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# “Shared learning” for building urban climate resilience – experiences from Asian cities

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**ABSTRACT** This paper considers how resilience thinking and, in particular, its emphasis on learning has been applied in 10 cities in Vietnam, India, Thailand and Indonesia. Applying a “shared learning” approach in the Asian Cities Climate Change Resilience Network (ACCCRN) has helped to create or strengthen networks, build appreciation for complexity and uncertainty among stakeholders, provide a space for deliberating concepts such as vulnerability and resilience, and build knowledge and capacities for stakeholders to engage and represent their own interests. Shared learning approaches face considerable challenges navigating politicized urban environments, in which the nature and value of existing systems – and therefore the value of building resilience – are contested. This article suggests that deliberate, strategic intervention by facilitators may contribute to more transformative change on behalf of equitable, socially just outcomes – and thus cautions against seeing urban climate vulnerability as a technical challenge, or shared learning as a “toolkit” for building resilience.

**KEYWORDS** climate adaptation / learning / participation / resilience / urbanization / urban planning

## I. INTRODUCTION

Even a first time visitor to Da Nang in Vietnam can observe how rapidly and dramatically the city is changing. A new bridge is being built across the river in the city centre, flanked by several other bridges from the last decade; recently emptied plots of land are being filled by sky scrapers for large hotel chains and office buildings; and the coastline from Da Nang to Hoi An 40 kilometres south is filled by brand new or currently under construction resorts. Everywhere in the city’s periphery, land is being in-filled and raised and old houses demolished to make way for new houses, convention centres, storefronts, office buildings and luxury villas. For those with their lives staked on the city, these changes are much more significant. Some have profited from these changes; local and foreign investors have done well for themselves and their families, while others have found new business and job opportunities in many of the city’s booming industries such as construction, manufacturing and tourism. Migrants from other provinces come seeking work, although unskilled migrants have at times been barred from registering as official migrants<sup>(1)</sup> and are barred from selling goods on the streets. Over the last

decade many have lost their farmland, expropriated by the government for various urban development projects, and some communities near the newly industrialized areas have suffered health problems from industrial pollution.

Like many coastal cities in Southeast Asia, Da Nang is also considered highly vulnerable to the impacts of climate change. The international climate change and development communities have called attention to the ways in which climate change will stress rapidly growing urban centres in developing countries. Direct and indirect impacts of climate change are expected to exacerbate a host of existing problems: deficits in basic infrastructure and services, particularly clean water provision and sanitation; external shocks to markets and emerging economic sectors on which city and regional economies depend; pressures on natural resources such as water and land; health and safety risks to poor and/or informal settlements in hazardous areas; and threats to critical ecosystems and flood buffers already stressed by urban encroachment.<sup>(2)</sup> International bodies such as the IPCC and UN-Habitat have recognized these risks, and a number of cities in the global North and South have initiated efforts to assess climate vulnerabilities and develop strategies to respond.<sup>(3)</sup> This has created demand for approaches and methods to support climate adaptation planning,<sup>(4)</sup> with a variety of organizations producing such guidance.<sup>(5)</sup>

In addition to the risks faced by cities from climate-related hazards, the case of Da Nang highlights the challenging political economy in which cities are now positioned and the ways in which this unevenly distributes risks and benefits. Over the last few decades, many urban centres in the Asia Pacific region have experienced enormous increases in population and investment, leading to an explosion in land values, development projects and speculation. The elimination of trade barriers has raised the level of competition between the region's megacities for foreign investment,<sup>(6)</sup> with increasing pressure on governments to play the role of "entrepreneur" rather than "manager" or "regulator".<sup>(7)</sup> In this context of rapid development and high land values, information about city development is a form of political and financial capital, and access to it is restricted.<sup>(8)</sup> This has strong implications for transparency and public participation in planning. Moreover, the mounting focus on private investment can often re-direct state priorities from provision of basic and public infrastructure (water, sanitation, roads, public spaces) towards higher-tier business infrastructure and services (communications, airports, transit hubs and malls).<sup>(9)</sup> In this way, climate change will impact cities that are increasingly spaces of contestation over citizenship and access rights, land and "right to the city".<sup>(10)</sup>

These observations raise questions about how practitioners can promote climate-sensitive urban development that is also equitable. In this paper, we draw on our experiences as facilitators in the Asian Cities Climate Change Resilience Network (ACCCRN) to describe a "shared learning" approach to responding to urban climate change and development challenges. Shared learning draws on concepts in resilience thinking and research on "social-ecological systems" to promote learning and co-production of knowledge; build new formal and informal networks across scales and sectors; build capacities of stakeholders for analysis and self-representation; and spark innovative responses to problems.

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1. Viet Nam Net Bridge (2011); also Saigon Giai Phong (2012).
2. McGranahan, Balk and Anderson (2007); also Satterthwaite, Huq, Pelling, Reid and Romero Lankao (2007); Balk, Montgomery et al. (2009); and Wilbanks, Romero Lankao, Bao, Berkhout, Cairncross, Ceron, Kapshe, Muir-Wood and Zapata-Marti (2007).
3. Carmin, Roberts and Anguelovski (2012).
4. “Adaptation” has been the more conventional framing used to denote responses to impacts of climate change. As noted below, there is a movement to consider these issues rather in terms of “resilience,” which this paper adopts.
5. USAID (2009); also ICLEI Oceania (2008); Snover, Whitley Binder, Lopez, Willmott, Kay, Howell and Simmonds (2007); and Ecoplan International and Compass Resource Management (2011).
6. Douglass and Jones (2008).
7. Harvey (1989).
8. Ribeiro (2005); also Kim (2008).
9. Douglass (2002); also Pieterse (2009); and Douglass and Jones (2008).

Equally, it can provide a space for deliberation around the nature and vulnerabilities of the urban system and what “resilience” should look like. Shared learning has many potential outcomes, however. In order to promote socially inclusive climate adaptation and development, it requires strategic planning and deliberate facilitation.

## II. URBAN CLIMATE RESILIENCE

The climate adaptation research and policy communities are increasingly using the concept of “resilience”.<sup>(11)</sup> This reflects concerns that early adaptation discussions focused too linearly on technical solutions to climate impacts, ie. “climate-proofing”, rather than on larger development and governance challenges<sup>(12)</sup> or on more transformative change.<sup>(13)</sup> Resilience concepts draw on ecological systems theory – a body of research that, for the first time, viewed ecosystems as adaptive systems with the ability to move to alternative states if critical thresholds were breached, as opposed to static entities that always returned to equilibrium. A common definition of “resilience” in this view is “... the capacity of a system to absorb disturbance and reorganize while undergoing change so as to still retain essentially the same function, structure and feedbacks, and therefore identity.”<sup>(14)</sup> Over the last several years, scholarship on “social–ecological systems” (SESs) has built upon this concept to acknowledge the role of human actors or “managers” in complex adaptive systems. SES research offers a strong critique of conventional approaches to resource management that focuses on efficiency and the tendency to manage systems component-by-component rather than holistically.<sup>(15)</sup> For climate change in particular, the concept of resilience provides an essential shift from a predict-and-act perspective to one of managing complex systems flexibly, under conditions of uncertainty.<sup>(16)</sup>

Resilience provides the conceptual basis for theories and practices aimed at improving management within SESs. This includes *co-management*, *adaptive governance* and, more recently, *adaptive co-management*, practices that seek to address management challenges in watersheds and agricultural ecosystems.<sup>(17)</sup> In order to collectively build resilience, actors in SESs must first determine the nature, functions and vulnerabilities of the system. Once this has been determined, actors may strive to maintain current conditions (“persistence”) or adapt to changes to prevent shifting into a new basin of attraction. In some cases, the current system may itself be unsustainable or “undesirable”, such that actors should strive to foster “transformation”. In this way, “resilience” practice might aim not to maintain the system’s current identity but, rather, improve it.<sup>(18)</sup>

There is now a growing interest in applying concepts of resilience to “urban systems”. A number of authors have characterized cities as complex, adaptive SESs<sup>(19)</sup> and argue that, as such, resilience thinking brings a useful perspective for ecologists, planners and other actors concerned with urban development under uncertain conditions.<sup>(20)</sup> A handful of initiatives are applying resilience thinking to cities by introducing resilience concepts to urban planners and service providers to support more sustainable planning,<sup>(21)</sup> or by seeking generalizable knowledge about characteristics that make cities resilient, through field research.<sup>(22)</sup> Tyler and Moench

provide a conceptual climate resilience framework from experience in urban areas, arguing for the need to enhance capacity of actors for learning, responsiveness and resourcefulness; to build resilience of physical systems as characterized by flexibility and diversity, redundancy, modularity and safe failure; and build institutional resilience, associated with inclusive rights and entitlements, transparent, representative and accountable decision-making, access to information and ability to apply new knowledge.<sup>(23)</sup>

A number of authors have highlighted gaps in SES resilience theory and practice that raise questions about its application, especially in highly politicized contexts. Garschagen, for instance, considers how institutions in different contexts pose barriers to meaningful adoption of resilience concepts in practice.<sup>(24)</sup> Others have reflected more critically on the underlying concepts of resilience and systems. They argue that although framed in normative scientific terms, “systems” are social constructs that legitimate certain interests.<sup>(25)</sup> In reality, stakeholders experience and understand a given “system” differently. Therefore they hold differing views on what constitutes that system and when it is “desirable” or “undesirable”.<sup>(26)</sup> However, because systems theory is associated with scientific expertise, the political nature of defining a system is often obscured.<sup>(27)</sup> Examining the application of resilience concepts and resilience “tools and methods” to cities, Evans worries that “... *seeing the city as an SES threatens to de-politicize urban transition ... by constraining governance within a technocratic mode.*”<sup>(28)</sup> Friend and Moench<sup>(29)</sup> propose the need for resilience discourse and practice to explicitly adopt values that go beyond resilience concepts, in particular those of social justice and poverty alleviation.<sup>(30)</sup>

### III. LEARNING FOR RESILIENCE IN SESS

“Learning” constitutes a central aspect of research and practice on natural resource management and resilience in SESS. Indeed, the capacity to learn is cited as a key characteristic, if not *the* key characteristic, of resilience or adaptive capacity.<sup>(31)</sup> For climate change adaptation, learning responds to some of the major problems noted by practitioners.<sup>(32)</sup> This includes lack of awareness; lack of knowledge – particularly lack of comprehensive, multi-disciplinary knowledge on systems functions and vulnerabilities<sup>(33)</sup> – and poor access to information; and a paucity of tools that encourage experimentation and innovation. Resilience scholars draw from a variety of traditions and frameworks, such as Lewin’s work on action research,<sup>(34)</sup> Kolb’s “learning cycles”,<sup>(35)</sup> and diverse practices on Participatory Action Research. These schools of thought share the emphasis on “social learning”, requiring multiple, iterative cycles of deliberation and engagement among learners, fostering experimental solutions to address problems and “learning-by-doing”, and combining multiple types of knowledge and perspectives.

For social–ecological systems, the process of learning must begin with stakeholders acknowledging a problem and conducting an iterative cycle of sharing knowledge, deliberation and experimentation. Learning processes might begin due to stakeholder anticipation of a looming crisis (“front loop learning”) or as a result of a small or large crisis that alerts stakeholders to their system’s vulnerabilities (“back loop learning”).

10. Harvey (2008).
11. Bahadur, Ibrahim and Tanner (2010); also Tyler and Moench (2012).
12. Schipper (2007); also Birkmann, Garschagen, Kraas and Quang (2010).
13. Pelling and Manuel-Navarette (2008b).
14. Walker, Holling, Carpenter and Kinzig (2004) (n.p.).
15. Walker and Salt (2006).
16. Berkes (2007).
17. Folke (2006); also Olsson, Gunderson, Carpenter, Lebel and Holling (2006); Armitage, Berkes and Doubleday (2007); and Lebel, Anderies, Campbell, Folke, Hatfield-Dodds, Hughes and Wilson (2006).
18. Folke (2006).
19. Ernstson, van der Leeuw, Redman, Meffert, Davis, Alfsen and Elmqvist (2010); also Batty, Barros and Alves Júnior (2006).
20. Pickett, Cadenasso and Grove (2004).
21. Wilkinson, Porter and Colding (2010); also Wardekker, de Jong, Knoop and van der Sluijs (2010).
22. Pickett, Cadenasso and Grove (2004); also Resilience Alliance, CSIRO, Arizona State University and Stockholm University (2007).
23. Tyler and Moench (2012).
24. Garschagen (2011).
25. Osbahr and Boyd (2007); also Evans (2011); Cannon and Müller-Mahn (2010); Friend and Moench (forthcoming); and Leach, Bloom, Ely, Nightingale, Scoones, Shah and Smith (2007).
26. Osbahr and Boyd (2007).
27. Evans (2011).
28. Evans (2011), page 233.
29. Friend and Moench (forthcoming).
30. The resilience literature has partly acknowledged and incorporated some of these criticisms, recognizing that social–ecological systems are socially constructed and that resilience thinking needs to incorporate insights from fields such as political economy and political ecology; see Walker, Holling, Carpenter and Kinzig

(2004); also Osbahr and Boyd (2007).

31. Folke, Colding and Berkes (2003).

32. Tschakert and Dietrich (2010).

33. Folke, Hahn, Olsson and Norberg (2005).

34. Lewin (1946).

35. Kolb (1984).

36. Olsson, Gunderson, Carpenter, Ryan, Lebel, Folke and Holling (2006); also Walker, Carpenter, Anderies, Abel, Cumming, Janssen, Lebel, Norberg, Perterson and Pritchard (2002); and Armitage, Marschke and Plummer (2008).

37. King and Jiggins (2002).

38. Reed, Evelyn, Cundill, Fazey, Glass, Laing, Newig, Parrish, Prell, Raymond and Stringer (2010) (n.p.).

39. Pelling, High, Dearing and Smith (2008a); also Reed, Evelyn, Cundill, Fazey, Glass, Laing, Newig, Parrish, Prell, Raymond and Stringer (2010).

40. Pelling, High, Dearing and Smith (2008a).

41. Folke, Colding, Berkes (2003).

42. Davidson-Hunt and O'Flaherty (2007).

43. See Forsyth (1996) for an example of normative knowledge on upland land users.

44. Armitage, Berkes and Doubleday (2007), page 93.

45. In contrast, work on federations of the urban poor highlights the ability of organized low-income and marginal communities to respond to climate change and disasters and advocate for adaptive policies; see Dodman, Mitlin and Rayos Co (2011).

46. Arthur, Friend and Marschke (2009).

47. Tschakert and Dietrich (2010).

Learning processes in an SES require a diverse group of stakeholders to develop a common understanding of a system, its key functions and vulnerabilities, and to exchange knowledge. This process may draw on a variety of engagement methods and learning tools, such as scenario-building, that lead to shared considerations of problems and visions for moving forward.<sup>(36)</sup> Various learning frameworks emphasize the need for multiple cycles of the learning process. This can start with "single loop learning", fixing errors from routines, to "double loop learning", which corrects errors by adjusting values and policies, and finally "triple loop learning", which leads to re-designing governance norms.<sup>(37)</sup>

Literature on resilience emphasizes "social learning", which denotes learning among individuals, linked to larger change among institutions or organizations. Reed et al. define social learning as a process that leads to changes in understanding among individuals, as well as learning that transcends individuals to "... become situated within social units or communities of practice within society."<sup>(38)</sup> In other words, social learning should lead to changes in the behaviour or habits of individuals but should also be "greater than the sum of its parts" in fostering larger change in organizations and institutions.<sup>(39)</sup> Social learning is also crucial to building formal and informal networks. Pelling et al. consider how social learning can foster adaptive actions among individuals in an organization, adaptive changes within an organization as a larger entity and adoption of institutional "rules of the game".<sup>(40)</sup> Learning may take place within formal ("canonical") networks of actors within or across organizations. Pelling et al. highlight the particular importance of "shadow systems", informal networks that interact with the formal systems in organizations. Shadow systems permit new types of experimentation, communication and learning through networks within or across organizations or communities.

One of the major discussions in social-ecological systems and natural resources management relates to the need to integrate different types of knowledge, particularly "scientific" and "local" or "indigenous" knowledge.<sup>(41)</sup> This combines insights from internal and external researchers. Davidson-Hunt and O'Flaherty caution against extraction of local knowledge by external researchers, and highlight the need for *processes* between researcher and local communities in order to facilitate "co-production" of knowledge.<sup>(42)</sup> These authors also recognize the importance of critical reflection on knowledge, whether local or scientific, as something that is not neutral but influenced by political interest.<sup>(43)</sup>

In practice, learning approaches can encounter major challenges, especially in situations where power dynamics are unequal. Armitage et al. consider the problems of engaging diverse communities when certain stakeholders have neither the "... ability, willingness nor the capacity to experiment and learn."<sup>(44)</sup> This is particularly true for poor or marginalized groups, they argue, who are important stakeholders but in many cases lack time or clear incentives to participate.<sup>(45)</sup> Arthur et al. reflect yet more critically on the relevance of learning in situations where there is conflict about fundamental rights of access and control over resources and their benefits. They assert the need for learning processes to deliberately build capacities and voice for people marginalized by current structures.<sup>(46)</sup> Tschakert and Dietrich contend that gaps in addressing power and politics in learning processes dominated by resilience thinking can be filled by insights from action research/learning.<sup>(47)</sup>

From this brief review, we can draw several points about the application of resilience concepts and a learning-based approach to addressing urban climate change vulnerability:

- The concept of resilience brings a new perspective that emphasizes complex linkages and the need for a flexible, learning-based approach to avoid major disturbances under conditions of uncertainty. This has special significance for cities, where dynamics are complex and stakes for catastrophic failure high. It provides an important shift away from conventional “predict-and-prevent” paradigms in risk management that are inappropriate and, indeed, can increase or simply transfer climate risk unevenly in society.
- Learning processes are important for defining the boundaries of the system, gaining new knowledge of its functions and vulnerabilities, building new actor networks and initiating collaborative action that may lead to change. Important features of learning processes include iteration and cyclical learning; learning from past experiences (back loop) and anticipating new experiences (front loop); co-producing hybrid knowledge from a variety of sources; and experimentation and learning-by-doing.
- At the same time, critics draw our attention to the risks associated with applying ecological concepts to social systems. Many problems in SESs may more strongly reflect differing values and interests rather than technical challenges such as lack of knowledge, coordination and capacity. The perception of problems depends on who is framing them; indeed, any given “stakeholder group” is the result of social processes and negotiations, and those with more power are likely to control or manipulate the learning process. Unless values of social equity are explicitly acknowledged and adopted, social–ecological systems and resilience concepts and their associated learning approaches can reassert the status quo.

#### IV. “SHARED LEARNING”

These principles from the literature on resilience thinking, social–ecological systems and learning offer insight into how stakeholders can address the challenges posed by global trends of urbanization and climate change. The question we consider then, is how can practitioners, such as government agencies, NGOs, academics or others involved and concerned with sustainable and equitable development, apply these in practice.

We have used the term “shared learning”<sup>(48)</sup> to describe an approach to addressing complex problems under conditions of uncertainty. Shared learning seeks to engage stakeholders in a structured process of exchanges characterized by:

- cyclical, iterative engagements that foster deliberation on the meaning and value of systems and explore vulnerabilities;
- crossing boundaries of sector, discipline and scale to foster sharing of sector- or group-specific knowledge and experience, knowledge from local practitioners and residents and from external resources;
- co-production of knowledge and deliberation on new analysis and information that can improve the quality of decision-making for government, households and the private sector;

48. Moench, Ahmed, Mustafa, Khan, Mechler, Kull, Dixit and Opitz-Stapleton (2008); also Tyler and Moench (2012).

## “SHARED LEARNING” FOR URBAN CLIMATE RESILIENCE: ASIA

- building upon existing newly formed networks, both formal and informal (including “shadow systems”), and capacities;
- learning-by-doing, experimentation with new ways of working and problem-solving (innovation), and reflecting on experience;
- promoting new understanding and framing of problems, and appreciation of complexity and uncertainty; and
- deliberately engaging, providing information and building capacity of stakeholders who may otherwise lack the time, opportunities, clear incentives and, more fundamentally, information and capacity to formulate, voice and advocate positions, especially when problems are framed as scientific or technical.

In practice, shared learning can be facilitated through a process of iterative interactions we term “shared learning dialogues”.<sup>(49)</sup> These engagements can take a variety of forms, from large-scale public meetings, to homogenous focus group sessions, to medium-sized multi-stakeholder gatherings, to one-on-one meetings. They can take place at the national level, the local level or exchanges between different localities. Structuring this process requires a facilitator – an actor or group of actors seen as credible and legitimate by all stakeholders, who can plan strategically and take advantage of opportunities to engage different actors and broker relationships.

Below, we consider the outcomes of applying a shared learning approach across 10 cities in Asia, from 2009 to the present, as part of the Asian Cities Climate Change Resilience Network (ACCCRN). In these cities, in many cases, we find that facilitators in the programme supported the co-production of knowledge: reframing discussions on climate change away from predict-and-prevent and towards a more systematic understanding of vulnerability and resilience; developing networks of stakeholders across sectors and scales; and fostering technical innovations and responses to some governance failures. It is more challenging to compare how shared learning navigated political differences in the ways stakeholders define, experience and value urban systems in rapidly developing Asian cities. We see examples of how shared learning fostered deliberation on fundamental questions about risk and vulnerability; on stakeholders demanding transparent analysis and access to information used by experts; and on co-producing analysis. This underlines the critical role of the facilitator in shared learning, not as providing neutral technical assistance but as brokers and strategic actors whose interests, perspectives and values will influence the process.

## V. SHARED LEARNING IN ACCCRN

ACCCRN is a Rockefeller Foundation-supported initiative that seeks to initiate the process of resilience-building in 10 cities in Vietnam, India, Thailand and Indonesia. Initiated in 2008, ACCCRN was designed to “... *demonstrate a diverse range of effective approaches, processes and practices for assessing and addressing urban climate vulnerabilities, and through this base of practice and knowledge to catalyze attention, funding and additional actions for building urban climate change resilience in more places.*”<sup>(50)</sup> The programme placed an emphasis on building the resilience of “poor and vulnerable people”.<sup>(51)</sup>

49. Moench, Ahmed, Mustafa, Khan, Mechler, Kull, Dixit and Opitz-Stapleton (2008).

50. See <http://www.acccrn.org/sites/default/files/documents/ACCCRN%20Brochure.pdf> (n.p.).

51. See <http://www.acccrn.org/sites/default/files/documents/ACCCRN%20Brochure.pdf>; also Brown, Dayal and Rumbaitis Del Rio (2012); and the Rockefeller Foundation (2009).



## SHARED LEARNING PROCESS IN ACCCRN



**FIGURE 1**  
Shared learning process in ACCCRN

NOTE: Shared learning in ACCCRN had a series of milestones, with stakeholder engagement both throughout and between each activity. These included vulnerability assessments, pilot projects and sector studies, city climate resilience strategies and intervention projects. Shared learning continues throughout these discrete activities.

SOURCE: ISET (2013) (Michelle Fox).

In ACCCRN, the shared learning process has included a variety of related activities:

- iterative interactions structured in a variety of formats, including multi-stakeholder gatherings, focus group sessions and small group meetings;
- vulnerability assessments, which provide an overview of climate change exposure, sensitivities and adaptive capacity for groups, geographical areas and/or sectors in each city;
- specific “sector studies” to further analyze specific topics of concern;
- pilot projects to test intervention ideas and engage community stakeholders;
- development of “city resilience strategies”, which outline key vulnerabilities and prioritize investment for donor or locally financed intervention projects; and
- small “intervention” projects based on resilience strategies; many of these were ongoing in the cities as of 2012.<sup>(52)</sup>

ACCCRN works in the world’s diamond-polishing capital, Surat, the dry, trading hub of Indore in western India and Gorakhpur in the river basins of India’s Gangetic plains; in the scenic but disaster-prone seaside towns of Da Nang and Quy Nhon in central Vietnam, and in Can Tho in the heart of Vietnam’s Mekong delta; in coastal Semarang in central Java

52. See ISET (2011) for a detailed explanation of the programme structure.



**FIGURE 2**  
**Cities engaged in the ACCCRN programme**

SOURCE: ISET (2013) (Michelle Fox).

and Bandar Lampung in Sumatra; in peaceful Chiang Rai in northern Thailand and in the dynamic regional hub of Hat Yai in the south. What they have in common is their relative size. None are considered “mega cities” in their respective countries, but all are growing in size, population and investment. New roads, infrastructure and communications are connecting them to remote regions, new people entering the city seeking opportunities big or small, and agricultural land or wetland ecosystems are being transformed to concrete.

Below, we explore and interrogate some of the observed outcomes of shared learning in the ACCCRN cities. There are observable instances where the process contributed to network building, to deepening understandings of complexity and uncertainty, and to creating spaces for deliberation and co-production of knowledge. We are also encouraged that shared learning processes in urban environments can lead to more transformative outcomes in the longer term, if deliberately and strategically oriented.

Yet that there were divergent outcomes from city to city cannot be under-emphasized. This reflects differences with regard to political systems and culture of stakeholders. It also reflects the diversity of facilitating organizations, which included a national research institute

(National Institute for Science and Technology Policy and Strategic Studies), international, national and local NGOs (Institute for Social and Environmental Transition, Mercy Corps Indonesia, Challenge to Change, Thai Environmental Institute, Gorakhpur Environmental Action Group) and a development consultancy firm (TARU Leading Edge). Each of these organizations entered the ACCCRN programme with different styles of working, networks and experiences with participatory engagement methods.<sup>(53)</sup> At the local level, counterparts varied from local government agencies in Vietnam, coalitions of academics and NGOs in Indonesia, a local environmental advocacy NGO in Gorakhpur, and, in Surat, a coalition between the Chamber of Commerce and Industry and municipal corporation.

In noting these differences, we emphasize the point made by Evans about the risks of applying standardized “tools” or “methods” across complex social environments.<sup>(54)</sup> This is also consistent with the understanding of social learning put forward by Reed et al.,<sup>(55)</sup> who discourage attributing desired outcomes directly to a particular social learning process. The discussion below thus considers the kinds of outcomes that a shared learning approach *can*, but will not *necessarily*, engender.

## VI. SHARED LEARNING LESSONS AND OUTCOMES

### a. Formation of new relationships, and formal and informal networks across scales and organizations

Across the ACCCRN cities, the process of shared learning assembled new groups of stakeholders that do not regularly interact or regularly exchange information. In Vietnam, where the topic of climate change is usually seen as the prerogative of one technical ministry (Ministry of Natural Resources and Environment – MoNRE), shared learning dialogues (SLDs) brought together a variety of provincial departments, “mass organizations” (Vietnamese state-affiliated civil society), lower levels of government, academic researchers, international and national technical resource persons and representatives of vulnerable groups (for instance, farmers and fishermen) in a single SLD workshop. In Indonesia, ACCCRN allowed for greater involvement of NGOs and academics in decision-making; usually, they are secondary actors and suppliers of analysis and information but not equal partners. This helped establish and strengthen relationships between governments, academics and NGO staff. The shared learning process in India assembled disparate sectoral groups such as business, NGOs and academia, for interaction and deliberation with the city government.

Interactions created a space for actors to develop new formal and informal networks. In Hat Yai, individuals from the Chamber of Commerce, the municipality, NGOs and provincial departments had developed personal and professional relationships informally in the past, through initiatives aimed at combating flood risk. Establishing a formal working group allowed this group to increase its size and influence, and they have since formed the Hat Yai City Climate Change Resilience Learning Centre as a physical office and institutional home for the network. In the Indonesian cities, members of the ACCCRN facilitating

53. Orleans Reed and Guibert (2010).

54. Evans (2011).

55. Reed, Evelyn, Cundill, Fazey, Glass, Laing, Newig, Parrish, Prell, Raymond and Stringer (2010).

56. Sutarto and Jarvie (2012).

organization, Mercy Corps, made an effort to build informal professional relationships with technical staff from city departments, in order to share information and discuss new ideas outside of the more constrained office environment.<sup>(56)</sup> In Vietnam, shared learning benefited from shadow systems within the official government bureaucracy; for example, the leadership of a department vice-director in Quy Nhon, whose facilitation skills and personal and professional relationships allowed him to convene representatives from different departments on a regular basis. In both Vietnam and Indonesia, inter-agency “climate change working groups” were formed and met regularly, promoting new or better working relationships across agencies. This has been institutionalized in the cities of Can Tho and Quy Nhon through the establishment of permanent climate change coordination offices.

A key insight for climate adaptation practitioners was the importance of leadership from individuals with strong communications and networking skills rather than technical knowledge of climate change as a main requirement. Because of a quirk in the administrative system, the role of ACCCRN coordinator in Da Nang was initially given to the Department of Foreign Affairs rather than the Department of Natural Resources and Environment, which is normally responsible for climate change. This proved to be highly effective while in place, due to the department’s convening authority, its leaders’ strong personal relationships and the dynamic facilitation capacities of its staff.

ACCCRN network-building extended beyond the cities themselves, with learning taking place at the national level with policy makers, and between cities, through exchanges. Within countries there are regular exchanges and visits between city working groups, which often turn to each other directly for consultation. Vietnamese and Thai city stakeholders have visited back and forth between countries, with the intention of developing a long-term learning regional network that it can draw on for advice and consultation. The Climate Change Coordination Office in Can Tho, in particular, has established knowledge-sharing relationships with other provinces, NGOs and research institutes across the region.

### **b. Dealing with uncertainty and complexity – and governance**

Initially, even explaining the concept of climate change was a major challenge for programme facilitators in all four countries. This was further complicated by linguistic limitations, for example in Thai there is no commonly understood distinction between “climate” and “weather”. When introduced to the concept, most stakeholders struggled to think beyond the immediate problems in their lives or cities, or discreet hazards. Chiang Rai stakeholders, for instance, focused on air pollution from crop residue burning in surrounding agricultural areas, which they associated with climate change. Particularly challenging was conveying the level of climate uncertainty for the coming decades, since conventional planning approaches use assumptions about the future based on historical trends. Partners struggled to grasp or accept that climate *projections* were not *forecasts* and that downscaling would not produce probabilistic data.<sup>(57)</sup>

57. Opitz-Stapleton (2011).

Processes of learning-by-doing helped to build a more sophisticated understanding of these topics beyond “single loop” learning. This was evident, for instance, in Vietnam and Indonesia, where normally only staff within one designated agency or external consultants prepare

official plans. In contrast, the ACCCRN climate change working groups – composed of technical staff from different government agencies (Vietnam) and NGOs, academics and local planning officials (Indonesia) – drafted the “city resilience strategies”. Through this process, group members gained a technical understanding of climate change and its importance to development planning. Because each working group member came from a formal organization within the government or civil society, they were able to take back new knowledge to their home agencies.

Gradually, there was a growing appreciation among stakeholders of complex linkages, an understanding of uncertainty and thinking beyond physical hazards to the interplay between physical systems, agents and institutions. In Gorakhpur, SLD participants identified linkages between waterlogging (flood), solid waste management, sewerage and in-filling of city lakes.<sup>(58)</sup> Sector studies in flood-affected cities such as Quy Nhon, Da Nang and Gorakhpur showed how uncoordinated urban development had exacerbated flood risk.<sup>(59)</sup> The research suggested that urban development that raised and in-filled low-lying areas would increase flood risk in other areas (usually, where lower-income and less powerful groups are located) – and in the long term, put high value investments at risk due to extreme events. In the Vietnamese cities in particular, these findings have begun to challenge more conventional notions that flood infrastructure would be able to protect new urban developments.<sup>(60)</sup> In response, partners have generally prioritized strategies that are resilient under a variety of possible futures<sup>(61)</sup> – technical innovations such as a project to design and promote water-harvesting systems (Semarang), “bio-pores” that enhance groundwater recharge and improve waste management through composting (Bandar Lampung), a real-time salinity monitoring system (Can Tho) and a system of SMS messages for disaster warning (Surat).

In moving away from a focus on hazards alone, partners also identified actions to address institutional failures. These seek to test and demonstrate more accountable, decentralized service systems, or improve quality or access to information. In Gorakhpur, the local residents are addressing gaps in local service provision by forming ward level committees to make providers more accountable. In flood-prone Hat Yai, the new Climate Change Resilience Learning Centre has installed CCTV monitors at different points on the upstream stretch of the river so that city residents can see for themselves the pace and strength of floods. This encouraged the local government to shortly thereafter install its own water gauges. While the climate working group has intervened to improve flood preparations and warning systems, they view this as an entry point for engaging key stakeholders and ensuring more responsive local government actions. This process led the Hat Yai team to consider longer-term strategies extended to the provincial and river basin level.

### c. Creating a space for deliberation and co-production of knowledge

As described above, shared learning should provide a space for informed deliberation on the meaning and value of systems, and co-production of new, cross-disciplinary knowledge. This implies access to information and avoiding dominance of technical knowledge only. Indeed, partners observe that interactions in ACCCRN helped develop cross-sectoral and inter-disciplinary knowledge across departments, city stakeholders and

58. GEAG (2009).

59. Van Dinh et al. (2010); also GEAG (2009); Southern Institute of Water Resources Research (2010a); and Southern Institute of Water Resources Research (2010b).

60. Reed et al. (2012).

61. Tyler and Orleans Reed (2011).

different scales of government. This benefited considerably from network-building, for example in Hat Yai, Can Tho, Quy Nhon and Gorakhpur, where new relationships facilitated the sharing of data across agencies. In Vietnam, interactions within the working group, with other stakeholders and with external resource people helped bridge sectoral knowledge silos between urban development and environmental planners, where an artificial barrier has been created between climate change and urban development.

Shared learning should also provide a space for deliberating problem-framing and validating the results of analysis. This was particularly evident in negotiations about who or what is “vulnerable” and “at risk”, and what it would mean to be resilient. During initial SLDs, facilitators used tools such as break-out groups, vulnerability matrices and simple multi-criteria analysis to provoke discussion about who or what was “most vulnerable”. Although stakeholders also had opportunities to provide feedback on results of the vulnerability assessments conducted by technical partners, this was often stymied by the inaccessible, lengthy and technical nature of these documents.<sup>(62)</sup>

Examples from Indonesia show how shared learning can provide a space for making knowledge accessible and for negotiating problem-framing. Working group members in both Semarang and Bandar Lampung lodged complaints against a spatial risk assessment conducted by a national research institute. They objected, in particular, to the use of highly technical language, which they argued made the findings inaccessible to the majority of shared learning participants. In addition, they argued that the methodology was opaque regarding how it developed certain indicators for “capacity” and “vulnerability”; that several of the indicators were misleading or incomplete; and that the data used from the national level were less reliable than local datasets. The study has resulted in further discussions and debates around how best to capture urban climate vulnerability and risk, with working group members in both cities agreeing to engage in further training with the national centre and to conduct an alternative vulnerability assessment.

The examples from Indonesia show the importance of deliberation around these concepts. Labels such as “at risk” and “vulnerable” are sensitive and political, since they identify whose needs will be prioritized and what actions will be taken. While the ACCCRN programme prioritized the needs of “poor and vulnerable” populations, it left considerable space for negotiating these concepts at a local level, by not prescribing a specific definition or criteria<sup>(63)</sup> or whether interventions should specifically target these groups versus the whole city.<sup>(64)</sup> In particular in ACCCRN, there were differences in the degree to which different stakeholders emphasized climate (ie. exposure) versus socioeconomic and political drivers of vulnerability. For example, many of the groups identified as “most vulnerable” were those who were clearly exposed to *climate-related hazards* like flood and drought, such as farmers, fishermen and communities located in hazardous areas. In other instances, they were groups marginalized by institutional or political drivers, but not necessarily exposed to climate hazards – for example in Can Tho, where vulnerability assessments drew attention to the struggles of households who were resettled by the state in order to make way for urban development projects.<sup>(65)</sup> Assessment in Semarang drew attention to communities affected both by climate hazards and socio-political insecurity; for

62. Opitz-Stapleton (2011).

63. A major question left open for interpretation was whether “poor and vulnerable” groups meant specifically “poor” – and if so, then by what metrics of income or socio-political marginalization? Alternatively, there was an implication that non-poor, non-marginal groups with high exposure to climate-related hazards might be considered among the most vulnerable; see Friend and Moench (forthcoming).

64. Brown, Dayal and Rumbaitis Del Rio (2012)

65. Challenge to Change, The Dragon Institute, The Mekong Rice Institute and Can Tho University (2009).

example, a slum community recently resettled from the coastal area to relieve problems with frequent flooding, but whose exposure to hazards had actually increased in the new landslide- and drought-prone uplands area. Similarly, fishing communities in Da Nang threatened by extreme weather were facing additional economic stress due to the privatization of near-shore coastal fishing areas. These examples show deliberations on not just *who* is vulnerable, but *what* is making them vulnerable.

In contrast, an example from Vietnam demonstrates how more closed discussions can entrench status quo values, positions and interests and influence interpretations of “resilience”. In Da Nang, project leaders commissioned a hydrological modelling sector study to understand inundation risks under future conditions. Findings suggested that planned elevated developments would compromise city drainage and exacerbate flooding, particularly in low-lying, lower-income farming communities. In response, however, officials from the Department of Construction proposed a study to support designs for new flood infrastructure and heightened plinth levels *to protect new investments* in the flood plain, rather than reconsidering whether the project should proceed given the risk to a large portion of the community. This could be seen as an example of “single loop learning”, in which learners make technical revisions only (in this case plinth heights). It also highlights the institutional challenges inherent in promoting a resilience perspective, as various pressures prevent the Department of Construction from adopting a different position on planned urban development. Finally, it demonstrates the political and social values attached to particular positions, especially concepts such as urbanization and “modernity” in Vietnam.<sup>66</sup> This particular discussion has remained a technical one, enclosed primarily within this small group in Da Nang (in contrast to a similar case in Quy Nhon, described below). Through various efforts, facilitators are now hoping to bring it into a more public learning process.

66. See Fortier (2010).

#### **d. Building capacity for analysis and self-representation**

Shared learning should support less powerful stakeholders in analyzing and representing their own interests. In Vietnam, local officials are increasingly doing so by engaging critically with national level climate change policy makers. As a result of the ACCCRN process, officials in Can Tho and Da Nang were able to develop their own climate change action plans and priority action items for approval by national governments, rather than hiring external consultants from the Ministry of Environment and Natural Resources. In the case of Quy Nhon, the Climate Change Coordination Office is putting forward a proposal to the national government's fund for climate adaptation regarding an investment focusing on mangrove preservation, although the fund has been allocated mainly for infrastructure projects.

As discussed above, however, learning needs to extend beyond one group of stakeholders if it is to have socially just outcomes. In ACCCRN, there were clear constraints on shared learning for stakeholder representation, especially for socially and politically marginalized groups. Most of the ACCCRN cities include domestic migrants (particularly in Can Tho, Da Nang, Bandar Lampung, Semarang, Gorakhpur and Surat), and Hat Yai attracts undocumented international migrants, especially from

67. TARU Leading Edge (2011).

Myanmar. State institutions often will not recognize, much less engage as equals in planning processes with these groups. Certain minorities within the cities are known to face specific forms of social or economic discrimination. Anxieties about these issues are evident – for example, in the Surat resilience strategy, which projects that economic downturn combined with migration would lead the city into a state of ongoing conflict.<sup>(67)</sup>

Just as there was no consistent definition for vulnerable groups in ACCCRN, there was also no standard approach for engaging or building capacity among those identified as vulnerable. In many instances, facilitators sought to “bring them in” as participants in formal SLD workshops, through small group break-out discussions and/or writing or drawing exercises. This included representatives from different areas or social/economic groups (farmers, fishermen, residents of informal settlements, among other) that were identified as vulnerable. In other cases, facilitators actively sought to build the knowledge and capacity of stakeholders through separate interactions. In Indore and Gorakhpur, facilitators mapped the root causes of vulnerabilities with representatives from slum areas, drawing on a variety of Participatory Rural Appraisal (PRA) tools such as seasonality, ranking exercises, focus group discussions and causal loop diagramming. The facilitator teams in Vietnam likewise used ranking exercises with focus groups in communes identified through multi-stakeholder workshops. These interactions provided input for vulnerability assessments, producing shared knowledge and raising awareness among participating groups.

These examples suggest that deliberately facilitating shared learning around capacity-building can help marginalized actors to engage with more powerful local actors. Representatives from vulnerable communes in the Vietnamese cities (including an island and fishing communities) developed and proposed concepts for pilot projects during multi-stakeholder workshops. This was evident in Gorakhpur, where the local ward level committee constituted under one of the ACCCRN pilot projects approached the local government department (including the municipal commissioner) to demand improved drainage and paved roads in their ward. A large group of citizens and civil society organizations also campaigned successfully to get the city administration to stop and remove illegal encroachments on Ramgarh Lake, a large waterbody in the city that provides important natural drainage.

### **e. Shared learning for transformation?**

Given the political economy of urban transition, can a learning process drive transformative change in cities? The city of Quy Nhon in Vietnam is an example where the shared learning process is providing a platform for a broader reconsideration of city development through the involvement of vulnerable households, the generation of new analysis and public debate. A flood in 2009, during the early stages of ACCCRN, caused unprecedented damage in peri-urban wards to the city’s north. These wards have been officially approved as new development areas under the city’s master plan, and since 2003 have undergone the construction of new roads and bridges and industrial, educational and residential facilities in low-lying farmland. The impacts of the 2009 flood were especially serious



for farming households who have lived in the area for generations.

Following the event, several participants in the SLDs expressed concern about how climate change impacts would affect both traditional villages and new urban development. This led to the commissioning of two sequential sector studies, with support from the ACCCRN programme, and eventually a set of larger research projects aimed at assessing the causes of the 2009 flood and future risk. The “grassroots analysis” of the 2009 flood combined local interviews with satellite imagery to map the flood’s evolution and understand why floodwaters were deeper, more powerful and took longer to drain into the adjacent lagoon than any other flood in memory. Co-produced by local and external stakeholders, the study indicated that recent urban development was the main driver of current flood risk in the city’s peri-urban areas and that planned future development would strongly exacerbate risk.<sup>(68)</sup> Results are informing a hydrological model capable of projecting how urban development and climate change scenarios will impact future flooding. Both studies have been shared through small meetings with officials and through workshops.

In resilience or adaptive management terms, the Quy Nhon case can be seen as an opportunity for “back loop learning”. This is because a major disaster in Quy Nhon provided an opportunity for stakeholders to acknowledge vulnerabilities and to re-organize. But by the same token, the process in Quy Nhon did not organically emerge from learning processes. It required deliberate facilitation and positioning from local leaders and external facilitators who sought to promote values related to equitable urban development.

68. DiGregorio and Van (2012).

## VII. SUMMARY AND CONCLUSIONS

The concept of resilience and its grounding in complex systems thinking is a new way of understanding cities that emphasizes complexity, non-linearity and dependence on ecosystems. It promotes flexibility, learning and innovation rather than command-and-control approaches to climate change adaptation. Social learning among groups of stakeholders, the development of formal and informal networks, and the integration of different types of knowledge can contribute to the resilience of a social-ecological system. We observe that applying a shared learning approach to building climate change resilience in the four ACCCRN countries has indeed helped to establish or strengthen networks across government agencies in different sectors and at different scales, as well as across non-governmental organizations and academics. Learning-by-doing helped stakeholders re-frame the discussions on climate change away from predict-and-prevent and towards a greater appreciation of complexity, uncertainty and institutional challenges associated with climate change. It sparked experimental technical and governance innovations for responding to these challenges.

At the same time, scholarly critiques of resilience and social-ecological systems thinking show the risks of promoting resilience and learning-based approaches to adaptation in contexts where there are major differentials of power and fundamental political debates over how the “system” is understood, problems are framed and whose interests are represented. They highlight how the discourse of resilience, when applied to cities, can legitimize actors and actions that undermine

social justice and equity. In ACCCRN, shared learning did provide a space for deliberation over fundamental questions concerning risk and vulnerability. In some instances, it allowed stakeholders to demand transparent analysis and access to information used by experts and to work alongside experts to produce analysis. This was particularly evident in debates over vulnerability assessments in the two Indonesian cities, but dominance by expert knowledge still remains a challenge for fostering meaningful deliberation.

There are examples where facilitators used shared learning to build the capacity of marginalized groups to advocate on their own behalf using climate knowledge and co-produced analyses – particularly in Gorakhpur. Yet, at the same time, there are substantial barriers and limitations. We are reminded of this when considering stakeholders in the city whose presence is largely informal and undocumented.

Climate change is often framed as a technical issue in such a way that marginalizes the political drivers of vulnerability.<sup>69</sup> Four years of shared learning in ACCCRN has helped to move away from a climate hazards narrative, and has shed light and opened up dialogue on major governance and urban development challenges for climate resilience. These achievements are small starting points. In the longer term, we hope that ongoing facilitation – continuing to build networks and develop new knowledge, and seeking to increasingly involve marginal actors – could contribute to more inclusive, just outcomes and development.

But equally, processes such as shared learning can easily reinforce existing power dynamics. This is especially risky when seen as a technical exercise or consensus-building activity. Urban climate adaptation projects often focus on gaining “city ownership” or “city buy-in”, as though cities were monolithic entities in which stakeholders shared the same basic needs and interests. Likewise, reducing shared learning to a “toolkit” carries similar risks; it suggests that it can have similar outcomes regardless of who is facilitating and on whose behalf. There are real limitations to addressing urban climate resilience in a short-term, development project format. The achievements made in ACCCRN are small starting points for a large challenge ahead.

For donors and practitioners, this is an important insight. Urban climate resilience practices need to open up new spaces for informed public deliberation about vulnerability and resilience. They should promote access to knowledge and information. They should build the capacities of groups who are politically, socially or economically marginalized to represent their own interests in responding to climate change.

69. Evans (2011); also Fortier (2010).

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