasters pose a serious risk to sustainable development. In the South, local coping strategies are an important element of adaptation to climate and disaster risk. Such strategies have emerged because of the limited assistance provided by urban actors and associated social security and governance systems. In the North, in contrast, local coping strategies are comparatively poorly developed. However, the extent of the changing climatic conditions is also reducing the capacity of Northern institutions to deal with climatic extremes and variability, which emphasises the need for more local-level engagement in the North. This paper analyses the differences in local and institutional responses to climate change and disasters in a Southern and a Northern city (San Salvador, El Salvador, and Manchester, United Kingdom, respectively), and highlights how the lessons learned might be translated into an improved distributed governance system; that is, an 'integrated engagement model', where local and institutionalised responses support rather than hinder each other, as is currently the case.

Keywords: adaptation, adaptive capacity, climate change, coping strategies, distributed governance, urban planning

INTRODUCTION

Climate change and disasters pose a serious challenge to sustainable urban development, placing many cities at risk—and not just cities in the developing world. During the past 30 years, there has been a quadrupling of so-called natural disasters worldwide,[1] resulting in escalating human and economic losses (UNISDR, 2006). The threats posed by climate change are even more worrying, as the urban areas already at risk from disasters are those most likely to be affected by climate change in the future (IPCC, 2007a, 2007b; Moser and Satterthwaite, 2008).

A vital component of any strategy that aims to help those most at-risk optimise their adaptation to climate change is knowledge transfer (IPCC, 2000). The terms 'knowledge transfer', 'technology transfer' and 'leapfrogging', when used with reference to sustainable development, often are considered to mean a transfer from the Northern to the Southern hemisphere.[2] However, developed nations also can learn valuable lessons from developing world technologies, mechanisms and ideas (UNDP, 2004), which generally use fewer resources and have a much lower environmental impact. In fact, climate change and increasing urbanisation make Northern institutions and associated social security and governance systems increasingly ineffective in dealing with extreme weather events, such as drought, fire, flooding and windstorms (Standing, 2008). Consequently, and in view of the growing need to identify non-carbon-intensive adaptation measures, a South–North knowledge transfer can provide valuable input to adaptation strategies in the North.

Against this background, this paper's objective is to analyse the differences in both local and institutional responses to disasters and climate change in Southern and Northern cities and to discuss how the lessons learned from these might be translated into an 'integrated engagement model for adaptation' within which local and institutionalised responses support rather than hinder each other. In the following section, the linkages between cities, climate change and disasters are presented: these highlight the differences in the level of risk faced by Northern and Southern cities (section 2). The ways in which local people adapt to these risks are then examined (section 3), as are the institutional responses that support or hinder local efforts (section 4). Finally, the lessons learned are presented using a South–North/North–South comparison of the differences, gaps and similarities between the local household-level reality and institutional interventions (section 5).

This paper is based on a comparative analysis of two innovative research studies carried out between 2005 and 2008 (Wamsler, 2009; DEFRA, 2008) which evaluate the effectiveness of urban development planning in climate and disaster risk management through in-depth case studies. These

[1] Note that the term disaster (and thus disaster risk management) in this paper includes everyday small- and large-scale disasters, and thus relates to changing climate conditions in terms of both climatic extremes and variability.

[2] The use of the terms/labels 'North' and 'South' are employed in this paper as they are broadly accepted in both the disaster literature and in the literature dealing with different kinds of knowledge transfer.

case studies represent cutting-edge research in the sense that they not only assess the capacities and efforts of organisations that service communities at risk but also compare them with local capacities, endeavours and needs. The first case study is an analysis of four slum communities in San Salvador, El Salvador, in Central America, where flooding and associated landslides are the main hazards to life and livelihoods, followed by earthquakes and windstorms. Interviews were conducted with relevant stakeholders from 40 different organisations at the national and municipal level (notably civil society bodies, environmental agencies, insurance firms, local authorities and utility companies, as well as other entities involved in disaster risk management). Interviews were held with 62 households (comprising 331 people). The second case study focuses on storm-induced pluvial flooding in Heywood, Manchester, United Kingdom, in August 2004 and July 2006—events that accounted for around 40 per cent of flood damage in England (DEFRA/EA, 2007). There are likely to be more events of this kind in the future because of climate change (DEFRA/EA, 2007). Two of the six areas affected in the Heywood area had already experienced minor but regular flooding prior to 2004. Again, interviews were conducted with approximately 40 staff members from all relevant organisations and with 44 householders.

After the analyses at the institutional and local level, a series of workshops was convened at which the various stakeholders were asked to comment on the preliminary research outcomes; the aim of this was to achieve a cross-fertilisation of ideas and knowledge from different sources. The preliminary outcomes discussed included the gaps identified between local and institutional responses and the strategies and measures that had been developed for improved adaptation. This was followed up via desk work and minor field studies in 2009 to assess the differences between the two case studies.

CLIMATE AND DISASTER RISK IN CITIES

This section explores the interrelationships between cities, climate change and disasters, comparing the level of climate and disaster risk[3] of Northern and Southern cities.

Cities, climate change and disasters

Climate change and disasters are closely linked. Although not all disasters are directly attributable to climate change and increased greenhouse-gas emissions, climate-related disasters represent on average two-thirds of all disasters (UNISDR, 2002), and account for almost all of the growth in the number of natural disasters since 1950 (Satterthwaite et al., 2007). However, it is not only climate change that influences disasters. Disasters themselves influence climate change in that they can increase or decrease greenhouse-gas emissions. Examples are (a) wild fires and volcanic eruptions that release

[3] Note that the term climate risk refers to risk that is related to weather-born hazards, whereas the term disaster risk also refers to risk that is related to hazards that are not weather-related.

carbon emissions that are stored in biomass, (b) volcanic dust and associated pollution, which results in a reduction of direct solar radiation and thus global cooling, and (c) the destruction of forests or other land use changes, decreasing the availability of carbon sinks.

Both climate- and non-climate-related disasters affect cities negatively. Historically, urban centres have been—and frequently still are—perceived as places of refuge from disasters and as buffers against environmental change (Pelling, 2007). Today, however, they are better described as hotspots of disasters and risk (Pelling, 2007), as disasters not only lead to disruptions in city functions but also intensify urban hazards, generate new hazards, increase urban inequalities and poverty, and reduce development capital investments in the built environment (Bosher, 2008; Wamsler, 2009). Related examples are increased heat stress, affecting human health and infrastructure, and the impact on supply chains, disrupting food and water access in cities, especially for the poor. Climate change also has indirect impacts on cities: millions of environmental refugees and urban migrants are expected to be created by disasters such as sea-level rise, desertification and catastrophic weather-induced flooding or landslides (Zetter, Boano and Morris, 2008; Tacoli, 2009). As Janos Bogardi, the Director of the Institute for Environment and Human Security at the United Nations University, Bonn, states: 'There are well-founded fears that the number of people fleeing untenable environmental conditions may grow exponentially as the world experiences the effects of climate change' (UNU-EHS, 2005). Other indirect impacts of climate change are thawing of permafrost due to mounting temperatures and rising water tables due to sea-level rise, both of which cause the ground to shrink, thus damaging the foundations of the built environment. This results in damage to highways, houses and railway tracks, as well as landslides, which can cause further destruction. Finally, disasters reinforce other climate change impacts, including increased vector-related diseases, reduced food security, and inadequate water and energy supply, thereby negatively affecting sustainable urban growth.

The concept of risk

In general terms, risk can be understood as the probability of adverse effects, whereas risk management is seen as the reduction of that probability by minimisation or prevention of those adverse effects. Today, climate and disaster risk is commonly defined as: 'The probability of harmful consequences, or expected losses (deaths, injuries, property, livelihoods, economic activity disrupted or environment damaged) resulting from interactions between natural or human induced hazards and vulnerable conditions' (UNISDR, n.d.). Accordingly, climate and disaster risk (R) usually is equated both to hazard (H) and to vulnerability (V):

$$R=H*V \quad (1)$$

The growing interest of some researchers and practitioners in responding to the negativity of the term 'vulnerability', and linking risk management with people's positive capacities and livelihood assets (Davis, Haghebaert and Peppiatt, 2004), is reflected in the following extended risk equation:

$$R=H*V*LC \qquad (2)^4$$

where *LC* represents a lack of capacity to (a) reduce or avoid hazards and (b) minimise existing vulnerability. Importantly, vulnerability refers here not only to a low level of disaster resistance, but also to a lack of existing mechanisms and structures to respond to and recover from hazards and disasters (Wamsler, 2011).

Note that the equation is not intended to be a mathematical formula but rather representative of a qualitative notion or definition. In fact, this definition of risk illustrates clearly that even a small rise in one of the three risk components has a multiplicative effect on the others and therefore can produce a major increase in risk. In other words, it shows that even if the hazard is small, the risk can be very high. This high risk can be caused by (a) the high level of environmental, institutional, physical and/or socioeconomic vulnerability of the area affected, and/or (b) the poor mechanisms and structures in place for response and recovery by individual residents, households and communities, or the institutions serving them (cf. Wamsler, 2009). Moreover, the risk equation indicates that even if an area is highly exposed to hazards, the risk can be very small if it is 'offset' by a low degree of the area's vulnerability and a high degree of capacity to respond and recover.

In this context, it is important to highlight that, in itself, climate change is not a hazard but a process of change that affects hazards, location-specific vulnerabilities and existing mechanisms and structures to respond and recover. Adaptation to this process of change involves efforts to limit the harm it may cause. Hence, by definition, risk must be tackled by reducing hazards, minimising location-specific vulnerabilities and improving existing mechanisms and structures to respond and recover.

Differences in risk patterns of Northern and Southern cities

Based on the understanding of climate and disaster risk described in the previous section, the risk of two distinct geographical areas can be compared by examining (a) each area's exposure to climate- and non-climate-related hazards, (b) the location-specific vulnerabilities to these hazards, and (c) the existing local and institutional capacity that can assist in responding to and recovering from resultant hazards or disasters.

If one compares cities in the North and South on this basis, it can be argued, first, that more dwellings in the South are exposed to multiple and potentially harmful hazards (UNDP, 2004). This is because of

[4] This equation is mathematically identical to the equation R=H*V/C presented by the United Nations International Strategy for Disaster Reduction (UNISDR, 2002), but it does not mix factors/variables with positive and negative connotations.

their geographical location and the high number of poor people living there who are often forced to live on marginalised land prone to hazards, such as riverbanks, steep slopes and unstable soil. Second, vulnerabilities also are comparatively high because most Southern residents have, for instance, substandard housing and inadequate social and technical infrastructure (Bicknel, Dodman and Satterthwaite, 2009): leaking sewage pipes from better-off settlements passing through poorer areas, a lack of water and waste management services, limited access to information, and overcrowding. In addition, the vulnerabilities reflect the shortcomings of local governments in providing resilient infrastructure and services as well as their unwillingness to work with low-income groups, especially those residing in informal settlements, which, as mentioned above, usually house those most at risk from climate hazards (Moser and Satterthwaite, 2008). Third, to make matters worse, Southern cities have a comparatively low level of aggregated institutional capacity to respond to and recover from hazards and disasters. The combination of all three risk factors results in the prevalent (although little theorised) understanding that people living in the South frequently face a higher degree of risk than those in the North.

This paper is based on the hypothesis, later confirmed, that increasing climate change and urbanisation are reducing more and more the 'historical' difference that is said to exist between Southern and Northern cities in terms of the climate and disaster risk they confront. In other words, the comparative analysis of the two case studies presented in this paper indicates that there is increasing convergence between the risk situation being faced in the South and the North. Related analyses are presented in the following sections.

LOCAL-LEVEL ADAPTATION RESPONSES

Key literature on risk management and adaptation (such as Twigg, 2004; UNISDR, 2004; Satterthwaite, 2008) commonly makes use of the terms 'local coping capacity', 'local coping strategies' and 'local adaptive capacity'—typically, however, without defining them. They are employed here as synonyms and as an umbrella term for all types of local-level responses for adaptation—that is, the responses and associated capacities of individuals, households and communities at risk that aim to reduce and manage existing climate and disaster risk.[5] On the basis of the understanding of risk described in section one, this includes the local responses and capacities to (a) reduce the intensity and/or frequency of hazards, (b) decrease associated vulnerability, and (c) respond to and recover from hazards.

[5] The Intergovernmental Panel on Climate Change (IPCC, 2007b, p. 21) provides the following definition of 'adaptive capacity', not specifically 'local adaptive capacity': 'adaptive capacity is the ability of a system to adjust to climate change (including climate variability and extremes) to moderate potential damages, to take advantage of opportunities, or to cope with the consequences'.

The Southern context—the case of El Salvador[6]

'We are always trying to improve, little by little, step by step, in order to become more secure'. This statement by a slum dweller in San Salvador illustrates the constant efforts to cope with disasters and disaster risk in poor communities. In fact, the first case study of four slums in San Salvador identified more than 100 coping strategies employed by the urban poor to deal with risk. An analysis of these strategies, which highlights the key features and the approaches most commonly used by affected populations, is presented below.

Coping capacities to reduce hazards—prevention

Examples of coping strategies that seek to reduce (or avoid) potential hazards are soil stabilisation to prevent the landslides that often are triggered by floods and measures to provide protection from river flooding. All of these initiatives are carried out mainly on an individual basis and include the building of retaining walls or embankments out of old car tires, stones, bricks or nylon bags filled with soil and cement. Planting is used to stabilise the soil and, in some instances, to create windbreaks.

Coping capacities to reduce vulnerability—mitigation

Most of the local adaptation responses identified aim to reduce social, economic, organisational and physical vulnerability. Examples are improvements to homes and their surroundings, such as the use of guttering or plastic sheeting to prevent the ingress of rain and waste water and increasing roof pitch to improve run-off. Other mitigation measures include the removal of waste from slopes to reduce flooding caused by blocked water gutters, as well as the removal of blockages from rivers and open water channels. People also take jobs outside of their own settlement so that they are less affected by local disasters. Other common strategies for reducing vulnerability are economic diversification by individuals and households, and members of the same household taking low-risk jobs or jobs with differing risk profiles. If one family member temporarily becomes jobless because, for instance, the local *tortillería* (corn mill) is destroyed by a disaster, income from other sources can absorb the losses and help to bridge the income gap. Increased household income for vulnerability reduction sometimes also comes from family members who have migrated to the United States. More than one million Salvadorans were resident in the US in 2004, and family remittances have become a major income source for El Salvador since the 1990s (SELA, 2005).

[6] This section is based on Wamsler (2007, 2009) and follow-up research conducted during 2009. Note that usage of the terms 'prevention', 'mitigation', 'preparedness for recovery' and 'preparedness for recovery in this section is related to the risk equation presented in section two. 'Prevention' refers to the reduction or avoidance of the risk factor H. The other measures refer to the reduction of the risk factor V: mitigation refers to the reduction of location-specific vulnerability and preparedness with regard to the enhancement of mechanisms and structures for response and recovery. Note that 'preparedness for recovery' includes 'risk financing' and 'stand-by for recovery' measures (Wamsler, 2009, 2011).

The measures described are based mainly on individual adaptive capacity. However, there are also measures that are implemented in cooperation with neighbours, with the whole community, and sometimes with the local or national government, such as the organisation of 'community cleaning days' and the creation of local committees for risk reduction.

Coping capacities to respond to hazards/disasters—preparedness for response

A common adaptation measure utilised by slum dwellers to improve their response capacity in the event of a hazard or disaster is the establishment of a local information system combined with mutual help. Examples include community-organised monitoring of the level of rivers and rainfall, guarding evacuees' empty houses, and evacuating the children of people living in high-risk areas to families in more secure areas if disasters are forecast. More individually-based adaptive capacity includes families temporarily moving to the highest rooms in their home if floods are forecast.

Coping capacities to recovery from hazards/disasters—risk financing

The term 'risk financing' includes local-level responses, that is, transferring the risk of individuals, households or communities to other parties or sharing it with them. This type of adaptive capacity aims to help people recover (better) from hazard or disaster impacts by establishing a 'security system' that assists them with obtaining 'ready money' following a hazard or disaster. Related measures thus form part of 'preparedness for recovery'.

'Risk financing' includes, for instance, arrangements to allow access to informal and formal credit mechanisms, donations, savings, additional income, and the sale of assets—immediately, if need be. A concrete example of the latter is the acquisition and maintenance of physical assets, such as construction materials, which can be sold easily if a household has to meet recovery expenses. To alleviate financial distress, one of the slum dwellers interviewed had sold seven roofing sheets of corrugated iron and then temporarily re-roofed his home with an old car body. He had consciously not nailed down the corrugated iron to his own roof so that he could resell it at a higher price. Further important risk financing strategies reported by slum dwellers were saving money 'under the mattress' and trying to get their properties legally recognised. The latter is seen as a key strategy—a legal home is considered to be a household's main asset, as it can be sold if funds are needed.

Compared with the strategies undertaken by individuals, community- and hierarchically-based risk-financing strategies include the establishment of community emergency funds and illegally accessing formal insurance mechanisms. In fact, while slum dwellers are not generally believed to have a culture of insurance, in two cases residents had illegally obtained employment certificates enabling them to pay into the social security system, even though they were not formally employed. In addition, 26 of the 331 people interviewed had health insurance as they worked in the formal market. One-third of the

interviewees were interested in acquiring property disaster insurance (the other two-thirds had no opinion on the subject).

Coping capacities to recovery from hazards/disasters—stand-by for recovery

Directly interlinked with risk financing are 'stand-by for recovery' strategies—which also from part of 'preparedness for recovery'. As with risk financing, stand-by for recovery measures aim to help people recover (better) from the impacts of hazards or disasters; however, the idea is not to create 'ready money' but to establish appropriate recovery mechanisms and structures that can facilitate the reconstruction and rehabilitation of damaged, destroyed or lost belongings, assets, structures and systems. A typical example of associated adaptive capacity is the way in which people diversify their sources of income after a disaster has occurred, for instance, by temporarily taking on a more profitable job in the construction sector, or through the creation of contacts and cooperation with government and (mostly) non-governmental institutions, such as religious bodies that can be 'tapped into' if post-disaster assistance is needed. The generation and encouragement of reciprocally dependent relationships to improve economic status also falls under this type of coping strategy, as remittances from abroad tend to increase and play an enhanced role during recovery.

Financing and other local barriers to cope effectively with climate and disaster risk

In the four slums analysed, households spent on average 9.2 per cent (ranging from 0–75 per cent) of their income on reducing climate and disaster risk, that is, USD 26 out of an average monthly household income of USD 284. This figure is intriguing, even more so if one considers that it excludes construction materials that are obtained for free (such as stones and sand from riverbeds or old tires from friends), free labour from family members, the opportunity costs of the considerable amount of time spent on adaptation, and the negative impacts of some coping strategies, such as the high interest rate paid to moneylenders and the financial losses due to adjustments in assets and activities caused by risk exposure (Dercon, 2003). On top of the large costs incurred by local adaptation measures, there are also substantial post-disaster expenses, including: replacement of belongings washed away during floods and landslides; recovery efforts; temporary income losses; and loss of the gradual and incremental investments made in the building of housing and community infrastructure.

The lack of financial resources due, for example, to unemployment and low income levels, was cited frequently by interviewees as one of the underlying causes of risk and disaster occurrence—and of the limited 'success' of local-level adaptation measures. Apart from financial issues, slum dwellers mentioned a series of other barriers to improving their adaptive capacity. These included a lack of support from government agencies, an unwillingness to invest in adaptation due to the ever-present threat of slum clearance, a poor sense of mutual rights and obligations in the communities regarding maintenance and development of the settlements (for instance, neighbours excavating the slopes below

houses or constructing latrines close to declivities), and a dearth of knowledge of adequate risk reduction and adaptation.[7]

Finally, one should note that the various coping strategies identified, although crucial, are fairly weak. Slum dwellers reported that it can take them several years to recover from single hazard events and that, to do so, they are dependent, primarily, on outside help. There are several reasons for this: first, urbanisation and the increasing ease of mobility it brings can lead households to 'default' on their obligations to relatives and neighbours. Second, different income levels (ranging from USD 120–750 per household and USD 30–500 per worker) foster individualistic behaviour, with the better-off households opting out of mutual and hierarchical arrangements. In addition, slum dwellers have little to sell (livestock or agricultural produce, for example) to help themselves or others in need. Third, the need to compete economically, which at present mainly rewards (productive) specialisation and intensification (instead of diversification), can reduce the capacity to cope with changing climatic conditions and disasters. Moreover, finally, slum dwellers simultaneously and persistently experience bad conditions over a period of years. Even after the weather has returned to normal, the adverse environmental changes caused by floods and landslides (such as run-off and poor soil) continue to be felt.

The Northern context—the case of Manchester[8]

The residents of Heywood, Manchester, were unprepared for the flood events of 2004 and 2006. As will be seen, hardly any coping strategies were used until after the 2006 flooding. As stated by the Pitt Review (Pitt, 2007), this situation, while not unique, was, in fact, common to many flood areas in Manchester and in England as a whole.

Coping capacities to reduce hazards—prevention

It was virtually impossible to identify any measures utilised by local residents, either before or after the events of 2004 and 2006, that sought to reduce hazards.

Coping capacities to reduce vulnerability—mitigation

More than one year after the 2006 floods, only 27 per cent of the victims interviewed had installed, or were installing, some form of measure to reduce their vulnerability or to increase their preparedness. The few mitigation measures identified were mainly ad hoc in the sense that they were carried out

[7] Note that the term 'adaptation' refers to the reduction of climate-related risk factors (see also endnote 3), whereas the more general term 'risk reduction' also includes the reduction of risk factors that are not climate-related.

[8] This section is based on DEFRA (2008), Douglas et al. (2010) and follow-up research undertaken in 2009. See endnote 6 on the use of the terms 'prevention', 'mitigation', 'preparedness for response' and 'preparedness for recovery' (including 'risk financing' and 'stand-by for recovery') in this section.

without pre-disaster planning and with little input from insurers or the agencies involved in flood risk management; in addition, they had a strong focus on reducing physical vulnerability. These efforts to reduce people's physical vulnerability were mainly based on 'dry-proofing'—building a barrier between the hazard (that is, the floodwater) and the inside of the building. As water had flooded buildings generally via the air bricks or through the gaps between doors and door frames, the most common steps taken were to fit flood-proof (sealed) doors, construct flood gates to the property, and install electric pumps. In one instance, a resident had taken up the paving stones in his back garden so it could be used as a 'soak away', while another resident had installed a small drain and illegally connected it to the adjacent sewer.

As well as these physical and individual mitigation measures, there were also some community-based measures following the 2006 floods. In fact, in four of the six areas flooded, a spokesperson was selected, which did lead to improved community risk-reduction consultation mechanisms. The objective of this new, and unfortunately temporary, measure was not, however, to support locally-based action, but rather to improve communication with the different organisations involved in institutional assistance and thus give the community a more powerful voice in lobbying for better service.

Coping capacities to respond to hazards/disasters—preparedness for response

While some residents dry-proofed their homes as a permanent mitigation measure, others identified temporary solutions aimed at improving their adaptive capacities to respond to future disasters. These included the purchase of air brick and door covers and the acquisition of sand bags, both of which need to be put in place quickly when a flood threatens. Today (2010), both the covers and the sandbags are quite visible in the area, showing that four years on from the 2006 flood, some families are better prepared. However, several interviewees reported that they live in fear now every time heavy rain is forecast and are reluctant to leave their home unattended at such times.

Coping capacities to recovery from hazards/disasters—risk financing

Risk financing through formal insurance is seen as the most important coping capacity. Indeed, many homeowners feel that an insurance policy is not only all the protection they need but also the most effective risk reduction strategy available to them. Accordingly, flood victims look primarily to the insurance industry for compensation; the first reaction of most Heywood residents who were flooded was to contact their property insurer.

All of the households surveyed had contents insurance. After the two Heywood flood events, insurance claims resulted in payouts of typically between GBP 30,000–45,000. These payments did not, however, cover the cost of temporary accommodation, which, for most people, was required on the two occasions for between three and eight months at a time. After payout, the property owners

faced varying increases in insurance premiums and in the 'excess', that is, the initial amount of the uninsured loss that they would have to pay. The excess increases varied from zero to GBP 15,000. Premiums went up in some cases, ranging from a modest to a threefold increase. In some cases further insurance was refused.

As the insurer's liability is to replace loss and not to provide improvement, there was little incentive to repair flood-damaged properties with resilient materials—as insurers would not pay for that. Simply moving a fuse box to a higher place on the wall was considered to be an improvement and therefore not covered.[9]

After risk financing in the form of a formal insurance policy, owning a property was identified as the second most important strategy for risk financing. People's life savings (and ambitions) are invested in their homes and their owners see them as their most important asset and as a buffer against all kinds of shocks and stresses. However, the houses in Heywood that were flooded are now blighted and unsellable, and for many selling the property without disclosing its actual flood risk is the last resort.

Coping capacities to recovery from hazards/disasters—stand-by for recovery

Election of a spokesperson could have been an important way of improving the mechanisms and structures for future recovery. However, the contact and communication established with local authorities and other stakeholders involved in flood risk management were created only to deal with the 2006 floods and were not meant to be anything more permanent.

Financing and other local barriers to cope with climate and disaster risk

Heywood residents have been discouraged from increasing their flood resilience for a number of reasons. First was the belief (in 2004) that the next flood would be a long time in coming, which, of course, turned out not to be the case. Second was the lack of knowledge and access to advice on the most appropriate adaptation measures to take. As mentioned above, only 27 per cent of Heywood homes with internal flooding in 2004 and 2006 have been adapted to deal with potential future flooding. However, the residents of an additional 25 per cent of homes flooded stated that although they would like to take preventive measures, they do not know what to do or they feel that there is nothing they can do to avoid flooding. The cost of potential adaptation measures (such as flood gates at around GBP 2,000) also has discouraged people from carrying out improvements. This reluctance to invest in flood resilience is related to two other issues: (a) Heywood residents would prefer a professional engineer to remove the risk altogether by improving drainage; and (b) there is a common belief that it is the government's responsibility to take action. In fact, residents argued that it was up to

[9] According to Pitt (2007), only a few insurance companies in England offer payments up to the like-for-like amount, with the policyholder paying the extra cost of a resilient repair.

the local authority, not them, to take flood-adaptation measures. In addition, the interviewees claimed to have received no response when they asked the utility company for protection, that attending public meetings was useless, that attempts to get a response from the local authority were in vain, and that they felt lost in the maze of institutions involved in flood management.

Discussion: key differences and similarities—a South–North comparison

To analyse the key differences and similarities between local-level responses for adaptation in San Salvador and Manchester, the coping strategies presented were first divided—based on their respective objectives—into prevention, mitigation, preparedness, risk financing and stand-by for recovery. Second, they were grouped—related to their thematic foci—into physical, environmental, economic, social/cultural, organisational and institutional aspects. Finally, the coping strategies were reviewed based on their underlying social patterns, namely, individualistic, communitarian, hierarchical or fatalistic, which have been established by 'cultural theory' (Thompson, Ellis and Wildavsky, 1990). Within this research context, 'individualistic' behaviour can be characterised as self-help, fixing things without assistance from people outside one's own household. 'Communitarian' behaviour, which is based on the belief that everybody sinks or swims together, is characterised by community efforts. 'Hierarchical' patterns relate to the belief in relying on authority structures for assistance, control and organisation, including strong leadership. 'Fatalistic' behaviour is a non-strategy for survival, as it is based on the idea that taking or not taking action has the same (negative) result.

The study of the floods in Heywood, Manchester, together with studies and a literature review of other European cases (see, for example, Pitt, 2007; Standing, 2008),[10] showed the tendency for people in the North to have a strong belief in hierarchical structures and mechanisms to help them deal with disasters. However, Heywood residents were somewhat disabused of this belief by the 2004 and 2006 floods, as their efforts to access the assistance they needed frequently were futile. In terms of local adaptive capacity, the most prevalent Northern strategies for coping with stresses and shocks were identified as, first, obtaining insurance coverage and, second, owning a home. A home is seen as the most important asset, providing security and a 'buffer' against unforeseen events. Unfortunately, neither strategy has turned out to be effective with regard to coping with the increased prevalence of pluvial flooding in the area. First, insurance companies would not cover all of the losses, payouts could not be used to improve the resilience of homes to future floods, premiums and excess charges were considerably increased, and in some cases further insurance was even refused. Second, people's homes became blighted and unsellable. Apart from insurance cover and home ownership, none of the Heywood flood victims had specific strategies to deal with floods and to adapt to climatic changes.

10 The analysis also refers to the experience of many of the 14 partner cities of the Green and Blue Space Adaptation for Urban Areas and Eco Towns (GRaBS) project (see http://www.grabs-eu.org/partners.php).

Even after the 2006 floods, only 27 per cent of the flood victims began to implement some mitigation and preparedness measures. Moreover, these were mainly individualistic and restricted to minor physical improvements related to better dry-proofing.

In contrast, in the slum areas analysed in San Salvador, 100 per cent of residents are actively adapting to their risk situation—which seems to be a common feature in the South (cf. Wisner et al., 2004, 2007; Jabeen, Allen and Johnson, 2009). The types of coping strategies used also are comprehensive in the sense that they (a) address all risk components (that is, hazards, location-specific vulnerabilities and related capacities to respond and recover), (b) tackle social, environmental, economic, physical, organisational and institutional issues, and (c) combine measures that are individualistic, communitarian and hierarchical.

Nevertheless, similar to the Northern context, people here also have lost their trust in community cohesion and hierarchical structures and thus focus mainly on individualistic measures. In addition, some of the various coping strategies identified are weak and deficient. Hence, people, like the residents of Heywood, frequently are dependent on outside help and call on either governmental or non-governmental organisations (NGOs) for more assistance. In both case studies, the reasons given for little or inadequate coping capacity are strongly related to a lack of access to information and financial resources.

A comparison of the two case studies indicates that apart from the strong differences in the level of local engagement, increasing climate change seems to bring the situation in the North and the South into greater convergence, in the sense that people at risk (a) are excluded from accessing (affordable) insurance policies, (b) have no real opportunity to use their home as an asset to cope with shocks and stresses, (c) receive inadequate institutional assistance in terms of obtaining protective infrastructure (such as sewers) and receiving information and support on reducing risk and post-disaster help, and (d) even feel in some cases driven to find illicit solutions to their situation, such as making unauthorised connections from drains to sewer systems, selling houses without disclosing the actual flood risk, and gaining illegal access to insurance.

INSTITUTIONAL RESPONSES: SUPPORT OF OR HINDRANCE TO LOCAL ADAPTATION

The previous section presented the local responses of individuals, households and communities in San Salvador and Manchester to adapting to climate change and increased disaster risk. The existing institutional responses that support, hinder or complement these local efforts are examined below, as are other constraints to their effectiveness. Note that in this context the investigation presented includes the actions of both governmental and non-governmental organisations.

The Southern context—the case of El Salvador[11]

In the interviews conducted in disaster-prone communities in El Salvador, slum dwellers often saw national and municipal authorities as unhelpful, and even a hindrance, to their efforts to improve their situation. Many promises were made by such authorities, but not kept.

Little governmental support for marginal areas

As in most countries there is a general unwillingness on the part of national and municipal authorities to work with low-income groups, especially those living in informal settlements (Moser and Satterthwaite, 2008). Accordingly, El Salvadoran authorities provide little support to the communities analysed and have little knowledge of their actual living conditions. As a result, action taken by planning authorities and the information given by them were viewed as contradictory and often unreliable. The low priority accorded by local planning authorities to the disaster risk faced by the urban poor, and their lack of knowledge of it, can be illustrated by the case of Santa Tecla, where a municipal order was passed to allow a developer to build a new settlement in a risk area that, following the 2001 earthquakes, was severely affected by landslides (Rhyner, 2002). This example shows the 'great divide' that exists between urban planning, disaster management and adaptation, which only increases existing risk and restricts local coping.

Priority of physical measures versus integral adaptation

While support from governmental organisations is barely existent in the areas assessed, there are a variety of NGOs, both national and international, that do provide assistance. These bodies use different approaches to reduce the climate change and the consequent increased disaster risk faced by the poor, such as in situ house improvements and settlement upgrading projects. During the past two decades, most of the NGOs working in these fields have had to make good the damage caused by disasters to some of their former projects and have faced financial losses because of the repairs that they have had to carry out. This has led to an increased awareness of the shortcomings of the purely physical/constructive approach that they had adopted and to the realisation that more integrated and participatory approaches were needed. On this basis, some NGOs have been reducing their one-sided focus on construction-related work and, step-by-step, have been adopting non-construction-related adaptation measures.[12] Nevertheless, this is still not the case for the majority of NGOs.

Indeed, for a series of institutional and organisational reasons, most NGOs maintain a physical/construction focus, which supports 'one-sided' social transitions within the low-income

[11] This section is based on Wamsler (2007, 2009) and follow-up research conducted during 2009.

[12] The success of more integral projects was substantiated by Providencia, one of the communities analysed, where human and material losses after the 2001 earthquakes were comparatively small.

bracket. In slum communities, there are the relatively well-off (the 'rich poor'), a large middle segment (the 'poor poor') and the relatively poor (the 'destitute').[13] Through project implementation, the relatively poor (having accessed full subsidies if these are available) and the large middle segment (having obtained combined credits/subsidies) can become part of the relatively rich poor. However, these improvements mainly involve physical living conditions rather than the economic, social, organisational and institutional assets needed to ensure a consistent and sustainable improvement in people's security and adaptive capacity.

Adding-on of new, separate structures for prevention, mitigation and preparedness

Within the context of the projects mentioned, climate and disaster risk are being reduced mainly through the creation of *new* solutions (such as new mechanisms, structures and technologies). In other words, the measures being taken do not build in general on local strategies and thus *existing* adaptive capacity. An example is the construction of expensive and maintenance-intensive houses with non-traditional building materials or the establishment of early-warning systems and emergency committees, irrespective of any local community structures that may be already in place. To make matters worse, little effort is invested in guaranteeing the long-term maintenance or continuation of the new mechanisms, structures and technologies implemented.

No support for local preparedness for recovery—risk financing and stand-by for recovery

In addition, while the organisations do implement projects including measures aimed at prevention, mitigation and preparedness for response, usually these have little impact on people's capacity for recovery. In other words, measures for risk financing and stand-by for recovery seldom are included in them. Only one of the NGOs interviewed has to date added disaster property insurance to its housing credit schemes. However, after a house is paid for, the insurance is cancelled and is not replaced by any mechanism for financing future damage. This is despite the fact that several NGO representatives have reported that around 4–5 per cent of their project houses are affected by disasters. Interest in risk financing is, though, slowly growing. In fact, Hurricane Stan in 2005 led to ongoing negotiations among several NGOs, cooperating micro-financing institutions, and national insurance companies.[14] Mere compliance with formal construction procedures is, however, seen generally as a sufficient basis for buying insurance.

[13] Note that Steve Rayner is the originator of the idea of varying vulnerability of the 'destitute, 'poor poor' and 'rich poor' (information obtained orally through a discussion with Michael Thompson, International Institute for Applied Systems Analysis, Austria).

[14] The insurance companies that were interviewed would offer disaster property insurance for social housing with premium rates of 0.034 per cent of the house value plus administration fees, or rates of a total of around USD 2 per month. Damage from all types of natural disasters is covered, as is damage related to construction errors.

As far as completed projects are concerned, none of the organisations analysed have a mechanism in place to offer former project beneficiaries micro-credits for future risk reduction or recovery needs. Furthermore, families wishing to obtain such credits from other institutions cannot use the project houses as collateral, as assisted housing cannot become bank property in the event of default. This presents a barrier to future coping, as project beneficiaries are unable to use their 'improved' assets effectively.

Support of communitarian measures versus local individualistic adaptation

The working approach of the NGOs analysed tends to be based on community action (such as cleaning sewage systems) and the establishment of hierarchical structures (such as the creation of emergency committees or institutionally-based early-warning systems). In fact, participation, mutual help and the setting up of community structures were identified as being among the most fundamental principles of project implementation—which completely overlooks the fact that local adaptation strategies are mainly of an individualistic nature.

Insufficient financial resources for supporting adaptation

The NGOs interviewed stated that resources that are earmarked for specific upgrading or social housing projects frequently cannot be used for implementing adaptation measures. This legal constraint occasionally results in help being denied to the most vulnerable slum dwellers, as their inclusion in projects would require supplementary mitigation work. It was reported that, generally, the resources available can be allocated only to construction and design improvements that entail little or no extra cost.

Hence, organisations willing to integrate risk reduction measures into their project design are working increasingly with municipalities and a range of additional financial partners. There is no established national mechanism for financing risk reduction. Funds are available only sporadically. For instance, after Hurricane Stan in 2005, a temporary risk reduction fund was set up by El Salvador's National Housing Fund (FONAVIPO), offering individual subsidies of up to USD 2,200.

No legal body for the management of climate and disaster risk

When it comes to national and municipal legislation, international organisations have provided financing to help create or revise policies and policy instruments to improve their potential to support adaptation, often in the context of their post-disaster assistance work. For instance, the national policy for housing adopted shortly after Hurricane Mitch in 1999 addressed, for the first time, the management of environmental risks. Between 2001 and 2004, the first draft policy for land use planning was developed in coordination by the Ministry of Housing and Urban Development and the Ministry of Environment. Risk reduction is included as one of the six sub-programmes of El

Salvador's national land use plan. The draft policy was, however, strongly criticised for its centralised and non-participatory character, restricted focus on natural hazards, and its proposal to establish an additional legal and institutional system for risk reduction (Umaña, 2003). In contrast to the draft policy for land use planning, some of the municipal land use plans include risk reduction in a more crosscutting way.

Disaster-related legislation dates back to 1976, when the Law for Civil Defense came into effect. After Mitch, a new bill for relief and civil protection against natural disasters was presented. A number of NGOs heavily criticised this bill as being based on a military and centralised vision. The Ministry of Environment demanded its technical and juridical revision, arguing that it was focused solely on emergency management, but should, in fact, be elaborated as an integral part of the land use planning policy (Umaña, 2002, 2003). Since 2001 different organisations have developed policy guidelines for risk reduction and adaptation, but these have not been adopted.

Across the board, policies and policy instruments at both the national and municipal level, as well as related guidelines, have generally not considered or even recognised local adaptive capacity, and furthermore often do not clearly determine the roles and responsibilities of the different stakeholders. Apart from the lack of a body of adequate legislation to support adaptation, the existing regulations are obsolete, not complied with, and not enforced—resulting in an increasing number of people settling in risky locations without sufficient support.

Inter-institutional competition

The integration of the fields of urban planning, disaster management and adaptation progressed strongly in El Salvador after Hurricane Mitch and the 2001 earthquakes. However, this was certainly not achieved through better inter-institutional cooperation. The alliances established, although required by the organisations to initiate a shift towards integrating the different fields, were mainly of a temporary nature, and most of the additional knowledge and capacities needed were built up independently and internally (such as through the use of short-term consultants). Consequently, there was increased overlap between relief and development organisations' field of action, which actually resulted in growing competition between them.

Lack of adequate data and data sharing

The inter-institutional competition described also is seen in the lack of data sharing between different organisations. The Municipality of Santa Tecla, one of the areas most severely affected by recent disasters, could not, for instance, obtain the data it required from national organisations to carry out local risk assessments. In addition, every organisation draws up risk maps in different ways, resulting in incompatibilities between them, which not only reduces their usefulness for disaster and land use planning, but also prevents capacities being fostered at the local level. In addition, digital maps have,

in the main, been prepared by external consultants over a very short period of time. Thus, they are not updated or disseminated regularly, are not the result of participatory efforts, and lack even the basic knowledge that is available at the local or municipal level.

No disaster forecast and early warning

A National Service for Risk Reduction, Mapping and Monitoring (entitled SNET) was established in 2001 as part of the Ministry of Environment. Nevertheless, there are hardly any formal mechanisms for disaster forecasting or early warning available to those living in marginal and informal areas, which also obstructs local coping.

The Northern context—the case of Manchester[15]

Without exception, all residents interviewed in Heywood felt let down or victimised by agencies and legislators who, in their opinion, should be the ones protecting them. Of particular concern was, first, the slow and inadequate response of the emergency services: for instance, heavy vehicles would cross flooded areas creating a wash that caused secondary flooding of several houses. Second, residents were concerned that nothing was being done to help them adapt to future flood risk. Third, they were confused about who was responsible for helping them protect their property. Legislative and institutional issues contributed to this situation, constraining effective adaptation both before and after the 2004 and 2006 floods and hampering constructive action at the local level (see below).

Ambiguous institutional setting—urban flooding comes under the jurisdiction of a number of agencies

While there are a huge number of different organisations involved in the management of riverine and coastal flooding, no agency is responsible explicitly for urban pluvial flooding. As well as the lack of inter-institutional cooperation, there is also an active tendency for agencies to blame each other for the Heywood flooding. The result is that residents are confused about who to ask for help or advice; if they do ask their demands are turned down, they are frustrated, and finally there is little action at the local level.

Lack of adequate data on pluvial flooding and data sharing

The *Strategic Flood Risk Assessment of England and Wales* does not cover pluvial flood risk or climate change. Past pluvial flooding is not marked on existing flood maps and there are no historical flood data on such events. Moreover, as the utility companies inherited an antiquated sewage system on privatisation in 1989, many urban sewers are not known about, and no-one has any idea what their

[15] This section is based on DEFRA (2008), Douglas et al. (2010) and follow-up research undertaken in 2009.

capacity might be. Furthermore, all six areas studied are located along two streams that have been previously culverted and that still form part of the combined sewer system (which collects both sewage and storm water). However, neither of these streams is included in the Environmental Agency's register of critical ordinary watercourses. To make matters worse, the fear of property blight prevents the general public from reporting pluvial flood events.

The few pieces of existing information on pluvial flooding are dispersed and principally in the hands of the private sector, such as insurance companies, which view them as confidential. In addition, there is poor data sharing between the public agencies involved. The resulting lack of access to information hinders institutional and local-level responses.

No forecasts or early warning for urban flooding

There is no forecast for urban flooding caused by intense short-duration summer storms. In fact, there is no weather radar related to this phenomenon, and the national *Floodline* does not cover pluvial flooding. This prevents potential victims from taking preparedness action through, for instance, the timely installation of temporary flood barriers.

Low priority accorded to flood risk by local planning authorities, and a lack of knowledge about it

Although in recent years significant advances have been made in including flood risk management and adaptation measures in urban planning, major gaps persist. In two of the six areas analysed (Millers Brook Close and Lane End), planning permission was granted for the construction of new houses although there was empirical evidence that the areas had been experiencing regular flooding even during moderate rainfall. No-one had assessed whether or not the local drainage system could cope with the increased run-off from these developments.[16] The planning department of the local authority admitted that it was unable to undertake a proper hydrological assessment because it possessed neither the personnel nor the expertise. That relevant information is not used as a basis for actual land use decisions (a) results in inadequate support and control of locally-based action and (b) actually supports inadequate local coping (such as the illegal connections being made to the antiquated sewers mentioned above).

Limited local control of flood risk due to privatisation of public services

Highway maintenance in Heywood is subcontracted to the private sector, and there is evidence that gully cleaning has been neglected, considerably increasing flood risk. In addition, important data such as *The Manual of Sewer Condition Classification* are now in the ownership of a private consultancy.

[16] The primary issues behind objections to planning permission for new developments usually are concerns on the part of the highway department, congestion, separation distances from existing developments, and design factors.

The trend towards the privatisation of public services in the UK considerably diminishes therefore the availability of information, local control, and finally local action-taking.

No legal body for the management of pluvial flood risk

Related to many of the issues mentioned previously is the fact that there is (a) no legislation on pluvial flood management, (b) no flood response plans, (c) no national policy to coordinate responsibilities in times of flood, and (d) no legislation stipulating that relevant data be made available to stakeholders. Neither the building regulations nor the planning guidance for England and Wales considers flood resilience as a requirement for new buildings. The *Unitary Development Plan* for Heywood, Manchester, does not include any guidance on pluvial flooding, and existing guidance by *Communities and Local Government* on the construction of new buildings to cope with flood risk does not necessarily result in flood-resilient construction in small urban catchments, as it does not deal with flooding of the sewers. Moreover, repairs carried out to buildings after floods typically are not subject to the building regulations, all of which make it difficult to access adequate assistance, support, and information on what local adaptation measures are needed. Furthermore, the importance of assessing and supporting localised responses is not mentioned in any national or municipal policy or policy instrument.

No governmental support for local risk financing

An agreement between the insurance industry and the government to provide insurance cover to houses at risk has been revoked. Consequently, insurers can withdraw cover for certain buildings or even areas that are considered to be at risk of frequent flooding. Climate change is a major issue for the insurance industry, with the cost of inland and coastal floods likely to more than double this century. Insurers need to see a reduction in risk or they will react to protect their business and withdraw cover. In contrast to a development in a recognised river floodplain or coastal risk area, small urban catchments are unlikely to appear on flood risk maps. After an event, therefore, the insurers are likely to adopt a cautious approach to future risk of flooding. People's most important coping strategy, namely, risk financing through the acquisition of an insurance policy, is thus becoming less and less effective.

Little support for areas with a low priority rating

Areas of lower political interest seem to be less likely to obtain support. In the course of a meeting between residents of Millers Brook Close, the local authority, and representatives of the utility company, a resident asked if legislation to provide acceptable cost-effective remedies for flood-prone neighbourhoods was not being passed simply because the area in question was not of strategic political interest to the ruling party.

No financial support of infrastructure improvement in pluvial flood risk areas

In England, areas that receive priority funding to improve local drainage capacity are influenced by the so-called *DG5 Register*, which lists properties where flooding has been reported. As the *DG5 Register* has a severe weather clause, generally it does not include small-scale pluvial flooding. Although flood victims can request that their property is included on the *Register*, many homeowners usually are reluctant to report flooding because of potential property blight and may try to sell their home quietly instead. As most properties at risk of pluvial flooding are not registered, the local drainage system does not receive the necessary upgrades.

Discussion: key differences and similarities—a South–North comparison

While it can be argued that Northern authorities are better prepared for 'conventional' weather extremes (such as riverine flooding), the systems and mechanisms associated with these extremes are 'outdated' in the context of climate change and the increased pluvial flooding that is one of its consequences (DEFRA/EA, 2007). The comparative analysis described in the last two sections indicates striking similarities between the institutional responses in the North and the South.

In both case studies, the institutional and policy landscape and the associated operational interventions often increase rather than decrease climate and disaster risk, and undermine local adaptive coping capacities. In fact, there are not enough formal incentives or encouragement to take individual action, and insufficient information is being provided on how to adapt best. None of the government agencies responsible for planning, disaster management or adaptation have provided personal counselling or advice on possible adaptation measures to either the disaster victims or the local communities.

Another similarity is the divide between those responsible for urban planning and those responsible for the management of the risk related to climate change and disaster. Although in recent years both professional communities have made significant advances towards integration, there is evidence that actual land use decisions are still not being taken on the basis of all of the relevant available information and that disasters are a low priority for many urban authorities. Hence, risk clearly is being exacerbated by the actions of various planning authorities over many years. This can be attributed to competition between different government organisations, political manoeuvring, a dearth of institutional cohesion, a lack of participatory and consensus-based approaches in the development, enforcement and monitoring of laws and policies, and inadequate financial resources. All of this results in an increasing number of people living at risk and poor provision of protective infrastructure and urban services.

Apart from the similarities mentioned, there are also a number of differences. The institutional landscape in the Southern context is very different from that in the North in the sense that it is mainly

NGOs that are engaged in the areas analysed in San Salvador, whereas in Manchester, it is primarily government organisations. In San Salvador, the NGOs do counterbalance, to some extent, the limitations of the government. They have been reducing their one-sided focus on construction-related work and have been adopting a broader approach, including non-construction-related risk reduction and adaptation. Moreover, generally they assess, plan and implement their projects on the basis of participatory approaches and increasingly consider local adaptive capacities. These are valuable lessons from which Northern cities also can learn.

CONCLUSION: THE NEED FOR COMPLEMENTARY INSTITUTIONAL AND LOCALISED ADAPTATION

The comparison of the San Salvador and Manchester case studies presented in this paper indicates that climate change together with growing urbanisation are increasingly exposing Northern cities to the same sorts of challenges as those experienced for so long in the Southern hemisphere. In other words, the 'historical' divide between the supposedly low-risk North and the high-risk South is diminishing at an increasing speed. One major reason is that climate change and urbanisation augment not only the vulnerability of cities to disasters and the number, predictability, frequency and severity of the hazards that they face, but also undermine the effectiveness of institutional responses that were designed to be applied in the event of more 'usual' and more 'predictable' hazards and associated impacts.

This paper shows that, in Southern cities, the low level of institutional capacity to respond to disasters can be compensated for, to an extent, by the rich range of innovative local-level responses developed by people living at risk. This is because Southern cities generally have a long history of dealing with disasters and coping with the limitations of national and local government. However, the same is not true of the North. Here, local coping strategies are comparatively poorly developed and even considered harmful in terms of interfering with government and private sector adaptation responses (Pitt, 2007; Douglas et al., 2010).[17] With the urgent need to discover innovative ways of combating climate change and complementing 'outdated' institutional responses, it is argued that this puts a greater onus on local-level engagement in the North as well.

The paper further reveals a wide gap between local-level and institutional responses by governmental agencies in Southern and Northern cities. In other words, in neither hemisphere do the different efforts to adapt complement each other. The key features related to this gap and the barriers to effective adaptation that result from them are summarised below:

[17] A typical example given by authorities is the increased use of water during drought periods due to households coping through the storage of water.

1. Urban authorities principally consider how to mitigate physical vulnerability and how to deal with imminent emergencies; they fail to address risk more holistically through a combination of prevention, mitigation and preparedness for response and recovery (including risk financing and stand-by for recovery measures).

2. Urban authorities usually are unaware of people's local coping strategies to adapt to risk and the financial impacts of these efforts.

3. People living at risk have a tendency to lose trust in hierarchical structures and community solidarity where risk reduction and adaptation are concerned, and even fear being 'taken for a ride' by national and municipal authorities.

4. While people's strategies for coping with increasing risk and disasters mainly are based on individualistic behaviour, the institutional assistance on offer focuses on providing uniform, short-term, and more community-based or hierarchical solutions.

5. While local coping strategies are diverse and crucial for adapting to increasing risk, they are insufficient to keep pace with the mounting impacts of climate change.

6. The current structures and mechanisms in place on the institutional (and associated legal) level are inadequate for supporting local adaptation and dealing with climate-related disasters; this is evidenced by across-the-board inadequacies—in policies, policy instruments, data recording and sharing, weather forecasting, early-warning mechanisms, and inter-institutional cooperation.

In sum, urban authorities hardly ever support local adaptive capacity and actually can undermine it.[18] As a result, even after institutional assistance for recovery and/or adaptation is provided, people usually continue to cope with increasing climate change and disaster risk *just as they did before*—without obtaining better information and support for improving and financing their own efforts. In the Northern context, this seems to lead to a growing dependency on insurance companies and, in the South, to continued reliance on NGOs. However, while insurance companies do not provide the type of assistance that would allow urban resilience to be increased, NGOs working in the South have developed a range of bottom-up approaches to support local adaptation from which Northern cities could learn valuable lessons.

The above illustrates how vital it is—not just in the South but also in the North—to adapt the institutional approaches used at present so that they provide better support for local-level adaptation in the future: this means also fostering the use of low-carbon-intensive adaptation mechanisms and

[18] For instance, in the case of El Salvador assisted programme housing cannot be used by beneficiaries as collateral for future credits to boost resilience. In the case of Manchester, an agreement between the government and the insurance industry was deregulated leaving an increasing number of people at risk without access to disaster insurance.

adopting measures that are not simply construction-related. But how might an 'integrated engagement model for adaptation' that would lead to institutional and localised responses for adaptation complementing each other actually look? Based on the case studies presented here (including discussions on how to tackle existing challenges with both the implementing organisations and those at risk), the need to revise current mechanisms and structures and to get urban actors engaged in a number of important tasks emerged, as follows:

1. Identifying, analysing, and thus gaining a better understanding of local-level coping strategies for adaptation to risk—especially risk increased by climate change.

2. Encouraging and scaling up effective (that is, sustainable) local coping strategies.

3. Scaling down unsustainable coping strategies by offering alternative mechanisms.

4. Reducing barriers to local coping.

5. Combining the existing different adaptation measures, namely, prevention, mitigation and preparedness for response and recovery (including risk financing, and stand-by for recovery), thereby tackling all aspects of disaster and climate risk in a holistic fashion.

6. Using existing institutional and structural platforms to finance new and innovative adaptation mechanisms.

7. Matching institutional responses to local people's efforts (combining individualistic, communitarian and hierarchical measures while facilitating a move away from fatalistic approaches).

8. Creating synergies with existing community-based action, such as environmental action groups or eco groups, which can foster and improve local-level engagement.[19]

If put into practice, an 'integrated engagement model for adaptation' would result in improved distributed governance by the uniting of top-down and bottom-up approaches, thus increasing the likelihood of achieving sustainable adaptation. In addition, it would foster change in disaster management and urban development discourses, by achieving further rapprochement between the separate professional communities of planning, risk reduction and adaptation. In particular, it would give greater weight to the social aspects of adaptation and highlight the need to incorporate a greater degree of flexibility into strategies to adapt to climate change and climate-change-related disasters.

[19] Universally valid examples of the proposed amendments, which are required to improve the contemporary system of adaptation, do not exist, as the identification and design of concrete measures has to be location-specific; that is, they have to respond to, and match, the local needs and capacities of both the affected population and the institutions that (should) support them. For some concrete examples in the El Salvador context, see Wamsler (2007).

REFERENCES

Bicknel, J., D. Dodman and D. Satterthwaite (2009) *Adapting Cities to Climate Change: Understanding and Addressing the Development Challenges*. Earthscan, London.

Bosher, L. (ed.) (2008) *Hazards and the Built Environment: Attaining Built-in Resilience*. Routledge, London.

Davis, I., B. Haghebaert and D. Peppiatt (2004) *Social Vulnerability and Capacity Analysis.* ProVention Consortium, Geneva.

DEFRA (Department for Environment, Food and Rural Affairs) (2008) *Risk Assessment and Risk Management for Small Urban Catchments*. Research project final report (authors: N. Lawson et al.). DEFRA, London.

DEFRA/EA (Environment Agency) (2007) *Incident Management and Community Engagement.* Theme work plan, 2005–2010 of the Flood and Coastal Erosion Risk Management R&D Programme. DEFRA/EA, London.

Dercon, S. (2003) *Poverty Traps and Development: The Equity Efficiency Trade-off Revisited.* Paper presented at the conference on 'Poverty, Inequalities and Growth', Paris, France, 13–15 November. Agence Française de Développement and the European Development Research Network, Paris.

Douglas, I. et al. (2010) 'Urban pluvial flooding: a qualitative case study of cause, effect and nonstructural mitigation'. *Journal of Flood Risk Management.* 3(2). pp. 112–125.

IPCC (Intergovernmental Panel on Climate Change) (2000) *Methodological and Technological Issues in Technology Transfer*. A Special Report of IPCC Working Group III. Summary for Policymakers. IPCC, Geneva.

IPCC (2007a) *Climate Change 2007: The Physical Science Basis*. Fourth Assessment Report. Summary for Policymakers. Geneva: IPCC.

IPCC (2007b) *Climate Change 2007: Impacts, Adaptation and Vulnerability*. Fourth Assessment Report. Summary for Policymakers. IPCC, Geneva.

Jabeen, H., A. Allen and C. Johnson (2009) *Built-in Resilience: Learning from Grassroots Coping Strategies to Climate Variability*. Paper presented at the World Bank Urban Research Symposium 2009, Marseille, France, 28–30 June.

Moser, C. and D. Satterthwaite, D. (2008) *Towards Pro-poor Adaptation to Climate Change in the Urban Centres of Low- and Middle-income Countries*. Climate Change and Cities Discussion Paper 3. International Institute for Environment and Development, London.

Pelling, M. (2007) *Urbanization and Disaster Risk*. Panel contribution to the 'Population–Environment Research Network Cyberseminar on Population and Natural Hazards', November. http://www.populationenvironmentresearch.org/papers/Pelling_urbanization_disaster_risk.pdf (accessed on 20 May 2011).

Pitt, M. (2007) *Learning Lessons from the 2007 Floods*. An independent review by Sir Michael Pitt. United Kingdom Cabinet Office, London.

Rhyner, K. (2002) 'Disaster prevention: are we really trying?' *Basin News*. 23. pp. 2–5.

Satterthwaite, D. (2008) *Climate Change and Urbanization: Effects and Implications for Urban Governance*. United Nations expert group meeting on 'Population Distribution, Urbanization, Internal Migration and Development, United Nations Secretariat, New York, NY, United States, 21–23 July. http://www.un.org/esa/population/meetings/EGM_PopDist/P16_Satterthwaite.pdf (accessed on 25 February 2009).

Satterthwaite, D., S. Huq, M. Pelling, H. Reid and P. Romero Lankao (2007) *Adapting to Climate Change in Urban Areas: The Possibilities and Constraints in Low- and Middle-income Nations*. Climate Change and Cities Discussion Paper 1. International Institute for Environment and Development, London.

SELA (Latin American Economic System) (2005) *Migrations and Remittances in Latin America and the Caribbean: Intra-regional Flows and Macroeconomic Determinants*. Thirty-first Regular Meeting of the Latin American Council, Caracas, Venezuela, 21–23 November.

Standing, T. (2008) *Challenges for Preparedness*. PowerPoint presentation by Chief Fire Officer Terry Standing, Gloucestershire Fire and Rescue Service, to the international exploratory workshop on 'Changing Climate – Changing Risks', organised by Lund University Centre for Risk Analysis and Management (LUCRAM), Lund, Sweden, 24 November.

Tacoli, C. (2009) *Crisis or Adaptation? Migration and Climate Change in a Context of High Mobility*. Paper prepared for the 'Expert Group Meeting on Population Dynamics and Climate Change', London, UK, 24–25 June. http://www.unfpa.org/webdav/site/global/users/schensul/public/CCPD/papers/Tacoli%20Paper.pdf (accessed on 30 November 2009).

Thompson, M., R. Ellis and A. Wildavsky (1990) *Cultural Theory*. Westview Press, Oxford.

Umaña, C. (2002) *Análisis de la estrategia institutional del proyecto RETOS*. Unpublished project document. Gesellschaft für Technische Zusammenarbeit, El Salvador.

Umaña, C. (2003) *Contribución al desarrollo de la institucionalidad local de la gestión de riesgo desde la perspectiva municipal*. Unpublished project document. Gesellschaft für Technische Zusammenarbeit, El Salvador.

UNISDR (United Nations International Strategy for Disaster Reduction) (2002) *Living with Risk: A Global Review of Disaster Reduction Initiatives*. United Nations Publications, Geneva.

UNISDR (2006) *2005 Disasters in Numbers*. http://www.unisdr.org/disaster-statistics/pdf/2005-disaster-in-numbers.pdf (accessed on 25 November 2008).

UNISDR (n.d.) *Terminology*. http://www.unisdr.org/eng/library/lib-terminology-eng%20home.htm (accessed on 10 November 2008).

UNU-EHS (United Nations University–Institute for Environment and Human Security) (2005) *As Ranks of 'Environmental Refugees' Swell Worldwide, Calls Grow for Better Definition, Recognition, Support.* Press release. http://www.ehs.unu.edu/file/get/3916 (accessed on 20 May 2011).

Wamsler, C. (2007) 'Bridging the gaps: stakeholder-based strategies for risk reduction and financing for the urban poor'. *Environment and Urbanization.* 19(1). pp. 115–142.

Wamsler, C. (2009) *Urban Risk Reduction and Adaptation: How to Promote Resilient Communities and Adapt to Increasing Disasters and Changing Climatic Conditions?* VDM Publishing, Saarbrücken.

Wamsler, C. (2011) *Climate change, adaptation, and formal education: The role of schooling for increasing societies' adaptive capacities.* IIASA research report. International Institute for Applied Systems Analysis (IIASA), Austria. In press.

Wisner, B., P. Blaikie, T. Cannon and I. Davis (2004) *At Risk: Natural Hazards, People's Vulnerability and Disasters*. Second edition. Routledge, London and New York, NY.

Wisner, B. et al. (2007) *Community and Civil Society Perspectives, Local Knowledge and Coping Strategies.* Workshop concept note for the 'ProVention Consortium Forum 2007 Making Disaster Risk Reduction Work', Dar es Salaam, Tanzania, 13–15 February. ProVention Consortium, Geneva. http://www.proventionconsortium.org/themes/default/pdfs/Forum07/ws4_local_perspectives.doc (accessed on 12 August 2008).

Zetter, R., C. Boano and T. Morris (2008) *Environmentally Displaced People: Understanding the Linkages between Environmental Change, Livelihoods and Forced Migration.* Forced Migration Policy Briefing 1. Refugee Studies Centre, Oxford Department of International Development, University of Oxford, Oxford. http://repository.forcedmigration.org/show_metadata.jsp?pid=fmo:4960 (accessed on 20 May 2011).