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Urban Governance for Adaptation: Assessing Climate Change Resilience in Ten Asian Cities

Thomas Tanner, Tom Mitchell, Emily Polack and Bruce Guenther
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Thomas Tanner, Tom Mitchell, Emily Polack and Bruce Guenther

Summary

Rapidly expanding urban settlements in the developing world face severe climatic risks in light of climate change. Urban populations will increasingly be forced to cope with increased incidents of flooding, air and water pollution, heat stress and vector-borne diseases. This research, undertaken with a set of partner research institutes, examines how to manage climate-related impacts in an urban context by promoting planned and autonomous adaptation in order to improve resilience in a changing climate. It investigates the linkages between the characteristics of pro-poor good urban governance, climate adaptation and resilience, and poverty and sustainable development concerns. The paper develops an analytical framework by combining governance literature with rapid climate resilience assessments conducted in ten Asian cities. Based on this empirical data, we argue that a number of key characteristics can be identified to assess and build urban resilience to climate change in a way that reduces the vulnerability of the citizens most at risk from climate shocks and stresses. These characteristics form the basis of a climate resilient urban governance assessment framework, and include (1) decentralisation and autonomy, (2) accountability and transparency, (3) responsiveness and flexibility, (4) participation and inclusion and (5) experience and support. This framework can help to assist in the planning, design and implementation of urban climate change resilience-building programmes in the future.

Keywords: climate change; adaptation; urban governance; resilience; Asia.

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Executive summary

Rapidly expanding urban settlements in the developing world are and will continue to face severe climatic risks in light of climate change. Urban populations will increasingly be forced to cope with increased incidents of flooding, air and water pollution, heat stress and vector-borne diseases (Wilbanks *et al.* 2001; Parry *et al.* 2007). Cities in developing countries are at particular risk due to their high density populations, a lack of adequate drainage channels, a concentration of solid and liquid waste, expansive informal settlements and urban expansion onto risky sites. Increased climate hazards coupled with rapid urbanisation are likely to put increased strain on the capacity of local governments as they attempt to respond to the vulnerabilities of the urban population, particularly the urban poor.

This paper presents the findings of a rapid governance and capacity assessment of 10 South and Southeast Asian cities (Bangkok, Chennai, Chittagong, Cochin, Dalian, Da Nang, Hangzhou, Ho Chi Minh City, Ningbo and Surat), which is designed to explore their ability to plan and implement an integrated climate change resilience programme. The cities were chosen based on an iterative selection process related to their population size and growth rate, their location on the coast or in coastal provinces and a screening of their exposure to climate hazards.

To assess the Asian cities' ability to plan and implement an integrated climate change resilience programme, the research team developed an analytical framework for good urban governance for climate change adaptation, incorporating learning from a governance framework developed by Mehta (1998) that considers attributes of good urban governance in Asia. The analytical framework also emerged from the understanding gained from an initial pilot phase of research in three cities (Surat, Chennai and Bangkok). Five categories were used to collect and analyse findings from individual city studies: (1) decentralisation and autonomy, (2) accountability and transparency, (3) responsiveness and flexibility, (4) participation and inclusion and (5) experience and support. The rapid assessments informed how each of these good governance components relates to, and should help deliver, climate resilience.

Decentralisation and autonomy: Evidence suggests that cities suited to building climate change resilience avoid cyclical political stalemates and achieve situations where national, state and city ruling parties can work together quickly and effectively to implement policies and programmes. In some cases, the decentralisation of decision-making and political control creates conflicts and delays between agencies, hampering the development of climate resilient programming, yet equally, while heavily top-down decision-making structures can help to implement programmes quickly, they often fail to allow participation of those people they are designed to help. Consequently, a balance must be struck between the need to build climate resilience rapidly and the need to avoid maladaptation by ensuring marginalised voices and climate science agencies contribute to the process of decision-making, planning and implementation.

Transparency and accountability: A municipal system committed to maintaining a relationship of accountability to its citizens and openness in terms of financial management in key 'climate sensitive' sectors, such as waste, water and disaster

risk reduction, urban planning and pro-poor service provision. Legislation and administrative systems that support the right to information must be in place to facilitate access to investigative or grievance procedures in cases where vulnerability to climate change has been increased. Independent, informed local media, with journalists who are interested in climate change, helps to hold city authorities to account, pressurises the political leadership to advance policies, and highlights the issues with citizens.

Responsiveness and flexibility: Climate change has the ability to spring surprises, whether in the emergence of new problems or in the impact of disasters, which may occur with a greater frequency or higher severity than the city has previously experienced. Accordingly, a city requires flexible agencies and management systems, suited to responding to and anticipating these surprises. Evidence suggests that an inter-agency, cross-government body dedicated to tackling the potential and actual impacts of climate change is desirable, and one which bases planning and programming on climate change scenarios. Highly knowledgeable officials, able to draw on the experiences of other cities, able to network across agencies, able to learn from the disaster management and response community and able to integrate the work of climate scientists all help to promote the necessary flexibility. Additionally, the 'mainstreaming' of climate risk assessments and climate scenario-based planning across sectors of the city government and in the development of projects, helps to build resilience. Furthermore, in responding to disasters, future resilience to climate change should be factored into the relief and reconstruction phases, and finances must be made available to retrofit or upgrade buildings and infrastructure to withstand future climate extremes.

Participation and inclusion: Authors of good urban governance studies suggest that the involvement of poor and marginalised groups in decision-making, monitoring and evaluation is a key characteristic of a city intent on improving the conditions for those living in informal settlements or living in exposed locations. As the impact of climate change in urban areas is likely to disproportionately affect the poorest and most vulnerable first and most severely, their integration in decision-making and policy processes is crucial for building climate resilience. This characteristic is necessarily tied to citizens' rights to information, as without information disclosure, meaningful participation and inclusion is not possible. Additionally, the quality of participation and inclusion can be somewhat difficult to ascertain (from tokenism and 'politicised consultations' on the one hand to citizen-led processes on the other), but climate resilience must be a product of balancing citizen-led processes with timely and efficient implementation.

Experience and support: The evidence suggests that cities possessing experience of developing integrated, people-centred early warning systems for extreme events are well placed to make progress toward climate change resilience. The less event driven aspects of climate change, associated with slow growing increases of stress on water supplies, waste management systems and environmental services require a different set of relationships. In this regard, cities benefit from the experience of local, national and international NGOs and civil society organisations operating in the city, community-based groups and research organisations. External donor agencies and the availability of project financing for

climate change resilience programmes helps to spur city authorities to act, but suitable systems must be in place to both utilise the knowledge held by partners and to reward these relationships. Additionally, a national government committed to tackling climate change and engaged in the UNFCCC processes appears to help with trickle-down support to municipal governments, even if it is just in clear strategic objectives linked to climate change.

1 Introduction, background and methodology

1.1 Introduction

Rapidly expanding urban settlements in the developing world are and will continue to face severe climatic risks in light of climate change. Urban populations will increasingly be forced to cope with increased incidents of flooding, air and water pollution, heat stress and vector-borne diseases (Wilbanks *et al.* 2001; Parry *et al.* 2007). Cities in developing countries are at particular risk due to their high density populations, a lack of adequate drainage channels, a concentration of solid and liquid waste, expansive informal settlements and urban expansion onto risky sites. Increased climate hazards coupled with rapid urbanisation are likely to put increased strain on the capacity of local governments as they attempt to respond to the vulnerabilities of the urban population, particularly the urban poor.

Despite these challenges present climate change adaptation-related projects largely ignore urban areas in favour of rural livelihood-focused activities. Rural livelihoods tend to be more dependent on climate sensitive natural resource-based livelihoods, and rural areas tend to have less protective infrastructure for climate extremes. This has meant that poor urban populations have not commonly been considered as priorities in adaptation planning and interventions. This is despite the fact that they often do not benefit from these infrastructure investments or are made more vulnerable because of dependence on faulty infrastructures such as substandard housing. Recent research highlights an urgent need to improve our understanding and action on climate vulnerability and adaptation in urban areas as an urgent priority, particularly where poverty levels and population growth rates are highest (Huq *et al.* 2007b).

In order to address this current gap in adaptation research, this paper highlights the vulnerability of cities to climate-related risks. More particularly, it focuses on the role that urban governments play in building climate resilient cities. The paper assesses the ability of ten Asian cities to plan and implement an integrated climate change resilience programme. This assessment is based on an analytical framework developed by Mehta (1998) that considers the key attributes of good urban governance in Asia. The paper argues that in order to build urban resilience to climate change, urban governments must display the following characteristics: (1) decentralisation and autonomy, (2) accountability and transparency, (3) responsiveness and flexibility, (4) participation and inclusion and (5) experience and support.

Following this introduction, Part 1 of this paper provides a background on the research project, the methodology undertaken as well as the limitations of the study. The second section maps out the linkages between climate change and sustainable urban development, and puts forward a framework for investigating climate-resilient governance. Section 3 presents the key findings from the assessment, outlining the shared vulnerabilities of the ten cities studied and some comparative analysis based on the climate resilient governance characteristics identified above. The final section concludes.

1.2 Background

This working paper is based on recent research undertaken on behalf of the Rockefeller Foundation. The Rockefeller Foundation has recently launched a Climate Change Resilience Initiative to address the impacts of climate change. One component of the initiative will focus on adaptation to climate change in Asian cities. The Rockefeller Foundation has therefore committed to working with cities in Asia where the capacity to generalise the learning about climate change resilience approaches and models to other countries and regions is greatest.

As part of the development of this component, the Institute of Development Studies (IDS) at the University of Sussex, UK, has worked with a network of partners and the Foundation to complete a rapid governance and capacity assessment of 10 South and Southeast Asian cities. This assessment was designed to address the ability and willingness to plan and implement integrated climate change resilience programmes, teasing out some of the key governance issues mediating this capacity. This work will inform more detailed vulnerability analyses and the development of pilot projects prior to scaling up of adaptation work in priority Asian cities.

1.3 Methodology

The methodological framework for this study followed a set of key steps in order to provide a comparable and replicable means of assessing governance and capacity for future climate adaptation programmes.

a. Literature review

The first step was to assess the current literature linking urban development, poverty reduction and climate change. This drew heavily upon recent commissioned research into these areas, as well as work on pro-poor urban governance (Huq *et al* 2007a, b). This helped inform both the analytical framework and the general analysis of case study inputs.

b. Selection of case study cities and partners

The selection of cities was based on a range of factors covering hazard, exposure, and practical considerations. These included the current and future climate hazard burden, coastal or tidally-influenced location, very high rates of urban population growth, a track record of disaster management efforts, and an even geographical spread across the region. This process was iterative through the first phase of research, with three cities identified for initial pilot case studies.

c. Initial pilot case studies and development of initial analytical framework

Pilot case studies were undertaken by research partners in Bangkok in Thailand, and Chennai and Surat in India. These were guided by a matrix of analytical areas and methods and results informed development of a common analytical framework for the full case studies in all ten cities.

d. Full case studies

The case studies were undertaken by research partners in the ten cities selected

for investigation. Given time pressures, these rapid assessments balanced primary and secondary data with cross-referencing and review. This ensured that they provided accurate and reliable analysis of urban governance to help assess willingness and ability to implementation climate resilience programmes. Cities and research partners are shown in Table 1.1 below, and in more detail in Annex 1.

Table 1.1 City case studies and research partners

City	Country	Research Partner
Bangkok	Thailand	National Institute for Development Administration
Chennai	India	Department of Anthropology, University of Chennai
Surat		Gujarat Institute of Development Research
Cochin		School of Environmental Studies, Cochin University of Science and Technology
Chittagong	Bangladesh	Bangladesh Centre for Advanced Studies (BCAS)
Da Nang	Vietnam	VietInsight
Ho Chi Minh City		Department of Urban Studies, University of Social Sciences and Humanities
Dalian	China	Research Centre of Urban Development and Environment (RCUDE), Chinese Academy of Social Sciences (CASS)
Hangzhou		
Ningbo		

The individual city screening studies considered in greater detail how existing governance structures at municipal and sub-municipal level might influence the potential implementation of climate change resilience programmes in the future. The analytical framework used to guide and support these studies is explained in greater detail in part 2 of the paper. Examples of potential programmes used to illustrate existing capacity focused on linkages with disaster risk reduction initiatives. These included urban disaster mitigation programmes, improved building codes, land use zonation, improved water and sewerage network, as well as ecological and environmental protection programmes.

e. Broader comparative analysis

The research outputs from the individual city studies have provided the building blocks for this comparative analysis of the ten cities discussed here. This will provide an input to inform the selection of a smaller set of cities where more in depth vulnerability and governance studies might be undertaken to scope out implementation of an integrated climate change resilience programme.

1.4 Limitations of study

The findings from this study are limited by the constraints of the research timeline as well as the bias of individual consultants in partner organisations. The consultants

tended to focus on the positive aspects of municipal governance rather than illustrating examples of poor urban governance. This can probably be explained by the consultant's wish to show the Rockefeller Foundation *their* city is an excellent choice, in an effort to secure further work. Additionally, many of the case studies included in the assessments focus on the capacity of the city government to respond effectively to disasters or other shock and stresses. Few case studies explored anticipatory actions or risk reduction programming beyond simply early warning related examples, which limits our understanding of whether successful response actions are indicators of resilience. The case studies provide examples of good governance characteristics, but not all are covered in each case and therefore represent independent variables, thereby limiting the extent of comparative analysis possible within the scope of this study.

Furthermore, assessments tended to focus on institutions, mapping their existence rather than evaluating their effectiveness. This can be attributed to the extremely tight timescale afforded to consultants, whose analysis and interviewing was constrained into less than a month. A more detailed analysis of the political economy of decision-making in the final set of cities chosen as part of the Foundation's programme will help to expedite the implementation of climate resilience programmes, as it will aid targeting of individuals and institutions with the power and resources to overcome barriers.

The framework deserves further attention if it is to provide a comprehensive urban governance framework that ensures risk reduction and resilience for the most vulnerable urban populations. By attempting a comparative analysis based on this framework, some other governance related factors affecting just some of the cities may have been overlooked. The historical contexts in which cities have developed give rise to certain cultures of planning and particular patterns of settlement. Some cities face much greater limits than others in the extent to which services can be equitably delivered and effective and equitable disaster preparedness measures can be implemented.

Given the tight timescale, the city assessments have not been independently reviewed and therefore may be subject to biases related to the political allegiances of the consultants, may be factually incorrect and the success of some of the initiatives outlined in the research should be investigated further.

2 Building the framework for analysis

2.1 Linking urban governance, climate resilience and adaptation

Urban settlements feature many of the same impacts of climate change as other settlements – such as air and water pollution, flooding, or consequences of increasingly viable disease vectors. These impacts may take unusual or extremely costly forms in urban areas – for example, flooding that results not from river flooding but from overwhelmed urban storm drains and sewers

during extreme rainfall events (which may become more common in the future). Urban settlements also experience the consequences of accommodating migrant populations, the unique aspects of urban heat islands (which affect human health and energy demand), and some of the more severe aspects of air and water pollution.

(Wilbanks *et al.* 2001)

The most recent IPCC Working Group 2 report reiterates these messages, indicating that the most vulnerable urban settlements are generally those in coastal and river flood plains, those whose economies are closely linked with climate-sensitive resources, and those in areas prone to extreme weather events, especially where rapid urbanisation is occurring (Parry *et al.* 2007).

Cities in developing countries are at particular risk from climate hazards for a number of reasons (Lavell *et al.* 2003; Bull-Kamanga *et al.* 2003):

- High density populations;
- Large sections of the urban population live in informal housing which is not regulated by land use controls and building standards;
- Concentrations of solid and liquid wastes;
- Large, impermeable surfaces and concentrations of buildings which disrupt natural drainage channels;
- Urban expansion on particularly risky sites.

The research presented in this paper does not aim to explore in detail the impacts of current climate variability and future climate change on natural and human systems in cities. Nevertheless, the work draws upon a range of literature and actions related to these impacts and response options, most recently for example through the IPCC Third and Fourth Assessment reports (Wilbanks *et al.* 2001; Parry *et al.* 2007) and a collection of papers in the journal *Environment and Urbanization* (Vol 19.1, 2007).

Instead, this research is concerned with how to manage climate-related impacts in an urban context by improving resilience and promoting planned and autonomous adaptation to a changing climate. In particular, it investigates the linkages between the characteristics of good urban governance, climate adaptation and resilience, and poverty and sustainable development concerns.

The concept of resilience is hotly contested, but is interpreted here as referring to the ability to persist and the ability to adapt in the face of climate shocks and stresses (Adger 2000, 2003; Holling 1986). In the context of the urban vulnerabilities and impacts, strengthening resilience therefore constitutes those autonomous and planned adaptation strategies, which reduce the vulnerability of those most at risk to increased climate hazards.

Reducing vulnerability and strengthening resilience of urban centres to climate change is a function of social, economic and political processes. Key vulnerability/resilience indicators include:

- Economic well-being and stability (eg. standard of living; rate of urbanisation);
- Demographic structure of population;

- Institutional stability (eg. institutional ‘memory’; corruption);
- Strength of and reliance on public infrastructure (eg. health expenditure; communication, infrastructure; financial, transport, corporate and systems; degree of centralisation);
- Global interconnectivity (eg. trade balance; tourism), and,
- Natural resource dependence and regenerative ability of ecosystems (Adger and Vincent 2005; Allenby and Fink 2005; Adger *et al.* 2005).

2.1.1 Linking urban climate resilience and sustainable development

There is an emerging consensus that resilience and adaptation strategies should target the most vulnerable citizens, often associated with the poorest and most excluded groups. This is founded upon principles of fairness and justice, given that these groups are usually the least responsible for causing the emissions contributing to global climate change (Adger *et al.* 2006). A focus on urban governance in the context of climate change therefore necessarily involves a focus on the way that governance systems target the needs and well-being of poor and marginalised groups of citizens.

As a result, many authors have drawn upon the strong linkages between adaptation and ongoing sustainable development interventions (Huq *et al.* 2007a; Schipper 2007; Mitchell and Tanner 2006; ActionAid 2006; Agrawala 2005). Huq *et al.* (2007b) indicate that in order to reduce vulnerability, urban adaptation policies should be pro-poor, reduce environmental and disaster risks, and recognise the need to manage rapid urbanisation in a way that reduces future risk. Stern (2007) argues that improved urban planning and provision of public services and infrastructure are crucial for both development and the promotion of resilient cities.

Those urban populations who are most vulnerable to climate risks are those who live in informal settlements or ‘urban slums’. UN-Habitat’s (2003) most recent report on human settlements as well as ActionAid’s (2006) recent report on urban flooding both highlight similar measures for promoting both poverty reduction and adaptation. These are also consistent with a number of policies discussed by Hasan *et al.* (2005) on how to meet the MDGs in urban areas. These co-beneficial development-adaptation activities include:

- Investing in proper and safe infrastructure which improves drainage;
- Ensuring that the urban poor participate in decision-making processes;
- Advancing poor people’s rights to adequate and disaster-safe housing;
- Increasing tenure for people living in informal settlements;
- Increasing access to (and disaster proofing) critical services such as health, water and sanitation;
- Implementing urban planning and management policies which would prevent the development of slums.

Aside from these planned adaptation measures governments and development actors must consider how they can support autonomous adaptation efforts by poor urban populations. Recent research indicates that slum residents are conscious of the climate related risks and are active in mitigating their vulnerability to such events (see for example ActionAid 2006). In El Salvador, people living in 15 disaster-prone

areas understood the risks associated with floods and landslides and invested in risk reduction by diversifying their livelihoods, investing in easily sold assets, and obtaining access to remittances (Wamsler 2007). There is need to support local capacity and to work together so that individual household efforts contribute to community-wide disaster risk reduction and climate adaptation.

2.1.2 Promoting resilience: the role of urban governance

Whereas climate change mitigation is generally approached from the level of global governance moving down to the national level, Adger (2005) argues that with adaptation this flow is reversed:

Because the impacts are spatially and socially differentiated, climate justice [...] is based on the individual. The actions to adapt to climate change are taken by individuals within their economic and other constraints. Thus the appropriate governance scale is at the level of the resource user and their management of the climate-impacted natural resource or livelihood resource, rather than a global commons [...] In effect, the diversity of climate change means that the most appropriate adaptation responses will often be multi-level responses.

(Adger 2005: 924)

Thus, because adaptation is largely made up of individual choices at the local level, collective action at the community and municipal level is the most appropriate response for adaptation in an urban context.

The quality of government at the local level has a potentially significant impact on climate risk. Municipal governments are responsible for decisions on quality and provision of infrastructure, disaster preparedness and disaster response, and city planning development (i.e. preventing new development in areas of high risk or by not protecting areas which allow for buffer zones) (Huq *et al.* 2007a). One of the most direct influences that local governments have on poverty and vulnerability is through the extent of their provision of water, sanitation, drainage, solid waste collection, public health and housing construction and improvement (Devas 2001b). However, recent evidence suggests that many municipal governments do not have adequate provisions in order to deal with increased climate hazards such as flood management (ActionAid 2006). In well governed cities 'good provision for storm and surface drainage can easily be built into the urban fabric, along with complementary measures to protect flooding ... But in poorly governed cities this does not happen – and it is common for buildings and infrastructure to be constructed that actually disrupt drainage channels' (Huq *et al.* 2007a: 6).

There have been some clear shifts in thinking in the international donor community on engagement at the municipal level (Milbert 2004). During the 1990s, urban projects were often negotiated at the national level with minimal engagement of local government institutions. In the 1990s, several donor countries engaged in long-term partnerships with local governments. Such interventions recognise the key role of local authorities, technical exchanges and training, as well as increasing support for international and local NGOs engaged in urban areas (Milbert 2004).

There has also been an increased recognition for the role of the private sector, or public-private partnerships (PPPs), for the delivery of urban infrastructure and housing. However, these partnerships have often been accused of being anti-democratic and excluding already marginalised urban groups (UN-Habitat 2003). Overall, a partnership approach has become a fundamental component of the strategies adopted since the 1990s by external assistance agencies. These strategies proclaim that local governments, NGOs and private groups should be partners in urban development and work hand in hand with all stakeholders (Milbert 2004).

Devas (2001a) argues that the extent to which urban governments are able to provide low-income groups with necessary environmental infrastructure and services is dependent on two factors: first, on the local government's capacity to meet their responsibilities – this often depends on good relations with higher levels of government – and secondly on the responsiveness of local governments to the needs of low-income groups. Others have linked good governance with national level action to facilitate greater decentralised legal, institutional and financial space for cities in order for municipal governments to be effective and more accountable to their citizens (Fernandes 2007). However, recent research on decentralisation indicates that such devolution to local authorities is only effective where sufficient time is also taken to build local capacity and improve accountability mechanisms (see collection in Robinson 2007).

The literature on urban governance and pro-poor development indicates that there are both demand and supply constraints to achieving pro-poor governance. These can be applied effectively to governance issues related to adaptation and urban environmental management. On the supply side, municipal governments are constrained by a number of factors (Devas 2001a and b; Satterthwaite 2001; Huq *et al.* 2007a):

- Municipal boundaries often do not include areas where the poor reside, thus placing them outside of municipal jurisdiction;
- City governments are often not responsible for many public services including land allocation, housing, water and other public services;
- Legal restrictions may prevent municipal governments from being able to act, for example, by not being able to supply those populations which do not pay property taxes;
- Weak managerial and technical capacities at the local government level;
- Lack of financial resources in order to increase service provision and build infrastructure. This is often exacerbated by international donors and development banks who reinforce the power of national governments and pay little attention to governance and needs at the local or municipal level;
- Lack of financial management capabilities and low financial incentives for staff resulting in corruption;
- Conflicts with national or state level governments.

Demand side constraints include the commonly low-frequency nature of high impact events, low levels of awareness about the changing nature of climate-related risks due to climate change and low levels of empowerment and mobilisation by the groups of citizens most adversely impacted by climate shocks and stresses. In

most cities at risk from floods, wealthier groups and formal enterprises do not face serious risk. For example, Mumbai has the resources capable of reducing risk from flooding, yet the costs are often borne by the low income groups who live in more risk-prone settlements (Huq *et al.* 2007a). Despite being at serious risk of increased flooding Dhaka, Mumbai and Shanghai have all attracted much private investment despite their vulnerability to storms and sea-level rise (Sherbinin *et al.* 2007). The speed at which the economic 'risk map' for cities will change is likely to be slower than the actual climate changes and risks (for example well-documented risk of New Orleans did not cause entrepreneurs and residents to move) (Huq *et al.* 2007b). So-called moral hazard may also play a role, as government decision-makers may not invest in a perceived low-probability event because they assume that the international relief community would come to their rescue in the event of a significant disaster (Sherbinin *et al.* 2007).

Devas (2001a and b) argues that the quality of pro-poor governance in urban settings is determined by the ability of the poor to influence political decision-makers. Broadly, these demand side variables include issues of institutional design whereby low-income citizens are able to participate meaningfully in elections and an active civil society, which is able to advocate for the rights of the poor. UN-Habitat (2003) highlights a number of principles for enhancing these mechanisms toward an 'inclusive city':

- Responsibility for service delivery should be based on the principle of subsidiarity (taking action at the lowest appropriate scale);
- All urban citizens should have equal access to decision-making processes;
- Increased empowerment of low-income residents in order to enhance accountability and pro-poor decision-making.

Recent experiences suggest that low-income groups in participatory democracies have greater say in public investment decisions and greater accountability on how these resources are used (Menegrat 2002). Similarly, community-based organisations and other civil society organisations are crucial in ensuring that city planning is both pro-environment and pro-poor (Hasan *et al.* 2007).

2.1.3 Climate resilient governance: a framework for analysis

As a means of assessing the Asian cities' ability and willingness to plan and implement an integrated climate change resilience programme, we propose a good governance framework indicating how characteristics of good governance might support effective climate resilience building. The framework draws on governance literature, as well as from a study of the attributes of good urban governance in Asia by IDS Fellow Lyla Mehta (Mehta 1998). The categories are also based on understanding gained from the initial phase of research conducted in three of the cities (Surat, Chennai and Bangkok) and are designed to inform and be informed by the research. The separate components of the framework provide a focus for the analysis.

1. Decentralisation and autonomy

This encapsulates the ability and capacity of municipal governments to make decisions and implement across a range of responsibilities and services. These

include in particular finance, urban planning, and disaster management. Autonomy focuses in particular on the relationship with other levels of government and other interest groups, as well as financial independence and managerial capacity of municipal authorities.

2. *Accountability and transparency*

Delivery of climate resilient urban development relies on a municipal system that maintains a relationship of accountability to its citizens, and is open in terms of financial management, information on the use of funds and adherence to legal and administrative policies.

3. *Responsiveness and flexibility*

Resilience in the face of uncertain climate shocks and stresses relies upon a governance system that can respond rapidly to a range of different scenarios and communicated needs. This category can draw in particular on studies of the components of flexible and adaptive decision-making.

4. *Participation and inclusion*

Participation and inclusion refers to the governance arrangements that enhance or preclude the participation of all citizens in decision-making, monitoring and evaluation. This refers in particular to the groups of citizens most vulnerable to prevailing climate shocks and stresses (including those in informal settlements).

5. *Experience and support*

A resilient urban system will build on existing experience in planning and successful implementation of climate-related risks targeting vulnerable groups. Such experience will depend on technical and implementation support to enable the successful implementation of adaptation strategies, including in the NGO/civil society sector, as well as technical and academic institutions.

3 Findings and analysis

3.1 Key features of cities studied¹

To provide context to the comparative analysis of the governance screening according to the above framework, the following section provides a breakdown of key features of the cities investigated, including an overview of relative size and wealth of the municipalities as well as the major climate hazards facing the cities. Climate hazards take the form of projected impacts of slow-onset changes such

¹ All figures provided in this section are the figures reported on in each individual city study. They are not necessary all from exactly the same year, nor the very latest figures although most are from data gathered between 2005 and 2007.

as sea-level rise, and the impacts associated with an existing or projected increase in frequency or intensity of extreme climatic events such as cyclones or rainstorms. The human dimensions of these risks take the form of increased vulnerability, often for particular sectors of the population, due to limitations in urban planning processes, inadequate urban infrastructure, weak response systems, or socio-economic inequalities.

3.1.1 Geography and climate

Most of the cities are coastal cities. Those that are not – Bangkok, Ho Chi Minh City and Hangzhou – are situated in river basins close to the sea. The centre of Bangkok is just 30 kilometres from the coast and Ho Chi Minh City, situated on the Saigon River close to the Mekong Delta is just 60 kilometres from the South China Sea. Hangzhou is located at the southern end of the Grand Canal of China, on the plains of the Yangtze River and the prefecture-level region of Hangzhou extends east to the flatland near Hangzhou Bay. Consequently all are situated on low-lying areas. Cochin and Bangkok lie at just 2 metres above sea level. The average altitude of Ho Chi Minh City (HCM City) ranges from 4–32 metres in the north-northeast to 0–1 metres below sea-level in parts. Most cities are also surrounded by hills with some extending into hilly regions as in the case of Chittagong.

Many of the cities are host to an extensive waterways system of rivers and canals, which being close to the coast are heavily influenced by the tides. Sixteen per cent of HCM City is comprised of waterways. This means most cities are extremely prone to natural flood cycles, particularly when heavy rain meets high tide. Rapid and gradual urbanisation, population growth, construction and infrastructure developments have had profound impacts on the ecology of many of the cities, disrupting natural waterways and degrading coastal zones creating yet more fragile conditions for residents. Chennai is the exception with no major river running through the city and is heavily dependent on the monsoon rains. The city faces significant drinking water shortages.

Most of the cities bar those in China have tropical monsoon climates. Cochin and Chennai's proximity to the equator mean little seasonal variation. Average annual rainfall varies from 1,800mm in HCM City to 3,500mm in Cochin. The Chinese cities are in subtropical monsoon climates with lower average rainfall of (approximately 1,400mm) and average temperatures as low as 16 degrees Celsius.

3.1.2 Demographics

Table 3.1 provides land area data combined with approximate population and population figures for comparison.

3.1.3 Climate hazards

Table 3.2 shows some of the human vulnerability components that exacerbate or are exacerbated by existing and future climate risks. Rapid in-migration into all the

Table 3.1 Demographics

City	Size (km ²)	Population (million)	Population density (persons/km ²)
Bangkok	1,568.7	6.3	4,016
Chennai	176	4.3	24,963
Chittagong²	155	3.38	21,806
Cochin	94.88	0.61	5,945
Da Nang	1,256	0.79	629
Dalian	12,574	5.7	450
Hangzhou	16,596	6.6	398
Ho Chi Minh	2,094	6.2	2,960
Ningbo	9,365 (land) (Oceanic = additional 9,758)	5.6	594
Surat	326	4.5	13,803

cities continues to put pressure on land, resources and public services. Inevitably slum areas are some of the most vulnerable to climate risks. Slum areas account for 35 per cent of Chittagong's population and have encroached upon 60 per cent of Surat's public land. Slum settlements tend to be along the cities waterways, usually the most vulnerable to climate impacts. In some cases, immigrant worker populations congregate around factories. Getting clean drinking water and sanitation to all these locations presents major challenges for the city authorities, exacerbated in many cases by salt-water intrusion. In Cochin, salinity upstream during the dry months has crippled economic activities and led to major drinking shortages. Attempts to control salinity resulted in trapping industrial effluents in water bodies upstream causing severe pollution.

3.2 Comparative analysis

Building on the characteristics discussed above, this section undertakes a comparative analysis between the various cities studied. This comparison is not exhaustive but rather attempts to highlight some similarities and differences in urban governance characteristics, and to illustrate where examples of good urban governance indicate a capacity for climate change resilience, thereby informing the characteristics of a climate resilient urban governance framework.

2 2001 figures.

Table 3.2 Existing and future climate hazards in the ten cities

City	Existing climate hazards	Examples of predicted future climate risks		Selection of human vulnerability components
		Slow onset	Increase in frequency or intensity of:	
Bangkok	Flooding	Coastal and River Bank Erosion Heat zones/hotspots	Flooding Salt water intrusion Diseases	In migration from climate change affected areas
Chennai	Cyclones Landslides Floods Tsunami	Heat zones/hotspots	Flooding Cyclone Disease	Drinking water shortages. Water supply contamination (due to proximity to degraded sewage pipes). Unauthorised construction. Encroachment of settlements onto low-lying areas close to water bodies.
Chittagong	Cyclones Flooding Landslides Tidal surges	Sea-level rise	Flooding, especially flash flooding Storms Cyclones Waterlogging Salt water intrusion Tidal surges	Rapid growth: growth rate decreasing but remains double the national rate Hill cutting leading to landslides and siltation of waterways causing/exacerbating flooding. Industrial pollution of coast and waterways. Poor solid waste disposal/lack of sewage treatment plants. Safe drinking water shortage (especially in slum areas). Waterborne diseases.
Cochin	Flooding	Sea-level rise Precipitation	Disease Water scarcity	Poor solid waste disposal. Salinity. Drinking water shortages. Construction has blocked waterways, reduced groundwater and caused flash floods.
Da Nang	Cyclones Floods Forest fires	Sea-level rise Temperature increase	Drought Disease Cyclones	Degraded dikes – unable to sustain future tides. Urbanisation leading to deforestation and loss of agricultural land: destabilising ecosystem. Conflicts between urban and coastal development and sustainable coastal management.
Dalian	Snowstorms	Temperature change Precipitation change		Degradation of coastal resources. Energy security. Poor air pollution: Coal use 3 times that of developed countries.
Hangzhou	Cyclones Floods Drought Snow/wind/hail storms	Temperature increase	Drought Heat waves (Hangzhou is the 'heat island city' of China due to consecutive high temperatures)	Energy shortages (induced by heat waves). Poor air quality.
Ho Chi Minh	Cyclones Flooding	Sea level rise Glacial melt Precipitation	Cyclone risk Floods	Fifty per cent of areas planned for development lies at less than 2 metres above sea-level therefore vulnerable to floods. Degraded dikes
Ningbo	Cyclones Floods Droughts Storm tides	Urban warming Precipitation	Disease Cyclones Floods	Traffic pollution and urban heat islands Water scarcity. Poor waste water treatment and solid waste disposal Water pollution (from industry). Energy shortages (induced by heat waves).
Surat	Flooding	Sea-level rise Precipitation	Floods Disease	Rapid urbanisation: 60 per cent of public land encroached by slum areas.

3.2.1 Decentralisation and autonomy

Exploring relative levels of decentralisation and autonomy (D&A) in the city studies encapsulates the ability and capacity of municipal governments to make decisions and implement them across a range of responsibilities and services. As Fernandes (2007) argues, there is a need for greater federal action which facilitates greater legal, institutional and financial space for cities in order for municipal governments to be more effective and more accountable to their citizens. D&A in the areas of finance, urban planning, and disaster management in particular provides a deeper understanding of capacities at the municipal level to implement additional climate adaptation programmes.

All city level authorities are responsible for a set of functions covering the key aspects of urban planning, service delivery and infrastructure development albeit differing levels of autonomy to authorise plans and legislate policy. Besides the constraints some cities face from heavily top-down decision-making structures, the most common constraints faced by authorities in fulfilling their duties for the purposes of good governance for climate resilience, include: (1) a lack of clarity between city, state and national level bodies, (2) poor coordination between departments and agencies, and (3) severe financial constraints (Milbert 2006; Kaufmann *et al.* 2005). While decentralisation and democratisation at the local level has brought about greater capacity and initiative and increased citizen participation, the financial capacity of many Southern municipal governments remains weak and the division of tasks between the central, regional and local governments remains unclear, leading to inefficiencies and conflict. Therefore, decentralising responsibility to municipal governments must also recognise the capacity constraints of local authorities (Devas 2001b).

Municipal governance structures

The three Indian cities Surat, Chennai and Cochin, provide interesting scenarios with regards to decentralisation and autonomy. Notably the 74th amendment of 1993 provides the required measures to strengthen the third tier of government across India demonstrating the extent to which decentralisation has been promulgated to the most local level. The third tier includes urban local bodies, which the Act helped to envisage as vibrant democratic units of self-government. At the city level the governance is structured around the Municipal City Corporations and the City Development Authorities which constitute urban local bodies. The City Corporations comprise executive and administrative wings, of which only the executive wing is made up of elected representatives. Elected Ward Corporators constitute the executive wing, who in turn elect the mayor, the senior-most elected official at the city level.

Whilst these are the key governing agencies with responsibilities for key service delivery and city planning, in Chennai the principle axis for governance is regarded as the relation between the governing political party of the State and that of the Corporation of Chennai. Currently the DMK party holds the majority of elected seats in the Corporation and is the leading party at State level. This helps smooth the Corporation's operations. When the two parties diverge, (e.g. between 2001 and 2006 the AIDMK party held power at the state level) conflicts arise and governance and development projects at city level suffer. An added advantage of

the DPA leading in the Corporation is that it the DPA is influential at the national level as a major ally of the leading United Progressive Alliance. The five-yearly change in government is seen as disruptive as one party abandons projects initiated by the previous government.

This relationship and conflict is not seen in the Chinese or Vietnamese cities where the one party structure permeates every level of government. Also, these cities are provincial or sub-provincial or 'separate planning' cities due to their size, meaning the municipal authorities report straight to the central level. Furthermore, the cities of Bangkok and Chittagong are also governed by their own municipal authorities.

Decentralisation and autonomy (D&A) in urban planning

Assessing D&A in urban planning provides a strong indicator of the level of control city authorities possess to integrate new factors and approaches into urban development from the city level downwards. The process behind developing Master Plans such as Chennai's or Bangkok's, for metropolitan areas can also provide useful focal points for exploring entry points for an integrated approach to building climate resilience.

HCM City provides a case of highly centralised urban planning that hampers foreign investment and causes major delays to urban development programmes. The Department of Planning and Architecture is responsible for planning, but in reality the main function of the department is not to implement but to administrate and provide a link between investors and the City People's Committee. A major point of contention is the restrictions on the city authority to adjust land compensation rates, which are set by the Ministry of Finance, date back ten years and are unacceptable to land owners. Many major public works are stalled because of this. According to respondents, centralisation in Vietnam may be appropriate to the current socioeconomic contexts, but it restricts creativity, stifles initiative and hampers the ability to solve urgent issues facing the city. The 'one stop shop' model being piloted in both HCM City and Da Nang is designed to facilitate and speed up administrative processes by establishing just one place for residents and investors to go to submit all applications, which then get passed on to the relevant departments.

Autonomy for the Ningbo and Dalian is higher than most other Chinese cities as they are two of five 'separate planning cities' which enjoy provincial level status and therefore report directly to the central government rather than the province. Separate planning cities are responsible for economic and social planning incorporating industry, transportation, fixed capital investment, energy, trade and social development.

D&A in disaster management

Central governments are quick to acknowledge that disaster management is one area of policy and planning that requires effective decentralisation. Disaster preparedness must happen at a level that can take into account localised geographical, socioeconomic and environmental features and effective communication systems must be developed between every level of authority and

reach all communities, households and individuals. Such communication systems are paramount to all agencies fulfilling roles and responsibilities for effective early warning systems and response mechanisms.

HCM City, despite centralised planning throughout Vietnam, is granted greater autonomy in the area of disaster management than any other sector. The City People's Committee (CPC) has set up the City Steering Committee for Flooding and Storm Prevention headed by the vice-chairman of the CPC. The city is entitled to raise revenue from city residents for flood and storm prevention activities. This is also the case in Da Nang City according to Decree 52 but the reality of collecting household contributions is difficult especially in poor and mountainous areas. Generally, relief and rehabilitation efforts have been supported financially from the central government or international aid. Few funds are available for disaster preparedness.

In Kerala, a state level Disaster Management Authority was established under the National Disaster Management Authority Act of 2005. As the district administration is the focal point for implementation of government programmes at the district level the district magistrate is the focal point for coordinating all activities related to prevention, mitigation and preparedness in addition to existing responsibilities for response and relief. Whilst the urban administration of Cochin is not very active on the issue of climate risk reduction, many civil society groups are preparing to work more systematically on the issue including dynamic self-help groups.

Climate resilience

Adger (2005) argues that because adaptation is largely made up of individual choices at the local level, collective action at the community and municipal level is the most appropriate response for adaptation in an urban context. However, despite the need for local level adaptation, few of the cities studies have appointed city-level agencies for addressing climate resilience, although representatives from the city may be increasingly engaged in national level processes.

The Corporation of Chennai is affiliated with two associations relevant to climate change: The Tamil Nadu City Managers Association and the City Managers Association (a consortium of the Corporations of the seven mega cities in the country). These bodies are charged with evolving common policies/procedures to address factors that have a bearing on climate change. However in terms of implementation in Chennai City, the decentralisation of environmental management to departments moved out from under the Corporation to improve efficiency in their operations has left the Corporation itself with limited capacity to resolve environmental issues, although solid waste and storm water management remain under its remit.

Bangkok's Department of Drainage and Sewerage (DDS) is directly responsible for flood control in the city and has established an operational centre for the prevention and solving of flood problems and a flood control centre. DDS officials have clear and distinct responsibilities and the director has both the capacity and authority to make decisions and implement effectively. This level of decentralisation is improving the quality of work and the department's ability to respond to the needs of citizens, aided by the availability of new technology.

None of the Chinese cities have designated government agencies responsible for climate change issues although several bureaus are engaged in related tasks. Interviewees were divided as to which out of the possible committees should be the most appropriate agency for dealing with climate change related issues.³

Whilst city authorities are becoming more aware of the need to incorporate climate change issues into their activities, it may be some time until adequate funds are made available. In the case of Da Nang in particular it was felt that the mismatch between financial resources and functional responsibilities in the disaster management sector was causing climate resilience building programmes to stay idle.

D&A in finance

One of the greatest struggles facing Southern municipal governments, is a lack of financial capacity and control (Fernandes 2007). The Bangkok Municipal Authority (BMA) has a high level of fiscal autonomy, collecting regular revenues (95.5 per cent from taxes, and approximately 3 per cent license fees, fines rent and income from public utilities) totalling 39,000 million Baht (approx. US\$1,157.3 million) in 2007. The BMA is authorised to use all its regular revenues and its 2007 expenditure equals its total estimated revenue. The BMA also receives special revenues from loans and grants from government agencies, NGOs of international donors, and supportive revenue from the central government for various public service programmes, such as land transportation, environment, health, education, security and tourism.

Chittagong City Corporation raises 55 to 65 per cent of its revenues from its own sources (85 per cent come from taxes) and a further 35 to 45 per cent is channelled to the corporation through line ministries. The Chittagong Development Authority (CDA) owns a huge number of plots of land, which provides its major source of income as well as renting markets and land transformation fees. Grants for preparation of the Master Plan and major public works come from the Bangladesh government and donor agencies. This budget has been reduced and delays in disbursement of funds are hampering project implementation.

In contrast, HCM City is required to submit most of its revenues to central government. Generally, the government retains a large portion of the revenue (65 per cent). Despite centralised planning and submission of revenues to the central level a certain level of decentralisation has been attempted in HCM City with district authorities being granted the power to decide on investment projects valued at VND 5 billion (US\$300,000) and enable investors to carry out detailed planning at 1:500 for approved projects.

3.2.2 Transparency and accountability

Increasing the autonomy of local government authorities must be accompanied by greater accountability. Democratisation must be enhanced at the local level

³ Agencies put forwards were: Development and Reform Committee, Weather Bureau, Water Conservancy Bureau, Civil Affairs Bureau and the Environmental Protection Bureau.

through the direct election of city officials as well as adequate and accessible mechanisms for holding elected representatives accountable (Devas 2001b; Robinson 2007).

The delivery of climate resilient urban development relies on a municipal system that maintains a relationship of accountability to its citizens, and is open in terms of financial management, information on the use of funds and adherence to legal and administrative policies (Huq *et al.* 2007a). Adequate financial transparency and adherence to policies is lacking in all cities, but initiatives are in place in nearly all cases to attempt to drive dramatic improvements in the capacity of citizens to hold their elected representatives to account. Legislating the right to information is key in this respect when accompanied by mechanisms to both facilitate access and to respond through investigative or grievance procedures.

Lack of transparency and accountability in key sectors can have serious implications for climate resilience and the resilience of the most vulnerable to climate shocks. In Cochin for example whilst the checks and balances on government accounting are improving, poor interaction between different departments combined with reported apathy and a lure of wealth continues to result in inefficiencies in the delivery of key services such as waster disposal, mosquito eradication and urban development. Although in times of emergency, councillors reportedly become more responsive to the needs of the electorate.

In Vietnam, however, even in times of emergency it is extremely hard for government officials to be held to account. A lack of individual responsibility felt by officials hampers accountability throughout the government; instead they are protected by their firm position in the party. Even following excessive losses of human lives and assets in fierce hurricanes, no individuals have ever been held to account.

Two projects which illustrate failures in transparency and accountability are shown in Box 3.1.

Right to information

The mismanagement of funds described above is not uncommon in Chennai, and is due largely to information being kept easily in the hands of the elected officials and bureaucrats. The Right to Information (RTI) Act, 2005, has improved access to information held by the Corporation, although certain exclusion clauses still deny access to some information and a waiting period of 30 days are challenging the RTI's efficacy. Cochin authorities are also subject to the Right to Information Act, 2005, which publicises the types of information that must be made available from e-mails to contracts to data, and provides a practical regime for citizens to secure access.

In China, the Regulation on Government Information Disclosure is scheduled for implementation in 2008, although Hangzhou and Ningbo are ahead of central government in this respect, bringing in Regulations on municipal government information disclosure in 2004. The Regulations call for disclosure of information on issues of public interest, many of which are related to areas affecting climate resilience, such as emergency planning, public service fees, public health matters, government budgets, urban planning, land requisition, building demolition plans and compensation standards. Dalian is lagging behind in comparison. Each city has a Government Portal providing information to residents.

Box 3.1 Failures in transparency and accountability leading to failed project implementation

Chennai Waterways Project

Chennai Waterways Project provides one example of an infrastructure project closely related to climate resilience that suffered from poor management, a lack of transparency and corruption. One of the reasons for a reduction in the carrying capacity of Chennai's waterways, in addition to siltation, was the encroachment of riverbank areas by slum communities. The Project was aimed at alleviating floods and reducing water pollution by increasing the carrying capacity, resettling families living along the banks, and preventing pollution of the waterways. The project suffered from poor coordination between implementing agencies, causing major delays and the project failed to stop inundations and sewage contamination, clearly lessening resilience to extreme climatic events.

Bangkok's Hopewell Project

Similarly, the Bangkok Elevated Road and Train System, or 'Hopewell project' to create an airport highway, mainline and light railway and shopping centre corridor, all elevated over local traffic, is a notorious white elephant in Bangkok City. The project was terminated by the central government two years after it began, with approximately 10 per cent completed and significant costs incurred. This was due to alleged corruption and repeated failures to progress stemming from its multi-faceted nature, making it prone to multiple government bureaucracies, land-use planning controls and disputes, and the vested interests involved in combining public and private finance. Conflicts with other parallel transportation projects also contributed to its failure across. This demonstrates multi-faceted nature of governance of Bangkok, with competing and conflicting projects and related interest groups. This experience gives perspective to the on-paper strategies of the comprehensive city plan.

HCMC has no unified information centre and poor data collection and storage. In the area of disaster management, it is very difficult to access information and despite public debates demanding more transparency there has been little progress. Important information is only available through informal channels. Similarly, in Chittagong there are few mechanisms for citizens to access financial information.

In addition to Right to Information Acts, other mechanisms provide greater transparency in the use of funds by city authorities. In India accounting and budgetary systems, financial and performance reporting, auditing, legislative scrutiny and disclosure of financial information have been modernised in several urban local bodies including Cochin. The Corporation has an official website and publishes its annual budget report. The BMA also publishes information by sector on the use of funds and adherence to policy. Citizens may also request information via official procedures.

3.2.3 Responsiveness and flexibility

Resilience in the face of uncertain climate shocks and stresses relies upon a governance system that can respond rapidly to a range of different scenarios and communicated needs. This uncertainty requires adaptive policymaking processes whereby governments are able to respond to both anticipated and unanticipated conditions (IISD 2006). Few city level agencies have been established in direct response to threats associated with global climate change. Yet given the vulnerability of all the cities to extreme climate events many of the institutional responses to these events are highly relevant for building climate resilience. Most have experience in responding to disasters and many have developed disaster management plans including effective early warning systems.

Motivation for building responsiveness and flexibility may come from devastating past experiences as in the case of landslides in Chittagong or the 2004 Tsunami in Chennai. The Chennai authorities soon realised the importance of disaster management and subsequently the Draft Master Plan identifies hazard prone areas and develops disaster preparedness Action Plan in response. The Action Plan is designed to make the earthquake vulnerability reduction programme applicable to other disasters indicating a degree of responsiveness to new contexts and heightened climate risks.

Risks to a city's economy from severe climate events are also key drivers of responsiveness. Respondents in Dalian for example suggest that the reason that the Dalian municipal government pays significant attention to disaster management is due to the enormous economic loss the city faces when floods, earthquakes or other climate events strike due to the types of industry building up around the city (ocean and air transportation, petroleum and chemical industries).

Similarly, few cities have budgets allocated to climate resilience per se, but related expenditures are helping to strengthen urban adaptation and vulnerability reduction. For example, most cities have made significant investments in water management and flood prevention. The Chinese cities have invested heavily in water conservation, including irrigation projects, drinking water supply for rural residents, preventing runoff, flood control and disaster defence work. The BMA similarly has a major flood management programme incorporating a large number of government departments. This reveals responsiveness in the long-term to flood management and the case study below reveals successful coordination between the BMA and the Royal Irrigation Department. Elsewhere a lack of coordination between agencies of the BMA is noted, which could limit short-term responses.

Flexible response mechanisms

D&A in disaster management can contribute to flexibility and responsiveness in the face of climate-induced disasters. These governance structures do not however guarantee a shift in responsiveness over time to new scenarios or communicated needs.

Situated on the Bay of Bengal, the breeding ground for cyclones and tidal surges, Chittagong is experienced in responding to disasters. Financial constraints still hamper preparedness and response operations, but two institutional mechanisms in particular are aiding the city's responsive capacity. The first are Standing Orders

for Disaster Management formulated by the Government of Bangladesh designed to clarify roles and responsibilities at every level, and secondly the City Corporation Disaster Management Committee. The non-disaster period responsibilities of the Committee cover preparedness activities such as establishing mechanisms for forecast dissemination, drills and shelter preparation. The Committee meets four times a year but is able to meet more frequently in times of disaster and more members can be recruited in unusual circumstances, providing a degree of flexibility.

India has a Contingency Action Plan stipulating the responsibilities of the different ministries and departments. The Gujarat State Disaster management Act, 2003 legislated the Gujarat State Disaster Management Plan which sets out procedures for all stages of disasters. Kerala state government is developing training programmes for government departments in disaster management and the administrative structures in Cochin appear to have the flexibility and resourcefulness to cope with rare events. Projections of sea-level rise and increased intensity of precipitation have been integrated into infrastructure planning. At the city level, this includes bridge clearance of 1.5 metres above high tide water level and elevation of roadways to 2.5 metres above high tide water levels. The administrative machinery for disaster management has been integrated at every level lending itself to a gradual shift to a more community-centred disaster management policy. Community-based approaches to disaster management stand a good chance of success here, given Kerala's record of mass public action.

All Chinese cities have an Emergency Management Office in accordance with national requirements. Many of the EMO's emergency plans provide strong foundations for responding to climate change associated risks. Ningbo for example has, in addition to an overall contingency plan for emergencies, special contingency plans to respond to: major natural disasters, typhoons, unexpected geological disasters, power outages, forest fires, biological crop disasters and animal disease outbreaks. Action Plans are associated with these plans to ensure the required research, financial resources and equipment, and technical and information support are made available. The systems are apparently flexible to new disasters. China's emergency system was built up after its suffering from SARS in 2003, in particular Hangzhou city was praised after SARS hit because it responded quickly on a provincial level regulation (related to animal diseases prevention and emergency control) than most other SARS-hit cities.

HCMC City Steering Committee for Flood and Storm Prevention has dealt successfully with flood-related problems that arose in 2006, though was predominately reactive rather than proactive. Despite serious losses to flooding and storms in recent years, neither natural disaster prevention nor climate change adaptation has been prioritised on the agendas of the City People's Council.

Responding to new scenarios

Surat is witnessing rapid in-migration and a growing slum population but city planners are working to integrate projected population increases. The informal sector is a major part of the Surat economy and the Surat Municipal Corporation (SMC) has taken steps to integrate the informal sector in planning, such as establishing hawking zones and stalls for the disabled. In response to the 1994 plague, the SMC has successfully implemented various slum relocation and

development programmes reducing the slum populations and providing water supplies and improved housing. This shows a good level of responsiveness and flexibility, and incorporates targeting the most vulnerable.

Da Nang's Integrated Coastal Management Plan was initiated in response to conflicts arising between rapid urbanisation and industrialisation and the conservation of Da Nang's coastal resources, and has involved extensive stakeholder consultation. It has also successfully demonstrated the potential for inter-agency cooperation and awareness-raising at all levels to develop an understanding of the value of coastal resources and build the institutional foundations and the motivation for effective coastal management. These foundations could be building capacity of all stakeholders to respond in a collaborative manner to new climate scenarios.

The worst series of landslides to hit Chittagong occurred in the June 2007 following several hours of heavy rain. The emergency response to the crisis was reported to have been swift with good coordination between government and non-government agencies at different levels. The funds and medical supplies were also reported to be sufficient. Emergency operations were severely hampered by the floods, which were exacerbated by the high tide slowing discharge into the waterways. But the critical issue in this case was the failure of the authorities to respond to the risk of landslide faced by the city in the decades previous; risks were caused primarily by hill clearing for land development. Both private encroachers and the city corporation are responsible for hill clearing over the last decades despite a growing movement of resistance to the practice. The 1995 Master Plan for Chittagong Development Authority forbid hill clearing but the practice has continued unabated. This case indicates poor governance in the area of environmental/natural resource management and provides an example of a clear failure to respond adequately to climate risks.

3.2.4 Participation and inclusion

Participation and Inclusion (P&I) refers to the governance arrangements that enhance or preclude the participation of all citizens in decision-making, monitoring and evaluation. This refers in particular to the groups of citizens most vulnerable to prevailing climate shocks and stresses, including those in informal settlements. Adaptive governance requires constructive engagement between local governments and pro-poor civil society groups who are most at risk (Kaufmann *et al.* 2005; Huq *et al.* 2007a).

This section relates very closely to the discussion on levels of transparency and accountability of the municipal authorities, particularly the references to information disclosure and mechanisms to promote citizens' right to information. Only when information is available does participation in decision-making, monitoring and evaluation become possible. Some of the mechanisms listed above such as websites can provide essential information but are often limited to those with access to certain forms of media.

A similar note of caution is required with discussions of participatory planning processes. Screening for participation and inclusion is about assessing the uptake of participatory process and public consultations as well as the principle or mechanisms being in place. In nearly all the cities processes for developing city

development plans include a consultation period or organised public hearings. But rarely do the most vulnerable or the most economically marginalised feature in the processes. In Vietnam, in principle the Party and Government call upon people to participate under the slogan 'people know, people discuss, people do and people supervise', but the reality is different.

The contrast to this is Kerala where the political consciousness and awareness of rights and responsibilities is high at every level. This is demonstrated by high turnout at elections and also facilitated by high literacy rates in the state. Development programmes in Kerala are identified and implemented at the ward level (the lowest level of urban governance) and are financed by a People's Planning Budget allocated through participatory budgeting based on sound needs assessment methodologies. One strong form of representation of the poor in Kerala is the Community Development Society made up of Area Development Societies comprised of Neighbourhood Groups (NGs). NGs consist of 20–40 women who meet once a week to discuss problems in their communities and seek solutions. Cochin has also pioneered e-governance systems.

But all these mechanisms do not automatically imply that the input from citizens in public consultations or participatory processes are fully integrated or adhered to. In Chennai there is little evidence of genuine representation or participation of the poor in decision-making. Instead a positive correlation between socioeconomic class and genuine representation is clear, marginalising further particularly those living in informal housing. When services are delivered in marginalised areas it is usually driven by vested interests and vote bank politics. Yet as mentioned above an estimated 40 per cent of Chennai Corporation's budget goes towards projects and programmes relating to the slums.

Even in Thailand, with a history of an active and dynamic civil society, research reveals difficulties in realising participatory and inclusive processes in Bangkok. An ingrained culture of bureaucracy, a lack of access to information, as well as low levels of education, low income and disinterest are significant factors especially for vulnerable groups. The Chittagong Development Authority and the City Corporation have their own authorisation committees who verify projects and submit to the board for approval to the exclusion of civil society and NGOs. Here the views of the most vulnerable are missing completely from the policy and programme development processes.

P&I in urban development planning

Surat's 'City Development Strategy' provides an example of an urban development plan founded upon on broad-based stakeholder consultations designed to incorporate the views of marginalised residents. The process is open to municipal councillors (some of whom are elected representatives of slum areas), NGOs and social organisations representing the poor. 12,000 forms were distributed as part of the strategy development process with a high level of response. Also considered in the process was a report from the Centre for Social Studies on urban poor, which deals with slum issues like infrastructure provision and quality of life. Under Gujarat Town Planning law a copy of the draft development plan must be available for public inspection and suggestions and objections must be incorporated into the final plan where appropriate.

Hangzhou's Comprehensive Protection of West Lake project provides an example of P&I in an urban development scheme in China that has reportedly resulted in all-round satisfaction with implementation including adequate compensation of displaced communities (see Box 3.2).

Box 3.2 Comprehensive protection of the West Lake, Hangzhou City

In 2002 Hangzhou Government invested five billion yuan in a project for protection of the West Lake, a famous tourist attraction. The project aimed to protect the natural and cultural resources and improve the ecosystem and the landscape in order to elevate the site to one of China's national '5A Scenic Spots'. The expansion of the lake and the opening of new scenic areas involved large-scale resettlement of the local population (933 households and 125 office units). The Hangzhou government have a poor record of handling resettlement programmes, but this time they proactively consulted with residents, business owners and workers. The government presented the objectives of the project and openly shared pictures of what the expansion would look like. The government also promised large amounts of subsidies and resettlement funds to those being relocated. All these efforts paid off as there was little objection to the proposal or implementation of the project, and in a resident and tourist evaluation of the site 99 per cent expressed satisfaction.

Unlike these cases, centralised planning systems in Vietnam do not lend themselves to high levels of public participation in decision-making and urban planning at the city level. The city authorities are under the direct control of the central government and decisions are promulgated without being subject to public scrutiny. The poorest citizens seldom have access to the information required to participate, even when projects are likely to have a significant impact on their lives. In disaster management, vulnerable communities are simply informed of urban disaster management plans formulated without their participation, usually communicated through community meetings or mass media. Only international organisations (UNDP, Red Cross and other INGOs) have taken a participatory approach to planning in Da Nang and only such organisations have incorporated disaster risk management into community development plans. The Integrated Coastal Zone Management programme in Da Nang which has led to the development of a coastal development strategy demonstrated the possibilities for fishing communities to be a core part of a consultative process for coastal management. The success of this process could lead the way in demonstrating the added value in giving marginalised or vulnerable communities a chance to participate in development planning in Da Nang.

3.2.5 Experience and support

A resilient urban system will build on existing experience in planning and successful implementation of climate-related risk reduction targeting vulnerable groups. Such experience will depend on technical and implementation support available to enable the successful implementation of adaptation strategies, including the NGO/civil society sector, as well as technical and academic institutions.

Experiences in planning for disaster preparedness, including the development of early warning systems were discussed above, all of which aim to reduce vulnerability and increase resilience of the cities in a broad sense. This section outlines different types of institutions, or combinations of institutions that have supported planning and implementation of projects aimed at disaster risk reduction. Some have the explicit objective of targeting vulnerable groups.

Experience of inter-agency cooperation

The BMA's experience of flood management provides an example of good collaboration between and within government agencies, resulting in major infrastructure developments and efficient early warning systems. See Box 3.3. In

Box 3.3 Early warning systems in Ningbo

Timely warning systems in Ningbo

In 2004, Zhejiang province set up a rain monitoring and warning system which is among the most advanced in China. The Ningbo authorities have established early warning systems using high-tech instruments. The Meteorological Bureau and the Water Conservancy Bureau are responsible for monitoring, collecting and releasing meteorological and hydrological information. In August 2007, Ningbo established the 'rainfall warning communication system' to deal with disasters associated with heavy rain. Three hundred hydrological telemetry stations were constructed in the city. If rainfall, rivers, or reservoirs reach critical levels (e.g rainfall >30 mm per hour), the warning system will be activated immediately. In response the warning notices will be sent by the relevant government bureau, and flood prevention plans will be activated. In 2005, when typhoon Kanu hit Ningbo, the Ningbo government took timely actions and thus was able to reduce damage.

The Ningbo government's typhoon response success

As typhoon Kanu formed, the Flood Control Department of the Ningbo municipality requested the relevant bureaus to monitor it and make the necessary preparations. The Department also promptly released information to the public via the media. Predicting that the typhoon would hit Ningbo in the afternoon of September 11, the Ningbo government issued an emergency notice ordering all people and ships in high risk and disaster-prone areas to be relocated by 12:00 on that day. In a short time, 147,003 people and 8,238 ships were relocated. Similarly, in 2006, when typhoon Saomai and Bilis hit Ningbo, the Ningbo government successfully evacuated thousands of people. As a result, Ningbo has avoided thousands of casualties from the typhoons.

Source

http://gtoc.ningbo.gov.cn/art/2007/8/7/art_822_94821.html

Related data of preventing typhoons hit Ningbo in recent years

http://slj.ningbo.gov.cn/homepage/ztbd.aspx?catid=116&cat_parent=94

www.zjdii.gov.cn/shuzizhejiang/shuzizhejiang-xiangxi.jsp?CONTENT_ID=2350

Chennai, the Tamil Nadu Housing Board (TNHB) has implemented housing schemes targeting all socioeconomic groups over the past few decades. Whilst lower income groups were taken care of and the scheme aimed to restrict settlements becoming too densely settled, the Board's programme has not been successful in the long-term. Many of the properties of the Lower Income Groups were bought up by private developers, who demolished the original buildings and replaced them with multi-storey buildings.

The cities' experiences of response and relief efforts have put warning systems to the test. Box 3.3 shows capacity and experiences of the Ningbo city authorities in responding in a timely and coordinated manner to a variety of climate impacts. Similarly, the case of a severe snowstorm in Dalian indicated not only accurate weather forecasting but swift communications and advice reaching the relevant authorities who were able to take appropriate action to minimise damage and loss of life. The challenge remains in all these cases to get emergency warning information and instruction to the more remote or most vulnerable settlements.

In the case of landslides in Chittagong, whilst experience of responding is extensive and reasonably smooth, there is still a long way to go in prevention and preparedness strategies. These require authorities to address the short-term human-induced risk of hill clearing and paying attention to the needs of the most vulnerable especially those on the outskirts in areas at higher risks of landslides. A systematic approach to integrating climate change into city planning and the targeting of vulnerable groups is needed. Several tools for building resilience have been suggested.

Civil society/NGO experience and support

In Chennai civil society groups and NGOs have played a significant role in supporting aspects of urban governance. With the capacity to work closely with communities, to fully understand needs and priorities and to facilitate participatory approaches civil society organisations can strengthen service provision, environmental management and the livelihoods of the most vulnerable people, crucial to building their resilience, as well as that of the cities' infrastructure, to extreme climatic events.

National level experience and support

National level efforts are also providing experience and support for city level climate resilience. Developments in climate modelling by national meteorology agencies such as IMHEN in Vietnam can provide crucial data for integrating climate resilience into urban planning. IMHEN is a leading research institute in the field of climate change with experience of in-depth research around climate policy, strategy development, climate modelling and future projections and forecasting. Under a project entitled 'Climate Change Impacts in Huong River Basin and Adaptation in its Coastal District of Phu Vang' in the neighbouring province to Da Nang, IMHEN conducted climate modelling for the central part of Vietnam which could be very relevant to, and useful for, integrating climate change adaptation into city planning for building resilience to climate change.

Box 3.4 Civil society support to vulnerable groups in Chennai City

Kattamaram

Kattamaram is a civil society platform formed to support Tsunami- affected communities. A recent confidential proposal by the state to forcibly move fisher folk from along the coasts where they have been living for generations, by at least a kilometre, in the wake of the December 2004 Tsunami was obtained by Kattumaram. Kattumaram launched a campaign and had the document published in the *New Indian Express* daily newspaper. The state stopped the eviction and opted for public hearings, which members of the Kattumaram were actively involved in. These public hearings were held in the wake of the N.C. Saxena Committee that was set up by the Supreme Court of India to investigate issues relating to Food Security and Livelihood Rights.

Exnora (Excellent Novel and Radical Ideas)

Exnora has played a major role in assisting with solid waste management, supporting zero waste management, a citizens' waterways monitoring programme, community sanitation improvement projects, a student environment programme and rainwater harvesting projects.

Puduvellam (New Water)

Puduvellam, a community initiative in Tiruvanmiyur in the south of Chennai, in a traditional fisherfolk settlement, has been commendable. Through relying on rain water harvesting and directing the storm water drains into temple tanks, they have managed to raise the ground water level in Tiruvanmiyur from 65-70 feet below ground level to within 10–15 feet in a span of four years.

3.2.6 Indicators of climate resilient urban governance

Table 3.3 provides a summary of the rapid assessment outputs, drawing out indicators of climate resilient governance for each city. The table demonstrates the limits to comparative analysis within the scope of this research, and indeed whether comparing cities tells us something new beyond the aims of the Rockefeller Foundation. However this analysis assists in developing our understanding of how the five components of good urban governance address disaster management and climate resilience. These potential indicators can therefore strengthen the current framework. In order for these to be integrated in a meaningful way, further research is needed to explore in depth whether the indicators highlighted necessarily lead to good or bad resilience outcomes.

Table 3.3 Summary of climate resilient governance indicators

City	Decentralisation and autonomy	Transparency and accountability	Responsiveness and flexibility	Participation and inclusion	Experience and support
Bangkok	<ul style="list-style-type: none"> – decentralised municipal authority – overlapping functions and poor coordination between governments – financial decentralisation and autonomy – local responsibility for flood control 	<ul style="list-style-type: none"> – access to information legislation – little oversight by citizens due to bureaucratic procedures 	<ul style="list-style-type: none"> – improvements in responsiveness to flood management – planning in response to climate change mitigation 	<ul style="list-style-type: none"> – low levels of participation among marginalised groups – public consultation on urban planning – top-down decision-making 	<ul style="list-style-type: none"> – experience in flood management, disease control and early warning systems – active civil society
Chennai	<ul style="list-style-type: none"> – decentralised municipal authority – conflict between national, state and city governments – increased autonomy has had mixed results 	<ul style="list-style-type: none"> – access to information legislation 	<ul style="list-style-type: none"> – responsive disaster management – poor city planning capabilities – poor coordination between departments 	<ul style="list-style-type: none"> – large budget allocations for slum dwellers – public consultation on urban planning but lack of representation for the lower class 	<ul style="list-style-type: none"> – membership in associations relevant to climate change – active civil society
Chittagong	<ul style="list-style-type: none"> – decentralised departments and agencies responsible for local service delivery – city disaster management committee – lack of financial autonomy 	<ul style="list-style-type: none"> – lack of transparency and access to information 	<ul style="list-style-type: none"> – clear lines of responsibility in disaster management – poor enforcement of land use policies 	<ul style="list-style-type: none"> – increasing involvement of stakeholders in decision-making 	<ul style="list-style-type: none"> – experience in disaster management – little experience in prevention and preparedness
Cochin	<ul style="list-style-type: none"> – decentralised municipal authority – state level disaster management but no municipal organisation 	<ul style="list-style-type: none"> – improving accountability but little transparency – access to information legislation 	<ul style="list-style-type: none"> – no direct municipal role in disaster management 	<ul style="list-style-type: none"> – inclusive and participatory decision-making including participatory budgeting 	<ul style="list-style-type: none"> – lack of institutions and infrastructure to deal with climate hazards
Da Nang	<ul style="list-style-type: none"> – ‘separate planning city’ controlled by central governing party – local disaster management – lack of financial autonomy and capacity 	<ul style="list-style-type: none"> – transparent delivery of public services 	<ul style="list-style-type: none"> – evidence of collaboration for environmental planning 	<ul style="list-style-type: none"> – lack of participatory decision-making 	<ul style="list-style-type: none"> – some experience in disaster risk reduction through integrated coastal management
Dalian	<ul style="list-style-type: none"> – ‘separate planning city’ controlled by central governing party 	<ul style="list-style-type: none"> – lagging access to information in comparison to other Chinese cities 	<ul style="list-style-type: none"> – responsive disaster management planning – investment in flood management – presence of Emergency Management Office 	<ul style="list-style-type: none"> – no specific agency responsible for implementing adaptation 	<ul style="list-style-type: none"> – experience in dealing with extreme weather events
Hangzhou	<ul style="list-style-type: none"> – ‘separate planning city’ controlled by central governing party – financial autonomy – no municipal authority for dealing with adaptation 	<ul style="list-style-type: none"> – access to information legislation 	<ul style="list-style-type: none"> – investment in flood management – presence of Emergency Management Office 	<ul style="list-style-type: none"> – limited public participation in decision-making 	<ul style="list-style-type: none"> – good practices in early warning systems and emergency planning
Ho Chi Minh	<ul style="list-style-type: none"> – highly centralised urban planning – decentralised disaster management – lack of financial autonomy 	<ul style="list-style-type: none"> – lack of transparency and access to information 	<ul style="list-style-type: none"> – reactive disaster management – lack of capacity and coordination limit responsiveness 	<ul style="list-style-type: none"> – lack of participatory decision-making 	<ul style="list-style-type: none"> – experience in dealing with storms and flooding
Ningbo	<ul style="list-style-type: none"> – ‘separate planning city’ controlled by central governing party – financial autonomy 	<ul style="list-style-type: none"> – access to information legislation 	<ul style="list-style-type: none"> – investment in flood management – presence of Emergency Management Office 	<ul style="list-style-type: none"> – limited public participation in decision-making and planning 	<ul style="list-style-type: none"> – good practices in early warning systems – large financial investment in water conservation and flood management
Surat	<ul style="list-style-type: none"> – decentralised municipal authorities 	<ul style="list-style-type: none"> – access to information legislation 	<ul style="list-style-type: none"> – responsive to growing informal settlements 	<ul style="list-style-type: none"> – broad stakeholder consultations in urban planning 	<ul style="list-style-type: none"> – experience with previous disaster situations

4 Conclusion

The literature and city assessments point to rapid urbanisation exacerbating climate risks, creating new ones and heightening human vulnerabilities to these risks. These include risks and vulnerabilities associated with pressures on natural or historical waterways and drainage systems and the rapid increase in informal settlements and substandard housing. The exposure of these conditions and human-induced vulnerabilities is providing motivation for integrating climate adaptation into city planning, though while desire and a degree of awareness seem to be evident, real progress is severely limited in most of the cities studied.

Investigating cities' experiences of disaster risk reduction within a good governance framework provides a useful starting point for further exposing the links between urban governance and climate resilience and assessing the potential for good urban governance to deliver climate resilience outcomes. Deeper investigation and analysis are required to understand the extent to which good urban governance and climate resilient urban planning and development can be linked to deliver pro-poor climate adaptation through achieving risk reduction for the most vulnerable populations. Governance arrangements must be able to address infrastructure, services and housing provisions for marginalised communities and in-migrant populations and therefore must form a core component of any climate resilience governance framework and a core consideration of further vulnerability assessments within each of the cities.

The rapid assessments discussed in this paper have contributed to developing this framework further. A few conclusions can be highlighted, in addition to the expanded analytical framework presented below; capacity for integrating climate risk reduction into city development plans or municipal agency remits is influenced by levels of awareness and understanding of climate risks and levels of motivation among elected representatives and government departments. Access to resources is also significant particularly in those cities with substantial financial autonomy. Accountability mechanisms in city planning and the participation of city residents in planning processes provide further indicators of the city's capacity to implement meaningful and pro-poor climate adaptation programmes. National level engagement with international climate policy and climate change mitigation appear to indicate greater institutional capacity and political will to implement climate adaptation programmes locally once sufficient funding and implementing frameworks become more widely available.

4.1 Characteristics of urban governance for climate resilience

Based on the existing literature and on reports from the ten Asian cities, we can tentatively conclude that components of good urban governance are related to delivering urban climate resilience in the following ways:

Decentralisation and autonomy: Evidence suggests that cities suited to building climate change resilience avoid cyclical political stalemates and achieve situations where national, state and city ruling parties can work together quickly and effectively to implement policies and programmes. In some cases, the

decentralisation of decision-making and political control creates conflicts and delays between agencies, hampering the development of climate resilient programming, yet equally, while heavily top-down decision-making structures can help to implement programmes quickly, they often fail to allow the participation of those people they are designed to help. Consequently, a balance must be struck between the need to build climate resilience rapidly and the need to avoid maladaptation by ensuring marginalised voices and climate science agencies contribute to the process of decision-making, planning and implementation.

Transparency and accountability: A municipal system committed to maintaining a relationship of accountability to its citizens and openness in terms of financial management in key 'climate sensitive' sectors, such as waste, water and disaster management, urban planning and pro-poor service provision is likely to support, facilitate and strengthen resilience building. Legislation and administrative systems which support the right to information, must be in place to facilitate access to investigative or grievance procedures in cases where vulnerability to climate change has been increased. Independent, informed local media, with journalists who are interested in climate change, helps to hold city authorities to account, pressurises the political leadership to advance policies, and highlights the issues with citizens.

Responsiveness and flexibility: Climate change has the ability to spring surprises, whether in the emergence of new problems or in the impact of disasters, which may occur with a greater frequency or higher severity than the city has previously experienced. Accordingly, a city requires flexible agencies and management systems, suited to responding to and anticipating these surprises. Evidence suggests that an inter-agency, cross-government body dedicated to tackling the potential and actual impacts of climate change is desirable, and one which bases planning and programming on climate change scenarios. Highly knowledgeable officials, able to draw on the experiences of other cities, able to network across agencies, able to learn from the disaster management and response community and able to integrate the work of climate scientists all help to promote the necessary flexibility. Additionally, the 'mainstreaming' of climate risk assessments and climate scenario-based planning across sectors of the city government and in the development of projects, helps to build resilience. Furthermore, in responding to disasters, future resilience to climate change should be factored into the relief and reconstruction phases, and finances must be made available to retrofit or upgrade buildings and infrastructure to withstand future climate extremes.

Participation and inclusion: Authors of good urban governance studies suggest that the involvement of poor and marginalised groups in decision-making, monitoring and evaluation is a key characteristic of a city intent on improving the conditions for those living in informal settlement or living in exposed locations. As the impact of climate change in urban areas is likely to disproportionately affect the poorest and most vulnerable first and most severely, their integration in decision-making and policy processes is crucial for building climate resilience. This characteristic is necessarily tied to citizens' rights to information, as without information disclosure, meaningful participation and inclusion is not possible. Additionally, the quality of participation and inclusion can be somewhat difficult to

ascertain (from tokenism and ‘politicised consultations’ on the one hand to citizen-led processes on the other), but climate resilience must be a product of balancing citizen-led processes with timely and efficient implementation.

Experience and support: The evidence suggests that cities possessing experience of developing integrated, people-centred early warning systems for extreme events are well placed to make progress toward climate change resilience. The less event driven aspects of climate change, associated with slow growing increases of stress on water supplies, waste management systems and environmental services require a different set of relationships. In this regard, cities benefit from the experience of local, national and international NGOs and civil society organisations operating in the city, community-based groups and research organisations. External donor agencies and the availability of project financing for climate change resilience programmes helps to spur city authorities to act, but suitable systems must be in place to both utilise the knowledge held by partners and to reward these relationships. Additionally, a national government committed to tackling climate change and engaged in the UNFCCC processes appears to help with trickle-down support to municipal governments, even if it is just in clear strategic objectives linked to climate change.

Annex 1 Research partners

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