Asian Cities Climate Resilience

Developing city resilience strategies: lessons from the ICLEI–ACCCRN process

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Acronyms and abbreviations

ACCCRN	Asian Cities Climate Change Resilience Network
AF	Adaptation Fund
CDP	Comprehensive development plan
CLUP	Comprehensive land-use plan
COP	UNFCCC annual Conference of Parties
CRS	City resilience strategies
DRR	Disaster risk reduction
GCF	Green Climate Fund
GIS	Geographic information system
GIZ	German Society for International Cooperation
IAP	ICLEI–ACCCRN process
ICLEI	ICLEI – Local Governments for Sustainability
INDC	Intended nationally determined contributions
IPCC	Intergovernmental Panel on Climate Change
ISET	Institute for Social and Environmental Transition
LCCAP	Local climate change action plan
LEDS	Low emissions development strategy
LGU	Local government units
M&E	Monitoring and evaluation
NCCAP	National climate change action plan
NGO	Non-governmental organisation
NIE	National implementing entities
RAN-API	National action plan on climate change adaptation (Indonesia)
TAP	ICLEI's Transformative Actions Program
UCCR	Urban climate change resilience
UNFCCC	United Nations Framework Convention on Climate Change
VA	Vulnerability assessment

Abstract

Asian cities are on the frontline of climate change. A third of all low-elevation coastal zones in the world are located in Asia, where two-thirds of the world's urban population reside. A number of Asian cities have been involved in climate change adaptation and resilience-building initiatives, focusing on the capacity of local governments to assess vulnerabilities and implement effective mitigation strategies. One such initiative is the Asian Cities Climate Change Resilience Network (ACCCRN). In 2008, it began a process of understanding vulnerability and developing and implementing resilience strategies in 10 cities across South and Southeast Asia. In 2012, with ICLEI's involvement, the process was extended to a further 46 cities, to improve their capacity to plan, finance and take action to promote urban resilience, using city resilience strategies (CRS). Based on a sample of 15 city resilience strategies from India, Bangladesh, Indonesia and the Philippines, this briefing presents the key lessons.

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1   Introduction

Cities are on the climate change frontline – both in terms of experiencing the impacts of a changing climate, and in terms of taking measures to adapt to these impacts and build resilience. The Intergovernmental Panel on Climate Change (IPCC) fifth assessment report (Revi *et al.,* 2014) recognises that actions are already being implemented in urban areas to adapt to climate change, while the United Nations Framework Convention on Climate Change (UNFCCC) annual Conference of Parties (COP) now includes a Cities Day, and local governments were recognised at COP16 in 2010 in Cancun as key stakeholders (Fischer *et al.,* 2015).

This recognition comes as the world's population is increasingly living in urban areas. Asia is already home to 53 per cent of the world's urban population, and China and India, along with Nigeria, will see the largest urban growth (UNDESA, 2014a). It is important to acknowledge that small urban centres, of fewer than 500,000 inhabitants, already account for nearly half of the world's urban population, and these are projected to increase by more than 5 per cent per year (ibid). Yet in Asia, these smaller urban centres are often the least equipped to meet the needs of their citizens, in terms of providing access to affordable, safe and secure housing, basic services such as sanitation and electricity, and access to health and education services, amongst others – which arise from effective urban governance and good urban planning. Without these essentials in place, the populations of these towns and cities are more vulnerable to the effects of climate change – particularly those living in informal settlements.

Asian cities are particularly exposed to the impacts of climate change. About one-third of the world's land in low-elevation coastal zones is in Asia, housing two-thirds of the world's urban population who are consequently at risk from sea-level rise (McGranahan *et al.*, 2007). Bangladesh is already experiencing coastal erosion, saltwater intrusion and flooding, triggering migration to cities (Shachi, 2015). The Philippines has seen an increase in intensity and frequency of typhoons, and has been identified as the country most affected by climate change in 2013 (Kreft *et al.,* 2014). Asian cities will also face heatwaves and flooding on a more regular basis, with direct and indirect impacts on health, and food and water availability, compounding the effects of existing deficits in infrastructure and services (Colenbrander *et al.*, 2016).

1.1   Urban climate resilience initiatives

In light of the above, Asian cities have been the target of a number of climate change adaptation and resilience-building initiatives, in particular focusing on the capacities of local governments to understand the likely future climate impacts, assess vulnerability and hazards, and plan and implement actions to address these. This working paper focuses on an initiative funded by the Rockefeller Foundation known as the Asian Cities Climate Change Resilience Network (ACCCRN), beginning in 2008. Initially focusing on 10 core cities in Indonesia, India, Thailand and Vietnam, it then expanded to cover Bangladesh and the Philippines, with one core action area being to experiment with and test 'local approaches to building climate change resilience for institutions and systems serving poor and vulnerable communities' (Arup, 2013). A key element of the city-level process was the preparing of city resilience strategies (CRS) with stakeholders from multiple sectors coming together to identify and prioritise action areas for building resilience, based on an assessment of risks and vulnerabilities arising from climate change and urbanisation (Uennatornwaranggoon, 2015).

These CRS were then a basis for applying for project funding from ACCCRN to implement the priority actions. The process at city level was supported by a range of partner organisations in-country and across the region.

In 2012, the ACCCRN process was scaled up to a further 40 cities in Bangladesh, the Philippines, India and Indonesia, led by one of the partner organisations, ICLEI – Local Governments for Sustainability, a global network of more than 1,500 towns, cities and regions engaged in building a sustainable future. ICLEI was also able to supplement the city-level process with small engagement-building grants in certain cities, to encourage the 'formation of genuine, sustained partnerships between the cities and their key external stakeholders' (ICLEI, 2014). The intended high-level outcomes of the ICLEI–ACCCRN process (IAP) were to 'improve the capacity of up to 40 cities in South and Southeast Asia to plan for, finance and undertake actions which promote city resilience in responding to the opportunities and impacts of climate change' and to help ensure 'funding is identified (and secured) from a variety of sources' (Scott, 2017).

1.2   Objectives of this paper

As the ACCCRN initiative comes to an end – shifting its focus to the fostering of a network of urban climate change resilience (UCCR) practitioners – it is timely to assess the CRS development process. This working paper seeks to examine the process behind the development of the CRS, and the resulting strategies themselves, in a selection of case-study cities, in order to:

- Identify the commonalities and differences in CRS in terms of risks to be addressed and the strategies or interventions identified within them,

- Understand some of the drivers behind the differences across city strategies, and

- Identify some of the implications for implementing the CRS.

The paper focuses specifically on the CRSs developed with the support of ICLEI from 2012 onwards, in Bangladesh, India, Indonesia and the Philippines, by examining a sample of CRS from each of the countries. It does not seek to serve as a formal evaluation of the strategies and the process behind their preparation.

In the next section, the paper considers the conceptual and practical underpinnings of approaches to developing city government capacities to build urban climate change resilience, and outlines the ICLEI–ACCCRN process as applied in the case-study cities. In Section 3, the methodology for this study is outlined, including the analytical framework, while the results of the analysis of the CRS samples are presented in sections 4 and 5. The final section provides a discussion of the results, and looks forward at the implications for cities of developing resilience strategies and ensuring they can be implemented and monitored.

2 Building urban climate change resilience

2.1 Framing urban climate change resilience

As the need to prepare for and adapt to climate change in urban contexts has become increasingly pressing, conceptual frameworks specific to UCCR have emerged. Many approaches to developing climate change resilience build on decades of experience of sustainable development and disaster risk reduction (DRR) projects, with a climate change dimension (Reed *et al.,* 2014). The IPCC defines resilience as 'the ability of a social or ecological system to absorb disturbances while retaining the same basic structure and ways of functioning, the capacity for self-organisation, and the capacity to adapt to stress and change' (IPCC, 2007). A starting point for building UCCR is to understand the interaction of climate change impacts, both direct and indirect, on urban systems and vulnerable populations within a city (Brown *et al.*, 2012). The pre-existing vulnerabilities of populations – as well as considerations of future growth of an urban area, and how these may affect risks and vulnerabilities in the context of a changing climate – mean that climate resilience emerges from the dynamics between space and time. The state of resilience will therefore constantly be evolving, and may be on a spectrum between avoidance of breakdown to transformational change (Brown *et al.*, 2012) in the way cities and their political, economic and social systems function. This evolution will also depend on the changing capacities of institutions and agents (actors) on the ground to respond (Tyler and Moench, 2012). Thus, the IPCC conception of resilience can be extended to define urban resilience as 'the ability of institutions, infrastructure, ecosystems and knowledge networks to evolve and adapt' in the face of shocks and stresses, beyond simply 'bouncing back' to a pre-existing state and retaining the same structure and ways of working (Kernaghan and da Silva, 2014: 2). A number of characteristics, which will support the pathway to becoming a climate-resilient city, have been identified: flexibility, redundancy, resourcefulness, safe failure, responsiveness, capacity to learn, and dependency on local ecosystems (da Silva *et al.*, 2012: 11).

In order to achieve the above, there needs to be a process of understanding the current and future climatic hazards faced by the city in question, and assessment of the vulnerable populations in the city. Different approaches to vulnerability assessment (VA) include participatory GIS mapping (Singh, 2014) and community-led hazard and vulnerability assessments (Taylor and Lassa, 2015). Resilience-building also means engaging with the underlying drivers of vulnerability, such as poverty, lack of security of tenure and/or lack of voice, to avoid merely bouncing back to the pre-existing state.

While resilience has become a catchphrase for preparing for a climate-changed future, the gaps in resilience-thinking must be recognised. The institutions and agents active in a city may harbour fundamental power imbalances. There is a need to focus on what resilience may mean to different groups of actors and thus understand the differentials of power which may impede resilience-building for certain groups or scales (Bahadur and Tanner, 2014). This requires an understanding of the drivers of vulnerability, which may extend beyond physical exposure to deep-seated structural inequities and imbalances, including in access to information and physical resources. Without addressing these structural barriers, resilience approaches will be unable to achieve the necessary transformation of political economy structures (Pelling and

Manuel-Navarrete, 2011), whether at the city, national or global scale. This transformational shift might be seen as the stage beyond resilience.

2.2   Building capacity at city level

The capacity to learn and adapt is central to building resilience. Capacity gaps, in terms of financing, human resources and technical knowledge are frequently identified as constraints facing local governments, whether in high-, middle- or low-income countries (Baker *et al.,* 2012; Colenbrander *et al.*, 2016). There is still a lack of effective mechanisms for integrating knowledge about climate change risk into local planning processes, due to a number of reasons: gaps in local access to and ability to interpret scientific data about climate change hazards and their implications for the city and its population (Measham *et al.,* 2011); and limited understanding of the drivers of vulnerability at the urban scale (Fünfgeld, 2010). More broadly, limitations may stem from constraints faced by local governments imposed by broader national governance frameworks, in terms of clear roles and responsibilities or statutory obligations, financial resources, or (lack of) political support (Baker *et al.,* 2012, Measham *et al.,* 2011).

One of the core objectives of the ACCCRN initiative was to support and develop the capacity of local actors, particularly in secondary cities, 'to plan, finance, coordinate and implement climate change resilience strategies' (Brown *et al*., 2012: 532). While ACCCRN deliberately had a broad range of target actors for capacity building, including 'city actors' and 'diverse stakeholders' (Archer and Dodman, 2015), the ICLEI–ACCCRN process focused efforts on building capacity of local governments, and through them, their communities and stakeholders. The process tried to address some of the gaps identified by Measham *et al.* (2011) by facilitating access to climate change data, and assisting with interpretation and understanding of likely local impacts, in order to plan appropriate actions. Additionally, it worked within national frameworks and guidelines. Reed *et al.* (2014), in their examination of ACCCRN projects as experiments, see the initiative's emphasis on shared learning dialogues, creating networks and learning by doing, as contributing to capacity building on resilience. The knowledge from the vulnerability assessments, along with the components of the resilience framework, were brought together through city-level shared learning, which sought to 'engage stakeholders in a structured process of exchanges' which included co-production of knowledge and analysis of new information, cross-disciplinary and cross-sectoral and cross-scale engagement, in a cyclical, iterative process (Reed *et al.,* 2014). This shared learning approach aims to promote 'flexibility, learning and innovation rather than command-and-control approaches' and has been found to help establish or strengthen networks across government agencies, non-governmental organisations (NGOs) and academics, facilitate multi-stakeholder engagement, and challenge dominance by experts in certain cities through more transparent information analysis (Reed *et al.,* 2014: 408).

The iterative process fostered by shared learning dialogues recognises the fact that building resilience takes time, and requires constant re-evaluation of the situation on the ground and learning from past projects. Additionally, 'without sustained engagement and a process to help different actors in the city to reach new levels of awareness most [ACCCRN core] projects would have likely remained focused on addressing more obvious challenges' (Uennatornwaranggoon, 2015: 11). However, an in-depth, sustained process has not always been possible in each city, due to funding, scale and time constraints.

There is also a role for city networks to foster capacity building of local governments in three ways: through processes of exchange across local governments and other organisations, by supporting specific policies, and through access to international forums (Castán Broto, 2016).

Certain networks may have preceded the climate change agenda (ICLEI included) and may seek to integrate climate change resilience with other objectives, such as environmental sustainability, economic growth or the green economy (ibid), building on past processes. Other networks, such as ACCCRN, have formed around the specific goal of building UCCR through a specific set of approaches. The approach applied by networks will differ according to the key drivers of action within the network and on the ground.

2.3   The ICLEI–ACCCRN process (IAP)

The ICLEI–ACCCRN process (IAP) was developed by ICLEI South Asia and Oceania offices and draws on the frameworks implemented and the experience and learning from the original ten ACCCRN cities, combined with elements of existing ICLEI approaches. The characteristics of a climate-resilient city were adapted by ACCCRN partners with a number of slightly different but complementary resilience frameworks emerging. For example, the model adopted by Arup, one of the international partners, combined spatial analysis with analysis of socio-technical networks: infrastructure, knowledge, and institutions, within a context of dependency on resources (ecosystems) and the desired outcome of well-being (da Silva *et al.*, 2012). The model applied by the Institute for Social and Environmental Transition (ISET), another international partner, had three key elements: systems, institutions and agents, each of which can be matched with a set of the seven characteristics of a resilient city – for example, agents should be resourceful, responsive, and have the capacity to learn (Tyler and Moench, 2012). The ISET framework, combined with the spatial analysis component of Arup's approach, was the basis for the ICLEI–ACCCRN approach to conceptualising urban resilience when working with cities.

Arup, as an ACCCRN partner, provided an assessment of the draft ICLEI process, and held two workshops with ICLEI staff in order to refine it further. The most significant outcome was to strengthen the spatial dimension of the analysis, which resulted in the addition of hotspot mapping to the methodology, where overlapping fragile urban systems and areas of vulnerability were represented visually using GIS maps, to highlight where attention should be prioritised. The toolkit was tested in three Indian cities – Shimla, Bhubaneswar, and Mysore – and subsequently used in a range of cities in Indonesia, Bangladesh, the Philippines and India.

The IAP targets city governments in their role of service and infrastructure providers, as well as their role to catalyse community action. It provides a streamlined process that is simple and yet rigorous, and is designed so that it can be implemented by the cities themselves, with only minimal need for external support. It enables local governments to assess their climate risks, and formulate and implement corresponding resilience strategies.

The IAP is a risk-based approach that draws on the ISET conceptualisation of urban climate change resilience mentioned previously, and has been designed in a step-by-step format, divided into six phases (Figure 1). A city with very little previous experience in climate change planning is advised to follow this sequence. However, other cities that have already completed some studies or analysis, or engaged in other climate projects, may wish to select only parts of the process. The process is also designed to be a continuous cycle of review and refinement, rather than a closed cycle, in recognition of the importance of learning to building resilience. In each of the four countries, the first four steps of the IAP were delivered (up to the production of the CRS), with the fifth implementation step being enabled somewhat through the small grant process, and the sixth monitoring and evaluation (M&E) step yet to be tested. Although each country followed the guidance of the toolkit, there were varying delivery models in each of the countries – and the toolkit itself draws on a variety of resources and approaches, ranging from shared learning dialogues to the United Nations Office for Disaster Risk Reduction (UNISDR) local government self-assessment tool (Gawler and Tiwari, 2014).

As a result of engaging in the IAP, city governments are expected to derive the following benefits:

■ Strengthened awareness and knowledge of potential risks at local level with engagement of stakeholders.

■ Better understanding of the city's vulnerabilities to climate change impacts and therefore better management of climate change impacts.

■ Development of a climate resilience strategy for improved local economic, social and environmental resilience of the city.

■ Integration of the resilience strategy into urban planning and implementation processes and guidance for financing and implementation of interventions.

Across the four countries, the delivery model for the IAP varied depending on the underpinning national and local contexts. In the Philippines, it was thought that engaging cities to work collaboratively with their surrounding municipalities might provide greater opportunities for effective climate change adaptation, so the concept of 'clustering' delivery emerged (see Section 6.2). The Philippines' local governments must also meet a national mandate to produce

a local climate change action plan (LCCAP) – meaning that the CRS is known as the LCCAP. In total, 15 local government units (LGUs)[1] participated in the ACCCRN project in the Philippines. The delivery model involved a mixture of individual city workshops, group workshops where all LGUs were invited to attend, and technical support provided online, via phone calls or personal visits by ICLEI Southeast Asia staff.

In India, Bangladesh and Indonesia, two distinct delivery models emerged: the original process which took cities all the way through the four phases of the toolkit, and a rapid assessment approach which recognised previous efforts, or complementary work currently underway. Thus, cities that had perhaps participated in ICLEI's urban low emissions development strategy (LEDS) process in India and Indonesia did not necessarily need to undertake all elements of phases 1 and 2 of the IAP, and could be fast-tracked to phases 3 and 4. In Bangladesh, the whole IAP process was undertaken over a compressed period of three months due to initial delays. The ICLEI South Asia office provided support online, via phone calls and personal visits with cities in both India and Bangladesh, while the Indonesian office supported the Indonesian cities.

ICLEI staff played an important role in the preparation of the CRS and in many cases, took the lead in drafting the documents, with frequent review and validation by the city climate core teams, either by email and/or validation workshops. In all cases, the resulting document is owned by the cities.

Figure 1. The six steps of the ICLEI–ACCCRN process (IAP)

Source: Gawler and Tiwari (2014)
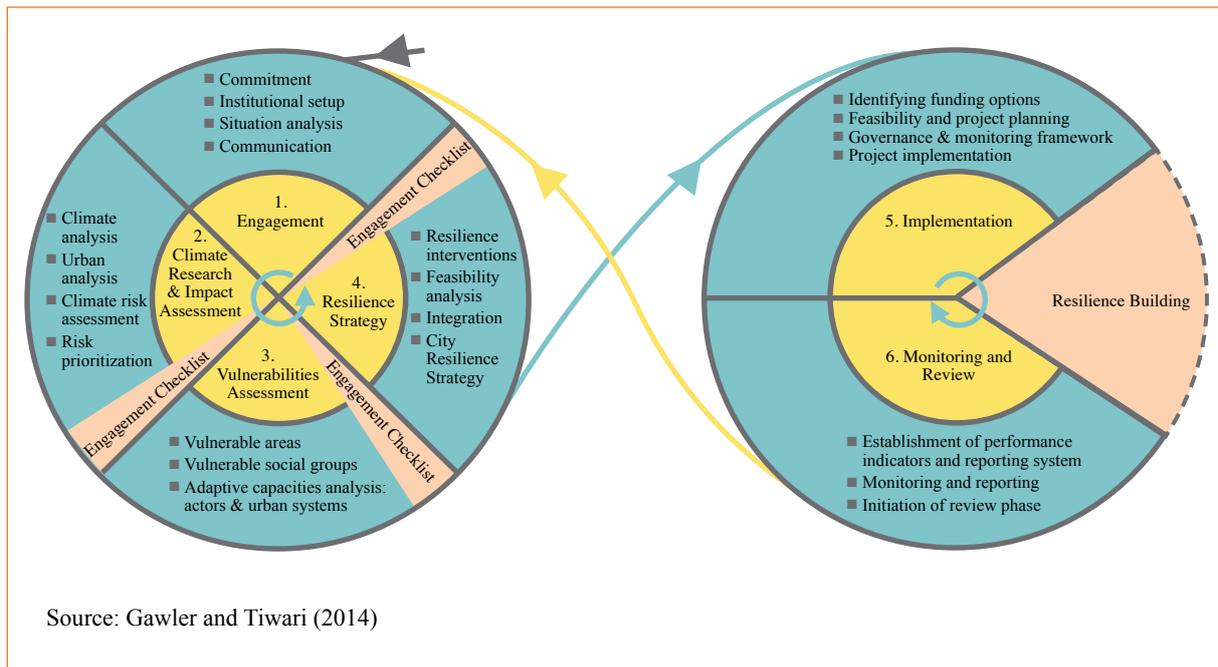
The CRS were developed following the IAP and Tool 4.0 (city resilience strategy) of the guidelines (Gawler and Tiwari, 2014) and supported by ICLEI staff. Consequently, the CRS largely follow the same format, starting with an introduction which outlines the methodology. An introduction to the city follows, including basic demographic, socio-economic and climatic information, while some cities also include an institutional profile. The toolkit guidance suggests including a section on past climatic events, and climate projections or scenarios for the future, before outlining the results of the vulnerability assessment. The VA should include the actors involved in the urban systems identified, and an assessment of their adaptive capacity. Following this should come the resilience interventions identified, which should include timelines,

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1 In the Philippines, cities and municipalities have different legal recognition, so are collectively referred to as local government units.

costs, and institutional responsibility and mechanisms to support this intervention being implemented. Across the cities and countries, the level of detail may vary, depending on the amount of information available, such as downscaled climate projections, and the depth of the assessment process, and on the time and resources available.

The ICLEI approach works through city governments, reaching out to communities and other stakeholders from this base. There was a clear expectation that cities would fully engage their communities throughout the process to ensure local ownership and leadership of interventions. In order to facilitate this, ICLEI's engagement-building small grants programme encouraged the formation of genuine, sustained partnerships between the cities and their key external stakeholders, for the implementation phase of the IAP. The grants were offered to city partners, rather than to the cities themselves, in order to encourage these partnerships. Groups eligible for receiving a grant must be part of the stakeholder group identified by the city and have been actively involved in the city's implementation of the UCCR planning process, such as NGOs, village committees or universities. The engagement grants were not made available for processes or steps which would be expected to be part of the core ICLEI–ACCCRN process, but rather to enable a level of stakeholder activity which might otherwise not be achieved. The grants had to be for at least one of the following purposes: to support specific stakeholder engagement activities and initiatives; to fund small innovative projects to test the feasibility of proposed resilience-building actions and as a trigger for more substantial interventions; or to fund minor research or studies to supplement the assessments completed in the core process (ICLEI, 2014). Following a competitive application process and selection by ICLEI, 15 grants were awarded across the four countries.

The general principles underpinning the engagement-building grants were twofold. The first was to provide tangible, financial support for city–community collaboration and initiatives. The second was to encourage local stakeholders to become fully involved in the UCCR process by seeing that good ideas can be turned into action, and that the city is genuine in its wish to collaborate with stakeholder groups and is able to resource this collaboration. This, to a certain extent, responds to critiques of resilience-thinking as not considering 'people, power and politics' (Bahadur and Tanner, 2014:211), though the level and extent of engagement across different stakeholder groups will vary.

3   Methodology

This study is based on a sample of the CRS that were produced by the cities engaged in the IAP with ICLEI. A total of 36 cities had produced CRS by January 2017, across the four countries, and a decision was made to adopt purposive sampling to ensure a cross-section of city strategies were considered here, featuring different climate change impacts, different base levels of climate knowledge and experience of climate projects, and both recipients and non-recipients of the ICLEI engagement-building grants. As a result, four cities from India, Bangladesh and the Philippines, and three from Indonesia, were selected for analysis, taking into account feedback from the ICLEI country teams.

The analysis is based around a matrix of elements to be examined from each CRS, around three key components: context, process and outcomes desired, as explained further below. The information gathered from each of the CRS was supplemented with additional contextual and procedural information supplied by the ICLEI country teams which had worked with the cities in developing their strategies, as well as interviews with some of the city representatives. Finally, the initial findings were presented at a workshop of local government representatives from the four countries held in Bangkok in February 2017, in order to obtain their feedback and to fill any information gaps and obtain updates on the latest processes. The workshop was also attended by local government staff members from certain cities which were not part of the selected 15 cities, providing additional insights into city processes around the IAP and small grants.

3.1   Analytical framework

As highlighted by Woodruff and Stults (2016), while an increasing number of cities globally are developing climate change adaptation plans, there have been few analyses of these plans. Where there are analyses, these can be based on a number of different approaches. Woodruff and Stults (2016) outline seven plan quality-evaluation principles, which are based on well-established plan evaluation principles: goals for future desired conditions; the empirical fact base that is the foundation for strategies; strategies guiding decision-making towards achieving the goals; strategies for public participation in creating the plan; coordination across different actors and organisations; implementation and monitoring; and the extent to which plans address uncertainty in climate projections and impacts. While the authors use regression analyses to evaluate a sample of 44 USA local adaptation plans, these categories can also serve as a basis for examining and comparing city-level plans via qualitative analyses, given their emphasis on knowledge and process. Similarly, Baker *et al.* (2012) highlight five key plan components used in evaluating local climate plans in Australia: information base; vision, goals and objectives; options and priorities; actions; and implementation and monitoring.

The analysis of city resilience strategies following the IAP process is not intended as a formal evaluation, but it is helpful to draw on elements of other city-level plan evaluations which have been carried out, to identify which are useful in understanding the potential of the CRS in each city as a tool for action, and for informing future city-level processes. This can also help in understanding how, why and with what effect these actions take shape, and to what extent they become part of urban climate change responses and could contribute to challenging power and interests at city scale (Bulkeley and Castán Broto, 2012), thus leading towards transformative change.

The framework used in this analysis of city resilience strategies examines three main elements: the context behind the CRS; the process of developing and implementing the CRS; and the outcomes desired of the CRS. Table 1 summarises the

elements of these three areas, which largely align with the quality evaluation principles highlighted by Woodruff and Stults (2016) and the components outlined by Baker *et al.* (2012). In examining the context, it is important to understand both what and who are the drivers for the CRS (whether endogenous or exogenous) as well as the vulnerability and hazards which the CRS will need to address. The contextual analysis can also help to assess the city's starting point in terms of its understanding of climate resilience, and the fact base and information it has to hand. The process questions seek to outline the actors involved in developing the CRS, the extent of or possibilities for integration with other plans and processes, approaches to financing actions and monitoring their implementation, and the political buy-in which will affect the take up of the strategy. Finally, the outcome questions assess the coverage of the CRS in terms of the strategies and interventions identified and the sectors these cover (and whether this links up to the areas identified as priorities in the VA). Kernaghan and da Silva (2014) identify four key thematic factors – knowledge, finance, policies and plans, and stakeholders – which contribute to creating an enabling environment for developing resilience, and these are captured within the framework categories. Section 4 examines some of the above elements in further detail.

Table 1. Analytical framework components

Context	Explanation	Example/indicator
Small grant recipients	Received an ICLEI small grant?	Yes No
Political	Are the LGUs working within a national or regional framework that is directing action?	National directives Regional directives
Trigger	Motivation for developing a CRS? Eg ICLEI–ACCCRN programme, climate event, political, timing of CRS relative to political cycles	Exogenous Endogenous
Advocator/sponsor	Who is advocating for a CRS to be carried out? Eg city administration, political actors, external actors	Exogenous Endogenous
Exposure/vulnerabilities	Exposure to which hazards? Eg risks and vulnerabilities identified, process for doing so	Hazards Risks/vulnerabilities Outliers Existing VA
Fact base	What information will inform the analysis for the CRS?	Existing information New information Top down (government agencies, international data) Bottom up (community insights, local data) Currency of data
Entry points	What is the entry point for the CRS?	Building on existing initiatives Uniting city-level projects Sectoral entry point (water, waste, DRR) Starting from scratch
Understanding	What city-level understanding is there of climate resilience?	Department which holds climate knowledge Current starting point of climate knowledge

Process	Explanation	Example/indicator
Planning process	Is the planning process logical and thorough?	Climate scenarios/impacts Urban systems analysis Vulnerability assessment Risk assessment Process for prioritisation
Assessment author	Who has led the risk/vulnerability assessments?	Internal (which department?) External (local or international agency?)
Process lead	Which department is leading the process? What is their level of authority?	Department/area
Primary author	Who is the primary author of the CRS?	Internal (which department?) External (local or international agency?)
Internal stakeholders	Who are they and which departments do they represent? How were internal stakeholders engaged through the process?	Number of stakeholders Departments represented Engagement via cross-departmental team One-on-one meetings Workshops
External stakeholders	Who are they and which organisations do they represent? Which areas of community? What approach to participation of stakeholders and community?	Ad hoc workshops One-on-one meetings Two-way sharing of information
Integration	What is the process for integrating with other city plans?	Yes: how? No
Finance	What plans are there for securing funding for the various strategies?	Internal Central government External (donors, private sector) Already secured for some interventions
Monitoring	What approaches are there to keep track of and assess implementation?	M&E plans developed Indicators
Endorsement	Has elected body endorsed plan? What is the process for meaningfully enacting the plan?	Yes or no? Is a formal vote required?
Local political cycles	What is the impact of local political cycles on conduct and outcomes of the plan?	Stable political leadership Changing political leadership (point in cycle?)

Outcomes	Explanation	Indicator
Goals/targets	What is the nature of the goals and targets?	SMART (specific, measurable, achievable, realistic and time-based) Broad
Strategies/interventions	What range and type of strategies/ interventions have been identified? Potential to reduce vulnerability? Innovative or business as usual? Already implemented/in progress?	CRAFT categories (climate risk and adaptation framework and taxonomy) Strategy/action plan Policy regulations Technical/infrastructure Investment Fiscal/financial mechanism Organisational/governance Education/awareness raising Assessment/research Public participation/stakeholder engagement
Sectors	Which sectors/systems are covered by the strategies	Transportation Terrestrial ecosystems Energy systems Coastal ecosystems Water supply systems Waste water systems Infrastructure Food systems Communication systems Health Key economic sectors Housing and basic services Livelihoods

4   Context: country and city overviews

4.1   General overviews

An overview of the four countries involved in this study is provided in Table 2. Of the four countries, India has by far the largest population, but the Philippines and Indonesia have a higher proportion of their populations living in urban areas. The case-study cities also display large variations in terms of population size, and this will determine the resources and capacities that city governments have to hand – for example, Quezon City, as part of Metro Manila, is the seat of national government and will be comparatively better-resourced than Tublay.

Table 2. Key city characteristics

Country	Total population (2015)*	Urban population (2014)**	Urban population (% 2014)	City name	ICLEI small grants?	Population size
The Philippines	100,699,400	44,531,000	44	Quezon City	Yes	2,761,720 (2010)
				Tublay	No	16,555 (2010)
				Naga	Yes	195,068 (2014)
				Santa Rosa	Yes	353,767 (2015)
India	1,311,050,530	410,204,000	32	Gangtok	Yes	100,286
				Nainital	Yes	41,377
				Nashik	No	1,486,973
				Patna	No	1,680,000 (2011)
Indonesia	257,563,820	133,999,000	53	Balikpapan	No	621,240
				Sukabumi	Yes	311,508
				Bogor	Yes	1,030,720 (2014)
Bangladesh	160,995,640	53,127,000	34	Mongla	Yes	39,837
				Barisal	No	328,278
				Rajshahi	No	448,087
				Sirajganj	No	158,913

* World Bank (2017). ** UNDESA (2014b).

4.2   National frameworks and directives on climate change

Climate initiatives at the local city level need to be regarded within the context of national and sub-national climate frameworks and directives, which will be at least one factor driving action, in addition to other endogenous and exogenous factors. While a national directive might not necessarily lead to a strategy or plan being developed at the city scale, it might facilitate the process by providing resources, whether technical or financial, or create incentives for preparation of such plans.

The Philippines 'strives to ensure that climate change adaptation and disaster risk reduction are mainstreamed and integrated into the country's plans and programs at all levels' (Republic of the Philippines, 2015: 4). Accordingly, the national framework strategy for climate change 2010 prioritises adaptation, as is elaborated in the 2011–2028 national climate change action plan (NCCAP). It outlines seven strategic priorities: food security, water sufficiency, human security, environmental and ecological stability, sustainable energy, climate-smart industries and services, and knowledge and capacity development (City of Santa Rosa, 2016: 4). All four of the CRS mention national directives as a political driver for action, due to the requirement for cities to produce a local climate change action plan (LCCAP) under the Climate Change Act of 2009. The process of preparing a CRS can therefore feed into the formulation of an LCCAP, which is updated every three years – the CRS effectively becomes the LCCAP.

Bangladesh has a climate change strategy and action plan, as well as a national plan for disaster management, which both direct city-level action. In Bangladesh's intended nationally determined contributions (INDC), the country stated its intent to take a two-pronged approach, with an emphasis on building resilience to climate change while also taking mitigation action (MOEF, 2015). With regard to adaptation, the INDC outlines 10 key areas for action, including 'enhanced urban resilience' as well as resilient infrastructure and policy and institutional capacity building (Government of Bangladesh, 2012: 10). Bangladesh is also a target for multiple international and national climate-related initiatives and often terms itself the climate adaptation capital, though the focus is slowly shifting towards an understanding of the need to take action in urban as well as rural areas.

In India, urban areas have been more central in national policies. The INDC includes a commitment to developing climate-resilient urban centres, and links this to the 100 Smart Cities Initiative as well as the Atal Mission for Rejuvenation and Urban Transformation (AMRUT) focusing on upgrading or developing infrastructure in 500 cities (Government of India, undated), linking climate goals to sustainable development objectives. The INDC also focuses on waste management and the transport and industrial sectors.

In Indonesia, climate change adaptation and mitigation are 'integrated as cross cutting priorities of the National Medium-Term Development Plan' (Republic of Indonesia, undated). The country has developed a national action plan on climate change adaptation (RAN-API) which enables adaptation initiatives to be mainstreamed into the national development plan. The medium-term objective of the RAN-API is to build adaptive capacity and disaster risk reduction, including in urban systems as a development sector, through capacity strengthening, knowledge management and adaptive technology (Republic of Indonesia, undated). The INDC also highlights the intention to mainstream climate change into development planning, which feeds down to processes at the local level, and notes that climate-resilient cities will support ecosystem and landscape resilience, recognising the country's archipelagic landscape.

Comparing the resilience strategies from the four countries, it is interesting to distinguish between those that stated they had set the CRS within the context of the national climate change frameworks (as is the case for the Philippines) and those that had not stated their alignment (Bangladesh, India and Indonesia). While this may have been intentional on the part of the city government and ICLEI teams, the separation of CRS from national climate change policies (at least in the documents) could have consequences on the applicability of the CRS in terms of highlighting the broader 'top-down' drivers for climate initiatives, which position the CRS as a framework for action – and where there may be fewer directives from above, this can demonstrate the city's own initiative-taking. For the Philippines, the strategies are LCCAPs and therefore intended to meet government directives.

5   Analysis: context, process and outcomes

The context-process-outcome table was completed for each of the 15 resilience strategies. The sections below examine in more detail the content and variety of the resilience strategies, and some of the reasons behind each, in relation to the IAP and the cities' own contexts.

5.1   Context and process

5.1.1   City motivation

What motivates city mayors or leaders to engage in a city resilience strategy process, and to put climate resilience on their local agenda? A number of key drivers emerged at the validation workshop with city officials. These included past experiences of climate-related disasters, such as typhoons and flooding; past participation in other climate-related city-level initiatives; higher-level political mandates; the opportunity to be recognised for good governance and to access funding through official 'seals' or competitions; the individual passion and commitment of city leaders; and a recognition that key areas of urban industry may be hampered or damaged if no action is taken.

In the Philippines, while the case-study cities were not directly affected by Typhoon Haiyan in 2013, the scale of the damage, and the knowledge that such typhoons are likely to occur more frequently in future, have been factors driving the development of resilience strategies. However, the national mandate to produce an LCCAP was an immediate motivator for cities to participate in the IAP, which was a tool that could help them meet this requirement: 'We were informed ACCCRN provided technical assistance to help with the LCCAP, so we were interested' (Creencia, 2016). As described in the Santa Rosa LCCAP, it is anchored on 'the local government's two major planning documents, namely: 1) Comprehensive land-use plan (CLUP) which guides the long-term development of the municipality, and 2) Comprehensive development plan (CDP) which details the implementation process' (City of Santa Rosa, 2016: 4). The IAP also creates an opportunity for LGUs to apply for funding for climate adaptation initiatives under the People's Survival Fund, where an eligibility requirement is the existence of a vulnerability assessment at the LGU level.

In Indonesia, the cities recognise their mandate under the RAN-API to take action on climate resilience, as well as from the presidential directive to reduce greenhouse gas emissions – the IAP was used as an opportunity to integrate climate change into the development planning and budgeting process. By embedding the CRS into the city planning system in this way, the CRS is effectively adopted and given legitimacy, becoming a regional action plan. Many of the city mayors already had an understanding of environmental issues, with climate issues integrated into draft city development plans, based on past experiences such as flooding and water scarcity, and involvement in past climate initiatives such as the Urban LEDS project in which ICLEI was also involved. Additionally, there are other incentives such as the Earth Hour City Challenge award which can motivate local action, and both Bogor and Balikpapan have won this award.

In India, motivations vary. For example, in Nashik, the local government has been preparing a sustainable urban habitat action plan with support from the German Society for International Cooperation (GIZ) – under the central government's Mission for Sustainable Habitats – and the IAP was implemented as part of this. In Gangtok, Nainital and Patna, the local governments are working on the IAP under their respective state action plans for climate change, as directed by the national government. In Nainital and Patna, the local governments had very limited understanding of the need for climate change adaptation, though the NGO stakeholders in Nainital were better informed and could bring this knowledge to the table, and in Patna the city government had experience of past disasters. In Nashik and Gangtok, there was more advanced understanding of the topic, and in Gangtok there was a feeling that the IAP offered the opportunity for a wide range of stakeholders across sectors to engage and to benefit from new perspectives, including from the ICLEI team (Fisher *et al.*, 2016).

Past experience of extreme events in Bangladesh, and a recognition that these events are becoming more frequent, has driven the development of the CRS – for example, in Barisal's CRS, it was noted that high-intensity cyclones have occurred more frequently in the last decade.

In the Philippines, there were both national and local elections in 2016, which affected the process of developing the LCCAPs, with some pauses and interruptions. In Quezon City and Naga City, the incumbent mayor was re-elected for a third term, which made for a smoother process. Meanwhile, in Tublay and Santa Rosa, a new mayor was elected, but the process seems to have stayed on track – Tublay's Seal of Good Governance in 2015 may encourage continuity. At the same time, since 2013 there have been a number of new national-level policy issuances related to land-use planning and budget tagging[2] which affect LGU planning. In these cases, the ICLEI team have had to accommodate the changes, to ensure buy-in from the new mayors, or to ensure that the LCCAP complies with the new policies – while this may slow the process down, it helps to assure the viability of the plans. In all four cases, the LCCAPs are draft plans needing final updates and approval by the municipal council in order to be officially adopted. This formalisation is central to successful plans: Woodruff and Stults (2016) find formal adoption of plans is important in ensuring that they have stronger goals, implementation and monitoring, as well as the involvement of elected officials in their development.

Similarly, in India, the CRS in each city has been shared in draft form with city actors but has yet to be officially approved. Gangtok was the only city with an election during the IAP but the same mayor was re-elected, thus not affecting the process. The Bangladesh sample cities also are waiting for approval of the draft CRS. While in Barisal the city's master plan included broad climate policies, for Rajshahi, the IAP was starting from scratch, and interventions from the strategy will be integrated with city plans.

5.1.2   Actors involved

To ensure that a CRS is effectively and meaningfully developed and implemented, the actors involved should balance legitimacy, authority and representation. The first stage of the IAP is the setting up of a climate core team, which is responsible for driving the process at the city level. It should be representative of a range of city government areas and be vested with the authority to act. Having a key driving person within the core team is important to push the process forward, such as an urban planner, who is more engaged in day-to-day operations. In both India and Bangladesh, the climate core team generally includes either or both the mayor and city commissioner, which gives the process the required authority, and ensures a degree of continuity and high-level support should one of them change. In Nashik (India) the core team of four includes two municipal engineers and a consultant from GIZ, headed by the commissioner. By comparison, the Nainital core team has 14 representatives from 12 different bodies, mainly government agencies but including two universities. In the Philippines, the core team has been given legitimacy and authority through a memorandum of understanding from the mayor. Similarly, in Indonesia, the 'working group' in each city is appointed by the mayor by decree which grants it both authority and funded time. In Balikpapan, the core team includes representatives of 13 different bodies, including the planning agency, the Department of Spatial Planning and Housing, and district and urban wards, while the Tublay LCCAP also identifies at least 14 possible agencies and sectors to be represented in the core team.

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2 Budget tagging is a process through which the Philippines government plans, prioritises and monitors climate change expenditure.

In addition to the climate core team, the CRS should have a 'home'. For example, in Indonesia, there is an effort to ensure more involvement of the local planning departments (BAPPEDA) but more frequently the responsibility for climate resilience ends up with the Department of Environment. In India, the lead person is often in the engineering department. These departments will have differing perspectives on the approach to urban climate resilience, as well as bringing different skills and knowledge to the assessment and prioritisation processes. In all cases, there is a threat of loss of vital human capital when the key staff members are relocated, sometimes to completely different bureaus, which means that a new staff member may have to start from the beginning in terms of their understanding of resilience and building relationships and trust. Additionally, the 'home' department may affect the level of authority accorded to the process and the final document – for example, the planning departments in Indonesia are recognised as having more authority than environment departments.

Once the climate core team is established, the IAP then requires the identification of the stakeholder group, as well as the best ways for them to be engaged in the process. This is where local interest groups would be represented – not all of the CRS list the members of the stakeholder groups, though in many cases there are overlaps with the identified vulnerable actors. ICLEI country teams encouraged city governments to engage broadly with a wider range of actors than might usually be involved: 'Sometimes we need to push the boundary so broader stakeholders will participate' (ICLEI Indonesia, 2016), and Tool 1.2 (forming a stakeholder group) encourages representation of different groups (Gawler and Tiwari, 2014). In addition to engaging representative and legitimate actors, the IAP provides for an analysis of actors across different elements including their vulnerability and adaptive capacity. In the Philippines and Indonesia, youth groups and certain NGOs have been key stakeholder groups. In Nainital, the stakeholder groups included elected representatives from the ward and district, as well as civil society organisations and the trade union. However, in Gangtok, despite the importance of the tourism sector, it is not formally involved in the process, though hotels are recognised as supporting actors, and it is in the interest of tourist industries to help reduce the impact of disasters such as landslides blocking roads, given the central importance of this sole access route into the city. Patna is another city with high inflows of visiting populations, and while 'tourists/pilgrims' are identified as vulnerable actors, 'industries' (non-specified) are seen as supporting actors.

The Santa Rosa document lists the community associations living in the 'danger zones' and affected waterways, which demonstrates a high level of specificity and thus targeting compared to many of the strategies which talk more vaguely of 'slum dwellers' or 'farmers' or 'vendors' as the vulnerable actors. It also suggests that relationships have already been established with the community associations in question.

5.2   Fragile systems, hazards and vulnerabilities

Phase 2 of the IAP requires an assessment of climate exposure, an urban systems analysis, and a risk assessment. The urban systems analysis (Tool 2.2, Gawler and Tiwari, 2014) enables an identification of fragile urban systems in the city, an assessment of the likely impact of climate change on these already fragile systems, and possible knock-on effects on other systems, based on the ISET urban climate change resilience framework. The systems can be divided into 'core' systems essential for the survival of city residents, such as water, shelter, transport and energy, while 'secondary' systems can include education and healthcare. Following this analysis comes the risk assessment, and the vulnerability assessment (Phase 3 of IAP). When combined with the urban systems analysis above, the two sets of information can be overlaid to identify hotspots in the city affected by the greatest number of climate risks, and the most vulnerable populations. All four countries included the hotspot maps generated through this process, which help to visually communicate the geographic areas, systems and people to prioritise for action. This sequencing directly affects which climate hazards are given highest priority and by consequence the subsequent prioritisation of interventions, by recognising the underlying vulnerabilities of city systems and their interconnectedness – beyond a simple identification of vulnerable persons or at-risk locations. Cities across the four countries generally adopted the definition of vulnerability used by the IPCC: 'the degree to which a system is susceptible to, or unable to cope with, adverse effects of climate change, including climate variability and extremes' (IPCC, undated).

The CRS's identified a range of pre-existing fragile urban systems as outlined in Table 3.

Table 3. Fragile urban systems identified in CRS

The Philippines	Indonesia	India	Bangladesh
Water	Water	Sanitation	Sanitation
Food security/agriculture	Waste (water, solid waste, sewerage)	Solid-waste management	Water supply
Health	Health systems	Urban planning	Land-use change
Aquatic ecosystems (Tublay)	Settlements	Transportation	Ecosystems
Terrestrial ecosystems (Tublay)	Transportation	Sewerage	Health system
Ecological solid-waste management	Food systems	Stormwater drainage	Transportation
Settlements	Ecosystems		Stormwater drainage
Energy			Peri-urban agriculture/ animal husbandry
			Biodiversity

Data for the risk assessments was gathered from a range of sources, including local partners (Indonesia); national-level climate data (Bangladesh, the Philippines, Indonesia and India), and shared learning dialogues (India). The Indian cities also relied on the Ministry of Environment's 4x4 assessment report on climatic trends at a regional scale (Government of India, 2010). A number of smaller cities relied on data collected at the regional level, for example the Naga city report was contextualised in relation to climate and hazards of Camarines Sur region, while a majority of cities related their water and sanitation systems to the broader watershed.

Baker *et al.* (2012) found that the information bases used in Australian cities' CRS were largely descriptive, based on global climate impacts, rather than downscaled to the local level. However, the presence of local universities and government agencies working on issues of climate and resilience assisted data collection in several of the sampled cities in South and Southeast Asia. For example, the agricultural university in Bogor and the city disaster risk reduction and management office in Santa Rosa provided data for each city's CRS. The Indonesian cities were also able to access downscaled, municipal data from the regional offices of the meteorological department (BMKG), which sped up the process considerably.

Three fast-onset hazards were identified in the strategies of virtually all cities: cyclones (or typhoons), floods and landslides (see Table 4). However, different emphases were placed on these in different settings in line with the particular characteristics of local systems. For example, Tublay's CRS was primarily concerned with landslides on account of the city's steep topography (the majority of city is located on slopes between 25º–80º), which places pressure on municipal food and agricultural systems. Furthermore, the three Philippine cities emphasised the vulnerability of their health and agricultural systems to cyclones in the wake of Typhoon Haiyan. Finally, the four Bangladeshi cities underlined the vulnerability of their health and housing systems to flooding on account of the cities' close proximity to river basins and the poor capacity of their storm drainage systems. Additional fast-onset natural hazards included droughts (Indonesia and Bangladesh), fires (Indonesia and India) and earthquakes (India).

Table 4. Fast-onset hazards identified in CRS

The Philippines	Indonesia	India	Bangladesh
Cyclones	Cyclones	Cyclones	Cyclones
Floods	Floods	Floods	Floods
Landslides	Landslides	Landslides	Landslides
	Drought	Earthquakes	Drought
	Forest fires	Fires (forest and landfill)	Water-borne diseases

The most common categories of slow-onset hazard identified in the CRS were temperature increases, and associated forms of climatic disruption (see Table 5). Unsurprisingly, soil erosion was identified as a particular problem in high-altitude cities such as Tublay, and sea-level rise in coastal cities such as Balikpapan and Mongla. Soil degradation through landslides and flooding was understood to place medium- and long-term pressure on agricultural systems in India and Bangladesh.

Table 5. Slow-onset hazards identified in CRS

The Philippines	Indonesia	India	Bangladesh
Temperature increases	Temperature increases	Temperature increases	Temperature increases
Climatic disruption	Health crises (dengue)	Water pollution	Climatic disruption
Soil erosion	Sea-level rise	Soil degradation	River erosion
Watershed degradation			Lowering of water table
Sea-level rise			
Air pollution			
Ecosystem damage			

The ACCCRN programme and ICLEI IAP both focus distinctly on urban climate change resilience, and the toolkit guides city attention towards climate-related hazards and vulnerabilities. Therefore, other disasters such as earthquakes were not emphasised in the vulnerability sections of the CRS reports for cities in Indonesia and the Philippines, despite their proximity to active seismic zones. This was partly a result of the fact that ICLEI's CRS process was framed slightly differently in different countries: for example, in the Philippines it focused on hydrometric hazards, as other environmental hazards are addressed at the national level. However, the ICLEI country teams did assist the cities in identifying other hazards which might compound city vulnerabilities, such as earthquakes and fires in Tublay. Due to the stated focus on climate change hazards, few cities identified non-climatic determinants of vulnerability such as poverty – a trend also observed by Baker *et al.* (2012) in Australia. As such, there is further scope to think of vulnerability as something that transcends environmental issues. Furthermore, cities generally assessed vulnerability in relation to past events (and their likely reoccurrence), rather than anticipating new or developing events in the future, or exploring the connections between slow- and fast-onset events. This reflects a general sense of uncertainty about climate change common in city governments in other parts of the world (Woodruff and Stults, 2016).

5.3   Types of initiatives

City resilience strategies across all four countries generally linked vulnerabilities with strategic goals and actions, and according to the most vulnerable hotspots identified in the city. Interventions were prioritised on the basis of their resilience potential, in terms of their redundancy, flexibility, responsiveness and ability to provide access to information, as outlined in Tool 4.2 (prioritisation of resilience interventions, Gawler and Tiwari, 2014). A diverse range of initiatives was identified across a multitude of sectors, integrating climate adaptation and mitigation measures. However, the four most common sectors for intervention were water, solid waste, public health and ecosystems, in line with fragile systems identified and sectors selected for their ability to respond to the types of vulnerability outlined in the previous section.

5.3.1   Water management

Common interventions in the water sector targeted water catchment areas, connecting municipal systems to those of the watershed, and engaging external actors, including the bodies responsible for forest management. Within this sector, it is possible to differentiate between 'hard' and 'soft' interventions.

Hard interventions include the introduction of pumps (eg in Patna in the pre-Monsoon months), the construction of drainage channels and spread of biopores, the protection of springs, and the introduction of water impounding and storage facilities. Patna also sought to improve pedestrian safety and mobility in the context of frequent flooding by introducing raised walkways.

Soft interventions include the introduction of building permits (restricting eg the use of non-permeable materials in areas vulnerable to flooding and landslides), and banning plastic bags and bottles, for example in the Indian cities of Patna and Gangtok. However, other cities emphasised the importance of participation, rather than prohibition. For example, Santa Rosa and Bogor organised training sessions and meetings with local residents and other stakeholders on the relationship between littering (plastic) and flooding. Attempts were also made to provide ownership to stakeholders, for example by introducing rotating management structures in the local watershed team (Santa Rosa, Bogor).

5.3.2   Solid-waste management

Given the considerable cost of waste collection services, hard interventions in the solid-waste management sector were partially dependent on local financial capacity. For example, while Quezon City government was able to contract private waste-collection enterprises in order to increase the efficiency of its solid-waste management system, cities in India and Bangladesh are largely dependent on under-resourced government waste-collection services. Different cities also articulated different plans in relation to landfill, in line with their specific capacities and ambitions. For example, while cities such as Gangtok and Balikpapan have an explicit commitment to ending landfill, Patna would like to introduce a waste-to-energy system, and Naga City is instead focusing on introducing capped scientific landfills.

With regard to soft interventions, Indian cities again lead the way on prohibition – with Gangtok having introduced bans on plastic bottles, plastic bags and Styrofoam – while most other cities rely on market-based interventions, such as the introduction of taxes on plastic bags. Public outreach programmes were also seen to be important activities in the solid-waste sector, encouraging people to dispose of their waste responsibly, and to compost wherever possible (Gangtok).

5.3.3   Public health

Public health was a particular concern in India and Bangladesh, due to the prevalence of waterborne diseases during times of flooding (see above). In addition to interventions in the water and solid-waste sectors, city governments placed emphasis on preventative measures, including improved sanitation and toilet facilities, safe drinking water and immunisations (Rajshahi). Soft interventions included public health campaigns promoting healthy lifestyles. In Bogor,

dengue fever outbreaks were a key concern to be addressed, through a mix of both improved healthcare facilities and awareness campaigns.

5.3.4 Transport

Transport was also seen as an important sector for intervention insofar as it both contributes to and is affected by climatic events – particularly in the Indian cities, which all highlight transport as a relevant sector. The different intervention approaches taken in the transport sector in the CRS are well illustrated by the cases of Gangtok and Nainital. The problem statement in Gangtok is based on the connection between rising temperatures and increased private car usage, and increased rainfall – and extreme weather events – and the deterioration of the road infrastructure. Initiatives to combat these problems included the planting of trees, the introduction of public walkways, the increase in numbers of public buses, the introduction of car-pooling bylaws, and better-quality road construction. In contrast – and starting from a similar problem statement – Nainital planned instead to introduce a park-and-ride scheme for tourists. These different initiatives are arguably attributable to the contrasting geomorphological and socio-economic profiles of the two cities. For example, the earthquake zone of Nainital has two zones where no infrastructure construction is allowed, increasing congestion in other zones, and the city attracts a greater number of tourists, who have different needs with regard to municipal transport.

5.3.5 Other interventions

A number of additional, innovative initiatives described in the CRS are particular to individual cities. For example, Naga and Balikpapan identified ecosystems and food systems as areas for intervention, while Gangtok included tourism, Nainital urban planning, and Mongla animal husbandry and urban agriculture. Women were generally identified as a vulnerable group in these initiatives, but also as important actors and important agents of change (particularly in Bangladesh and Indonesia). Of all the cities, only Tublay's CRS includes a commitment to gender mainstreaming.

5.4   Implementation

5.4.1 Financing

While funding options for climate change resilience are growing, with a number of international climate adaptation funds, they remain inadequate, unaccountable and inaccessible (Smith *et al.,* 2013). Sub-national or local governments continue to face challenges in accessing these funds, such as the Green Climate Fund (GCF) or Adaptation Fund (AF), as only national implementing entities (NIE) or regional or multilateral implementing entities are able to directly access funds, and others wishing to secure funds must achieve accreditation or work through an accredited entity. In India, the NIE for both the GCF and AF is the National Bank for Agriculture and Rural Development – for which urban areas would not be a priority. In Bangladesh, the government has recognised the importance of mainstreaming climate finance with national development finance, and as a result the Economic Resources Division is the national designated authority for the GCF (Huq, 2016). The Green Climate Fund offers the hope of more access possibilities as non-traditional actors seek accreditation, such as networks of cities, which would enable direct resourcing to cities.

Local governments can also struggle to access national climate funds. Bangladesh has a Climate Change Trust Fund, which has been allocated approximately US$400 million. However, its projects are predominantly rural-focused, and it sits under the Ministry of Environment and Forests. As of 2012, the Climate Change Trust Fund had only allocated 3.1 per cent of total disbursed funds to local authorities (Government of Bangladesh, 2012). Separately, the Philippines People's Survival Fund is a special climate adaptation fund of the national treasury totalling 1 billion PHP, targeted at LGUs which have carried out vulnerability assessments, and local community organisations with accreditation. The fund prioritises projects in poorer areas and key biodiversity areas. Yet so far only two Philippine cities' applications have been successful,

as the application process is very complicated and challenging for LGUs. India has a National Adaptation Fund on Climate Change initially capitalised with US$55.6 million, though it is targeted at state governments, while Indonesia has the Climate Change Trust Fund which cities can access if they have climate mitigation and resilience strategies and actions, though the fund currently mainly acts as a vehicle to channel international and private sector funds (ICCTF).

These limitations, alongside the often low, local revenue-generation base of many of the cities – which may earn income through waste management or other fees but frequently do not have the ability to raise their own taxes such as land tax – have to be borne in mind by the cities to ensure their resilience strategies remain viable without seeming to be wish-lists. At the same time, it can be advantageous to develop a plan that is open to a mix of funding options: Woodruff and Stults (2016) find in their sample of 44 USA local plans that state funding is strongly negatively correlated with plan quality. The CRS which were studied mainly rely on budgetary mainstreaming to ensure that their plans can be financed, as national and international climate-specific funds remain challenging to access. For example, in the Philippines, the production of the LCCAP contributed to the city's Seal of Good Governance, which is tied to national funding. Additionally, because the LCCAP is anchored in the LGU's CLUP and CDP, the opportunities for budgeting for resilience interventions can be integrated into these two planning documents, as long as the timings of the plans coincide.

In Indonesia, the RPJMD mid-term development plan is the primary vehicle for embedding interventions, securing funds, and achieving national alignment. For example, Balikpapan has allocated funds to cover climate disasters in the yearly budget. The city relies heavily on national and provincial government support for climate funding in the form of special allocation budgets and provincial support budgets. Many of the interventions identified for resilience link with other planned projects such as to improve water and drainage infrastructure, or forest management and protection, increasing the financial feasibility of these initiatives. Certain initiatives are also supported through the Balikpapan Corporate Social Responsibility (CSR) Forum, such as periodic maintenance of drainage systems. Thus, the city has identified a number of different avenues to ensure initiatives get implemented.

The Indian CRS have included approximate costings of interventions, and where relevant the interventions are linked with national schemes or ongoing projects within the city. Similarly, the Philippine city of Naga's LCCAP emphasises the links between the LCCAP and ongoing projects – ensuring that the LCCAP initiatives complement existing or past initiatives to make use of existing skill sets, systems and partnerships. The LCCAP recognises that certain initiatives have to be 'shelved' where the technology or financing gap is too high. The list of initiatives thus distinguishes between those that are new projects or expansions of previous initiatives, and between those that require infrastructure investment. In addition, cities in the Philippines must set aside funds for DRR and adaptation and mitigation yearly – where these are not used, they are rolled over for the next year.

In Bangladesh, the CRS categorise the interventions based on low, medium or high capital cost – with low capital-cost initiatives being covered by the existing city budget, and high-cost initiatives requiring substantial financial support from elsewhere. Consequently, in the case of Barisal for example, the low-cost projects are mainly 'soft' projects related to improving communication or awareness raising, while the high-cost projects require infrastructure investment such as construction of a water-treatment plant or canal excavation. However, the CRS also identifies the potential co-benefits of each intervention and whether they contribute to short-, medium- or long-term resilience in the city – which means that high-cost projects will be prioritised if funding can be secured.

Certain initiatives can benefit from a clustering approach between multiple local governments – for instance in the case of watershed management, where a number of local governments may share management of a resource. This can offer opportunities for cities to collaborate on a joint bid of a larger financial scale than might be manageable for an individual city, opening up the door for applications to large funders such as the Asian Development Bank. The mayor of Gangtok highlighted the possibilities created by convergence of schemes: where a particular intervention has multiple components, which can be funded by different identified government funding sources, this enables the interventions to complement and support each other.

Other opportunities on a smaller scale would include corporate social responsibility or market mechanisms, which would be particularly relevant in cities where industries have much to gain from enhanced resilience, such as the tourism sector in Gangtok and Patna, the shipping industry in Mongla, or the shoe-manufacturing industry in Santa Rosa.

The engagement of external stakeholders was a key consideration in ICLEI's engagement-building small grants made available to cities participating in the IAP process. As such, the grants were made to local stakeholders rather than the local government, to ensure ownership of the projects and their outcomes by the stakeholders themselves, beyond the government officials who may be transient. The grants also allow testing of approaches and learning by doing – with the intention of supporting the capacity of the city actors to apply for and access other external sources of funding in future. For example, Bogor's Healthy Citizen Forum received a grant of US$1,400 for a project to reduce water run-off by improving the drainage systems of paved roads using a new surface (responding to the fragile systems identified as drainage, water supply, and health systems), while in Nainital the Centre for Ecology, Development and Research received US$35,000 for sensitisation, information gathering and developing an ecological sustainability plan relating to the city's water supply systems (in response to the priority fragile system being identified as the water supply – while ecosystems had originally been identified as another fragile system, the city core team then removed this from the priority list). External stakeholders may be able to reach different population groups to the local government, and may be better equipped to take on certain tasks, hence their involvement in implementing the CRS can help to strengthen the process.

Thus, the cities are demonstrating a solutions-oriented approach to funding, using a mix of funding sources including recurrent expenditure where it can be used, special-purpose grants from national governments where applicable, and seeking out other financing opportunities as and when they arise.

5.4.2 Prioritisation

While financing is a key consideration in project prioritisation, other factors may also play a role. The IAP Tool 4.2 suggests scoring the interventions in relation to their contribution to the characteristics of resilience (redundancy, responsiveness, flexibility and access to information) to obtain a ranking (Gawler and Tiwari, 2014). The interventions can also be ranked according to technical, political and financial feasibility, and these two combined rankings can be the basis for drawing up a shortlist for discussion in the climate core team and stakeholder group. However, beyond this process, other factors may play a role in prioritisation.

For example, the discussions at the research validation workshop with local government representatives revealed that in Bangladesh, local councillors will often put emphasis on their areas of special interest, which means that certain topics may not be prioritised if they are not a political focus. In Bogor and Balikpapan, the CRS process started just after the election of a new mayor, which means the political priorities of the mayor could shape its priorities from the start. In Patna, the number of people affected by the intervention was used as a prioritisation tool – the more people benefiting, the higher the priority. The city representatives recognised that longer-term interventions may not get priority, in preference for short-term projects which provide results more quickly. This is not necessarily a negative. Some 'quick wins' can be showcased, used to build consensus, and highlight the importance of taking further action. Balanced with this is the need to recognise that many issues are cross-sectoral – such as livelihoods and transport – and that they may also relate to areas outside the local government boundaries, such as if there is a big daytime population in the city. This creates intersections across departments within and beyond local governments, and managing the competing demands in a way which best suits the city's needs is a task for the local government, working with local stakeholder groups.

Another factor affecting prioritisation is the funding that cities have earmarked or can apply for. At the same time, restrictions on certain sources of funding may affect the way in which strategies are implemented. For example, while in the Philippines there is a requirement to set aside not less than 5 per cent of the LGU's annual estimated revenue from regular sources to support DRR activities, limitations on use of funds will restrict the scope of certain interventions.

The question of planning for the future, in particular for rapid population growth, is another important issue related to implementation. The CRS across the board list current and historical populations, and recognise fast-growing populations, but do not offer future projections. However, they do recognise the impact of the growing population on matters such as waste management, water demand, and land conversion. But without projecting and planning towards future populations, the resilience strategies may fall short of future demands. While many cities will consider population growth in master plans for housing and public services, this should be integrated with resilience planning.

5.5   Monitoring and evaluation

One of the significant shortcomings of the final CRS produced by city governments was the absence of monitoring frameworks and evaluation strategies. There are significant challenges, however, with M&E of climate change resilience, both conceptually and in practice (Bours *et al.*, 2014; Sanahuja, 2011; Villanueva, 2011). M&E frameworks and indicators were absent in the CRS in Bangladesh and Indonesia. Similarly, Indian cities do not currently have the capacity to monitor resilience implementation, with the exception of cities with existing relationships with international donors (for example, Nashik's historical relationship with GIZ). The CRS produced by the four Philippine cities demonstrated the strongest engagement with M&E through the inclusion of a number of performance indicators. The Philippine mandate to produce an LCCAP also requires the identification of a monitoring framework. As the CRS in the Philippines were meeting this mandated requirement, extra effort was allocated to developing appropriate frameworks, including a workshop specifically targeting this area.

The absence of developed M&E planning in the resilience strategies was primarily the product of a lack of evaluative capacity, both in terms of resources and knowledge of M&E tools. Additionally, the IAP did not provide a step-by-step guide for developing a M&E framework. However, many city government representatives noted that they did not regularly undertake M&E activities of any city plans, unless an external donor enforced this requirement. This is not an issue particular to the CRS reviewed for this report: M&E is under-developed in many of the climate resilience strategies prepared through the ACCCRN programme reflecting the broader need to develop capacity and tools in this area. However, M&E is essential to effective implementation and is a vital element for adaptive governance, providing a feedback loop through which city governments may benchmark and adapt their plans in line with identified outcomes. As such, there remains a need for guidance to develop monitoring frameworks and evaluation processes to support the CRS implementation process. Patton (2015) notes the importance of developing M&E alongside the development of any planned activities – not just at the end – to bring into focus the information needs of the different users of M&E data.

6 Discussion

Over a period of four years, ICLEI was tasked with getting 40 cities to the stage where they can understand, think about and plan for resilience, using local governments as the entry point. Given the limited timescale and the fact that many of the cities were a considerable distance from ICLEI offices, applying a common methodology such as the ICLEI–ACCCRN process ensured that all the cities went through the necessary stages, from initial engagement of core teams and stakeholder groups to developing a city resilience strategy. The cities had varying levels of understanding of climate change and experience of climate-related projects, and varied hugely in terms of population size, types of hazards they faced and their capacity to take action. Additionally, the national contexts varied, in terms of frameworks for climate action and incentives for city-level initiatives. It is worth noting also that the analysis process underpinning the IAP focuses on climate change resilience, thus many of the resulting strategies are being used by local governments effectively as climate adaptation strategies, reflecting the value to which they think the plans can be best put. This final section reflects on three key areas relevant to the future of the CRS process: engagement, scale and transformation, based on the case-study cities involved in the IAP.

6.1 Engagement and inclusion

One of the critiques of resilience-thinking is that it does not pay sufficient attention to 'people, power and politics', and the different ways in which actors and institutions are included in or excluded from planning processes (Bahadur and Tanner, 2014). While shared learning dialogues are a mechanism for ensuring a range of voices are heard in the process of developing the resilience strategy, certain actors are better represented than others. For example, 'communities' are often represented by ward leaders, who do not always share the same priorities as their constituents. The inclusion of a diverse range of civil society groups can help to broaden representation and participation. A majority of the studied CRS processes included community and civil society groups as stakeholders, selected both in line with local hazards (eg communities susceptible to landslides) and forms of political organisation (eg trade unions). The inclusion of community groups in the early stages of resilience planning, as well as during the implementation phases, is critical if initiatives are to be successfully put into action and sustained.

To achieve high levels of engagement and inclusion, the analysis here suggests that resilience initiatives need to take into account the **specific** needs of different stakeholders – moving beyond generalised assumptions about slum dwellers or street vendors – in order to overcome structural barriers to inclusion. Furthermore, although the focus of the CRS process was squarely on environmental and climatic hazards, there is a need to consider the **intersectional** nature of risk in climate-vulnerable cities, and the ways in which social and economic factors such as gender and poverty conspire to increase the exposure of certain groups to environmental hazards. For example, while groups such as fishermen, farmers or women are often identified as vulnerable actors, their vulnerability stems not just from climatic hazards but also other underlying factors that need to be addressed through other means, such as insecure incomes, dependence on middlemen, and/or unequal rights within the household.

A further group whose voice is often underrepresented in resilience planning is that of the private sector, given the vast range of private-sector actors present within the urban environment. The private sector is the major engine of job and livelihood creation, and is therefore key to resilience. It is also responsible for a large share of infrastructure

implementation and operation, particularly with respect to buildings, electricity generation and transport. The inclusion of private-sector organisations is particularly important in the contexts studied here, given the financial constraints faced by many city governments, and the potential for the co-funding of resilience initiatives. Certain groups of private-sector actors, such as the tourism industry in Gangtok and Patna, or the shoe-manufacturing industry in Santa Rosa, have much to gain from ensuring the city acts on resilience. There is also potential for representative organisations such as chambers of commerce to play a key role, as has been the case in the ACCCRN city of Surat, where the South Gujarat Chamber of Commerce and Industry is a central actor in the city's Climate Change Trust, along with 12 other organisations (Karanth and Archer, 2014) and the Corporate Sustainability Forum in Balikpapan.

There is a growing body of research demonstrating the value of the 'co-production' of urban services by community groups working in partnership with local government (Mitlin, 2008), which outlines a series of methods and tools that could help resilience strategies increase engagement and inclusion. For example, there are many well-documented examples of constructive partnerships between local organised groups and local government in assessing vulnerabilities and planning for DRR (see Carcellar *et al.*, 2011; Mitlin, 2012) to continually assess priorities and build a longer-term investment in terms of physical and social capital. A greater emphasis on the co-production of city resilience strategies, for example by ensuring climate core teams always include civil society representation (being cognisant of legitimate and diverse representation), would diversify responsibility from the city government to a broader range of actors from both the private sector and civil society, building consensus around common goals while ensuring the representation of vulnerable groups.

6.2   Achieving scale

So far, 46 cities have benefited from the ICLEI–ACCCRN process, and the various forms of support that accompany it. However, there remain countless other cities in need of similar forms of support, and questions around how best to extend this. As such, it is worth reflecting on ways in which the IAP achieved scale, and could be scaled up further in the future.

In the Philippines, the IAP applied a clustering approach to reach a larger number of LGUs while fostering collaboration across LGUs that share cross-border issues, such as watershed management, or sharing land on ancestral domains, as well as bringing in regional actors. This clustering approach meant that the IAP reached 15 LGUs rather than the planned 10, and consequently 15 LCCAPs were developed, through a process that allowed shared learning across cities and exchange visits (Scott, 2016). The Philippines experience suggests that clustering works best where a large city is surrounded by smaller municipalities, or where there is a strong relationship between a city and its hinterland (Scott, 2016). For example, ecosystems, water, livelihoods, food and transport are sectors which operate beyond the boundaries of a single local government, while at the same time also intersecting across departments within a local government and with different stakeholder and interest groups. The clustering approach of cities could also be used to apply for climate financing, enabling access by groups of cities to collectively build their resilience by working on cross-boundary issues.

At the validation workshop, other approaches to scaling up resilience planning were offered by city representatives. For example, in India, cities can act as role models for nearby cities – such as Gangtok or Patna demonstrating approaches to nearby cities, similar to the clustering approach. In Kurseong (also in Sikkim), which was not one of the case-study cities, the municipality has been inviting five other nearby municipalities to follow Kurseong throughout the IAP process, for example joining in workshops and thus learning about the process even if their cities are not implementing it yet. The various city representatives also felt that involving regional or state government agencies could help to scale up the CRS approach, as could networks such as the Compact of Mayors, the Municipal Association of Bangladesh or the Association of City Governments (Indonesia), if the cities with resilience-planning experience could lead seminars or field trips to demonstrate their approach. In the case of Indonesia, it was pointed out that incentives to act on resilience could be created by integrating climate change into national awards for cities, such as the Clean City award. Furthermore, NGOs and civil society organisations can lobby local governments to take up good practices based on the experiences of other cities.

Financing opportunities will clearly play a role in determining possibilities to scale up action. For example, ICLEI launched the Transformative Actions Program (TAP) at the Paris COP in 2015, with the intention of tackling barriers

to climate finance faced by cities. Over 120 projects were submitted to the TAP in 2015, signalling the high demand for services that strengthen the capacity of local and sub-national governments to access climate finance and attract investment. ICLEI and partners hope that TAP will provide a new strategy to enable cities to directly access international financing, but it is clear that the system is not fully operational yet, as implementing all of the projects in the TAP pipeline would require a total investment of at least US$9 billion (Deng-Beck and Price, 2016).

What are the implications of these experiences and suggestions for countries which do not yet have requirements or standards for local climate change adaptation or resilience plans? It may be that the experience of developing a local climate change adaptation plan is instrumental insofar as it enables the identification of limitations in higher-level institutional arrangements by local institutions, who can then lobby for change at the national scale (Measham *et al.,* 2011). For example, the Philippine People's Survival Fund application process is proving technically challenging to LGUs, despite the experience of these LGUs in developing LCCAPs and undertaking the vulnerability assessments behind these. The lessons learnt from the IAP can be cross-fertilised between different municipalities, for example through national forums and networks of city governments. Networks of local governments, such as ICLEI and United Cities and Local Governments (UCLG) have a role to play in facilitating information exchange between local governments, promoting and enabling good practice. The development of the IAP toolkit, which is freely available on the ICLEI website and can be used by any local government, is an important approach to enabling good practice.

6.3   Embeddedness and transformation

The IAP process also raises a final question. What steps need to be taken to ensure that the resilience strategies, and the processes behind them, become genuinely embedded in the cities in ways that are transformational, reshaping local structures of political economy? To what extent can the process inform and change the way the city operates over decades, to ensure that resilience-building initiatives evolve as the nature of climate threats and the city itself changes? Some elements of the IAP facilitate embedding, such as the mainstreaming processes identified in Tool 4.3 (integration into city plans, Gawler and Tiwari, 2014). Additionally, within each country, processes particular to each context helped to move the identified actions into core city plans (such as integrating with the CLUP and CDP in the Philippines, and the medium-term development plan in Indonesia). These processes help to embed resilience-thinking and action, but do not necessarily facilitate transformation.

The definition of resilience used by the Rockefeller Foundation has evolved over the course of the ACCCRN initiative: 'the capacity of individuals, communities and systems to survive, adapt, and grow in the face of chronic stress and shocks, and even transform when conditions require it' (Rockefeller Foundation). However, cities often have very different conceptions of what transformation can mean and how it can be achieved on the ground, as became clear at the validation workshop. For example, municipal representatives from the Philippines understand transformation to mean a better quality of life for city residents. This requires a supportive policy environment at the national level, which leaves LGUs with the autonomy to harmonise their different plans, benefit from inter-LGU cooperation, and ensure resources are equitably shared and in recognition of different capacities.

In contrast, for the Indian and Bangladeshi representatives, transformation is about building the capacities within city governments to deal with unforeseen situations, in a systematic and organised manner, through preparedness and planning and better use of resources. This means working to change perspectives and mindsets, and using regulatory powers to influence action, for example to push businesses to take up more climate-related actions. Finally, for Indonesia, transformation requires finding a long-term solution to integrating resilience into planning at multiple scales, beyond administrative boundaries.

Transformation is perhaps an overly ambitious objective given the short timeframe and broad geographical scope of the ICLEI–ACCCRN process. However, the emphasis on engagement with different stakeholders could encourage more inclusive approaches to urban governance. While a central guiding team is therefore necessary to lead the climate change resilience process at city level, in whatever form this team may take, there is a need to ensure broad engagement with the wider population to ensure that the CRS is representative and does not perpetuate power imbalances. It is important

to build coalitions around shared visions of the city, and to engage coalition members in issues of adaptation planning as early as possible. The process of CRS enables cities to establish clear climate leadership to take the process forward, identifying a broad range of vulnerable actors and assessing their adaptive capacity. However, the practical implications of this process remain to be seen, and further research will be needed at a later stage in order to critically assess the relationship between CRS planning, implementation and outcomes.

One model that offers opportunities for transformative structural change is **adaptive governance**. Adaptive governance brings together consideration of both the drivers underlying vulnerability (political, social and economic) and the physical manifestations of risk, thus highlighting the people, neighbourhoods and cities at risk (Dodman *et al.*, 2016). It draws on the knowledge and self-learning of various groups of actors at multiple scales (Folke *et al.,* 2005), including those of marginalised groups within a city. Actors engaged in adaptive governance can comprise non-state actors, including the private sector, local residents, academia and civil society, who can be engaged in processes from vulnerability mapping to participatory planning, to national-level institutions which shape policy and regulatory agendas framing action into which local climate change adaptation plans can be mainstreamed (Fünfgeld, 2010), to international institutions funding climate action and shaping global agendas. Climate change resilience should be integrated with other local, national and international agendas to best meet local priorities. The multi-scalar approach can strengthen adaptive governance, such as when 'local and national institutions gain strength from being nested in regional and global institutions' (Folke *et al.,* 2005: 449). Participatory approaches to governance can redress power imbalances in knowledge and access to resources and decision-making which drive vulnerability (Colenbrander *et al.*, 2016). Thus local governments become one actor amongst many (Bulkeley and Betsill, 2005).

Adaptive co-management is a logical extension of adaptive governance. This is the idea that 'the responsibilities for allocating and using resources are shared among multiple parties' (Plummer and Armitage, 2007: 62). Although not without its critics, this is perhaps an option for transformative change for resilience, as ownership needs to be deeply shared, and options for continuity are expanded beyond a single entity. For example, in Santa Rosa, the local university partners with the local government in the implementation of the engagement grant on urban agriculture, with ownership by the university over the process. Where local governments partner with academic institutions, this can sustain knowledge – for example, in case of a change in administration – and lead to more knowledge generation. ICLEI staff themselves can function as a vital resource in ensuring continuity at the local level, despite being an external organisation. The new engagements and management approaches that are trialled through the small grants programme allow for experimentation at city scale – as cities are 'reconfiguring discourses of climate change governance toward an increasing emphasis on experimentation as a means to deal with the open-ended processes of governing urban areas' (Castán Broto, 2016).

There are indications that the process of developing CRS in the cities can help to foster adaptive urban governance: firstly, with the flexibility and responsiveness to adapt to new information as new risks emerge; and secondly, by emphasising inclusive approaches to 'reducing risk and increasing benefits to all urban residents' (Dodman *et al.*, 2016: 201). However, adaptive governance is dependent on effective systems of M&E – systems that were under-developed in all CRS outside of the Philippines. Such systems provide a feedback loop that is essential to learning and adaptation, and need to be integrated in city resilience planning from the start.

If building resilience is integrated with other city priorities – such as achieving sustainable growth and ensuring sustainable livelihoods for residents – and broader urban processes – such as planning, financing, implementation and evaluation – then resilience building can be embedded in everyday urban governance. The CRS produced through the IAP have demonstrated how building resilience can be integrated with other city priorities: in fact, they have shown that doing so is the only way for them to be accepted and actioned.

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