Building Urban Resilience to Climate Change:
What Works Where, and Why

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Over the past 4 years ISET has worked with stakeholders in 15 cities in 5 countries — Vietnam, Indonesia, India, Thailand and the United States — to identify the challenges climate change will pose for these cities and to begin the process of systematically building city resilience to climate change in the face of those challenges. In the process, we have developed and continue to refine a resilience-building curriculum that includes laying the groundwork for addressing climate change and climate resilience, conducting a climate change vulnerability and risk assessment, and using this assessment and other materials to prepare an initial resilience strategy.

In this presentation, we:

a) Introduce the current curriculum and the aspects of the curriculum that have proven key to its utility;

b) Highlight the commonalities we have found in building resilience across this varied spectrum of cultures and capacities; and

c) Discuss the types of country, culture, and capacity-specific modifications that we have found necessary to implement to maintain stakeholder engagement, comprehension, and implementation.

We close with a discussion of the implications of this work for US climate change adaptation efforts, and for building resilience and increasing the capacity of vulnerable groups and peoples in general.

INTRODUCTION

There is mounting international concern about how to address projected climate change impacts to urban areas (Satterthwaite et al., 2007; Wilbanks et al., 2007; Balk et al., 2009; UN-HABITAT, 2011). Currently, 50% of the world's population lives in urban areas, and this is projected to grow to 70% by 2050 (World Health Organization, www.who. int). Yet, the majority of the research to date has focused on the likely impacts of climate change and pointed to the need for local measures to adapt to these projected impacts, rather than focusing on methods and processes to generate those local adaptation measures (Tyler and Moench, in review).

The growing number of guidebooks and manuals now available to support local governments in assessing climate change impacts and developing responses (see, for example: USAID, 2009; Snover et al., 2007; NOAA et al., 2009; ICLEI Oceania, 2008; Ecoplan Intl. and Compass Resource Mgmt, 2011) remain primarily theoretical. There has been limited practical experience with planning for urban adaptation anywhere (Birkmann et al., 2010), and most climate planning in the U.S., for example, has been devoted to mitigation strategies (Wheeler, 2008). Where the focus has been on adaptation (for example: ADB, 2010; World Bank, 2010), studies have primarily emphasized specific measures for responding to identifiable future climate risks, or country-level policy approaches (Lim et al., 2004). These approaches can be problematic for several reasons (Tyler and Moench, in review):

- The climate information used to guide these evaluations is often of poor quality or misused. Even when climate information is available, it is often poorly communicated: formats are unhelpful, uncertainties and potential parameter ranges unclear and information on extreme events to bracket planning scenarios is limited (Opitz-Stapleton, 2011).

- A focus on climate impacts perpetuates a "predict and prevent" paradigm aimed at some specific future climate event or risk level, rather than at future climate conditions that are both variable and dynamic (Milly et

al., 2008; Birkmann et al., 2010). This deflects attention from complex systemic interactions and weaknesses, capacity deficits or institutional failures (Ruth and Coelho, 2007).

- Climate impact approaches often focus on analysis of the climate changes themselves and their direct impacts, rather than assessment of vulnerabilities that can be caused by failures of infrastructure or ecosystems, by policy, cultural or governance constraints, or by limited human capacities (see for example Eriksen et al., 2007; Heltberg et al., 2009; Verner, 2010).

- The focus on planned responses to climate impacts overlooks the fact that most adaptation will be undertaken informally by individuals, households, and organizations. Significant potential gains in urban resilience could be realized via enabling mechanisms if informal or autonomous adaptation is clearly recognized. This has to occur on a local level, informed by local needs and capacities, however, to be effective.

- Climate impact approaches under-emphasize the importance of mechanisms for systematic learning as a key element of building ongoing capacity for adaptation. This learning needs to occur at multiple scales and include a broad array of actors.

These concerns suggest the need for a broader approach to climate adaptation in cities. ISET has developed the Climate Resilience Framework and associated Climate Resilience Framework: Training Materials (training.i-s-e-t.org) to fill this gap.

THE CURRICULUM

THE CLIMATE RESILIENCE FRAMEWORK

The *Climate Resilience Framework* (CRF) is a conceptual planning approach to building resilience to climate change. It is designed for practical application, and has been developed from and tested in field situations. The Framework addresses the need for an approach that clarifies complex sources of vulnerability and addresses the complexities of climate adaptation, yet is simple enough for local practitioners to apply in their own context.

The CRF is structured to build a broad understanding of urban resilience by describing the characteristics of urban systems, the agents (people and organizations) that depend on and manage those systems, institutions (laws, policies and cultural norms) that link systems and agents, and patterns of exposure to climate change. It operationalizes these concepts through structured and iterative shared learning approaches that allow local planners to define these factors in their own context, in order to develop practical strategies for local action (Tyler and Moench, in review).

The CRF is composed of 4 main elements, as shown in Figure 1: inputs to the process at the bottom of the figure; a detailed assessment of vulnerability; and, a resilience building component - all facilitated through a shared learning process.

The entry point into the resilience building process is at the bottom of the diagram, where arrows indicate inputs of local knowledge, scientific knowledge, and a catalytic agent who initiates the process. The "catalytic agent" is

FIGURE 1: CLIMATE RESILIENCE FRAMEWORK
GRAPHICAL REPRESENTATION OF THE CLIMATE RESILIENCE FRAMEWORK, SHOWING THE PROCESS OF RESILIENCE PLANNING.
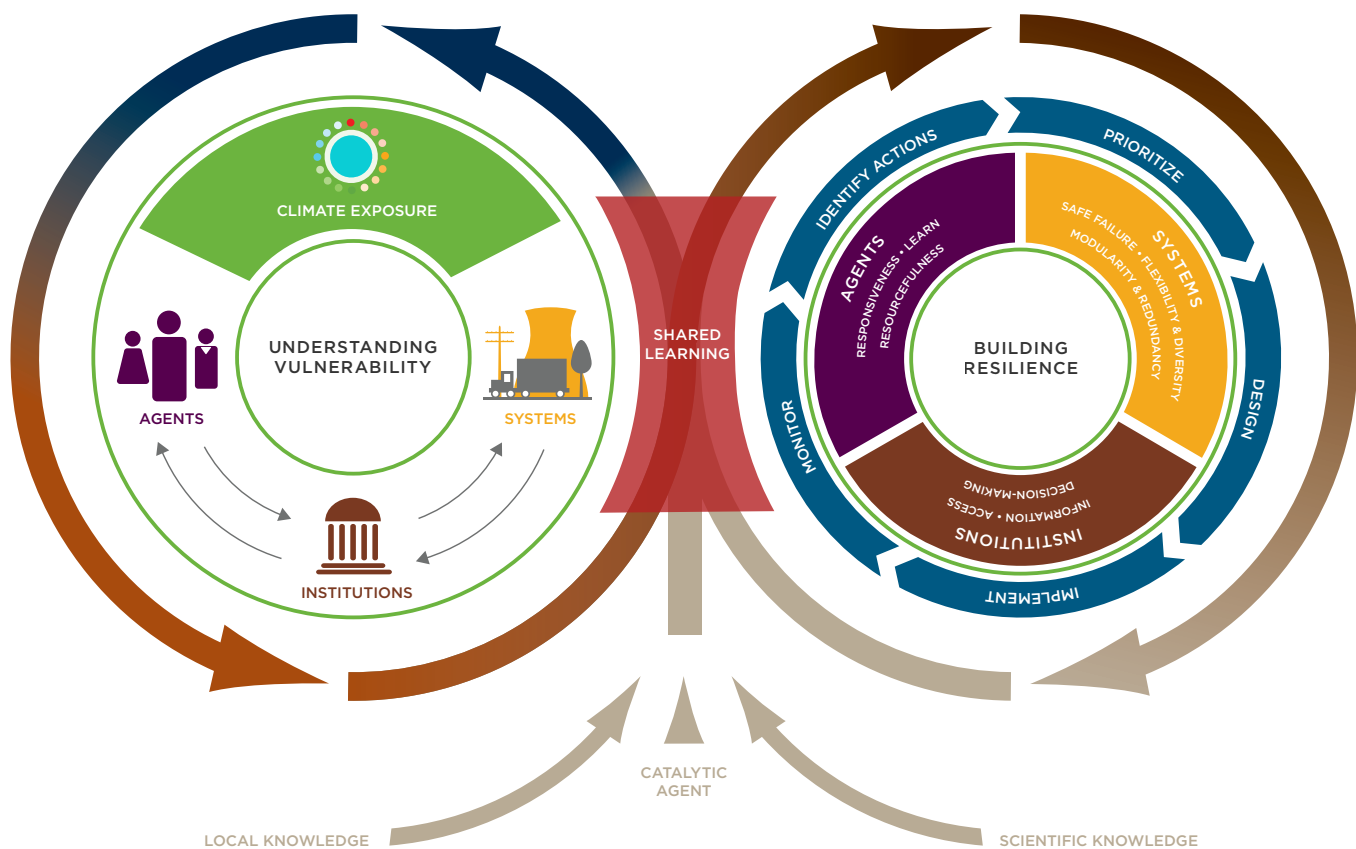
The Climate Resilience Framework emphasizes resilience rather than adaptation.

Resilience and adaptation are interlinked. Resilient systems are the stable, yet flexible foundations that people require in order to shift strategies and adapt as conditions change.

Adaptation is often discrete actions, such as building flood-protection systems or mangrove restoration, with discrete beginnings and ends, developed to address specific vulnerabilities or problems.

Resilience is an ongoing, iterative process. Resilience recognizes that vulnerability and climate risk are constantly evolving, as our cities and communities—and the systems, agents and institutions within them—evolve and interact.

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intended to be a broad, high capacity organization that can provide training and methodological support to local NGOs or organizations that will directly engage local communities in the local language. The catalytic agent could, for example, be a local climate change working group, a local or regional government department or office, university research or policy team, a national-level organization, or an international level organization.

Working alone, most local NGOs (in the developing world, though not necessarily in North America or Western Europe) will not have the resources to deliver this program. In part, this is because of how the Framework reframes the adaptation challenge as one of building resilience. The reframing changes the way program trainees think about adaptation, as an iterative, dynamic process rather than one-off, discrete measures, without necessarily changing the specific measures that might be undertaken. Though this takes careful facilitation and iteration, one of the greatest benefits of this approach is that it avoids over-focusing on the climate science, and helps cities identify systematic factors causing vulnerability.

The left-hand loop of the CRF guides users through an assessment of who and what is vulnerable, why they are vulnerable, and what factors hold that vulnerability in place. This assessment is structured through assessment

of four key elements—**systems** (both infrastructure and ecosystems), **social agents**, and **institutions** (laws, policies and social norms), and, for each, the degree to which they are **exposed** to climate change hazards. Within the framework, building resilience means:

- Identifying the *exposure* of *systems* and *agents* to climate hazards;

- Identifying and strengthening *fragile systems* by strengthening the characteristics that reduce their vulnerability to climate hazards;

- Strengthening the capacities of agents to both access systems and develop adaptive responses; and,

- Addressing the *institutions* that constrain effective responses to *system* fragility or undermine the ability to build *agent* capacity.

The vulnerability analysis is structured to naturally lead to a clear identification of entry points for reducing vulnerability and increasing resilience.

The right-hand loop of the Framework guides users through developing possible adaptation or resilience building actions to address the vulnerabilities identified in the left-hand loop. Actions are prioritizing and implemented, and development of resilience indicators and follow-up monitoring is used

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to learn from the implementation. This planning element takes the CRF from an academic exercise to application.

The CRF is implemented through Shared Learning Dialogues (the center element, in red, in Figure 1). Shared Learning Dialogues draw from participatory engagement and research techniques. In these dialogues, local knowledge is solicited, relevant global/international knowledge is also introduced, the dialogues are structured to assure that learning is bi-directional, and dialogues are held iteratively to allow for increasingly detailed and informed engagement (as shown in Figure 2).

Throughout the CRF planning process, the focus is on capacity building and on utilizing pre-existing skills and knowledge. Consequently, the Framework can be implemented within existing development or disaster risk reduction mandates. The process, and the individual components within the process, are iterative, allowing time to build the understanding and relationships required to successfully engage in this work.

THE CLIMATE RESILIENCE FRAMEWORK: TRAINING MATERIALS

The *Climate Resilience Framework: Training Materials* are a structured set of informational materials and activities designed to teach a city core working team, led by a facilitator, how to implement the Climate Resilience Framework.

FIGURE 2: GRAPHICAL REPRESENTATION OF THE SHARED LEARNING DIALOGUE PROCESS.
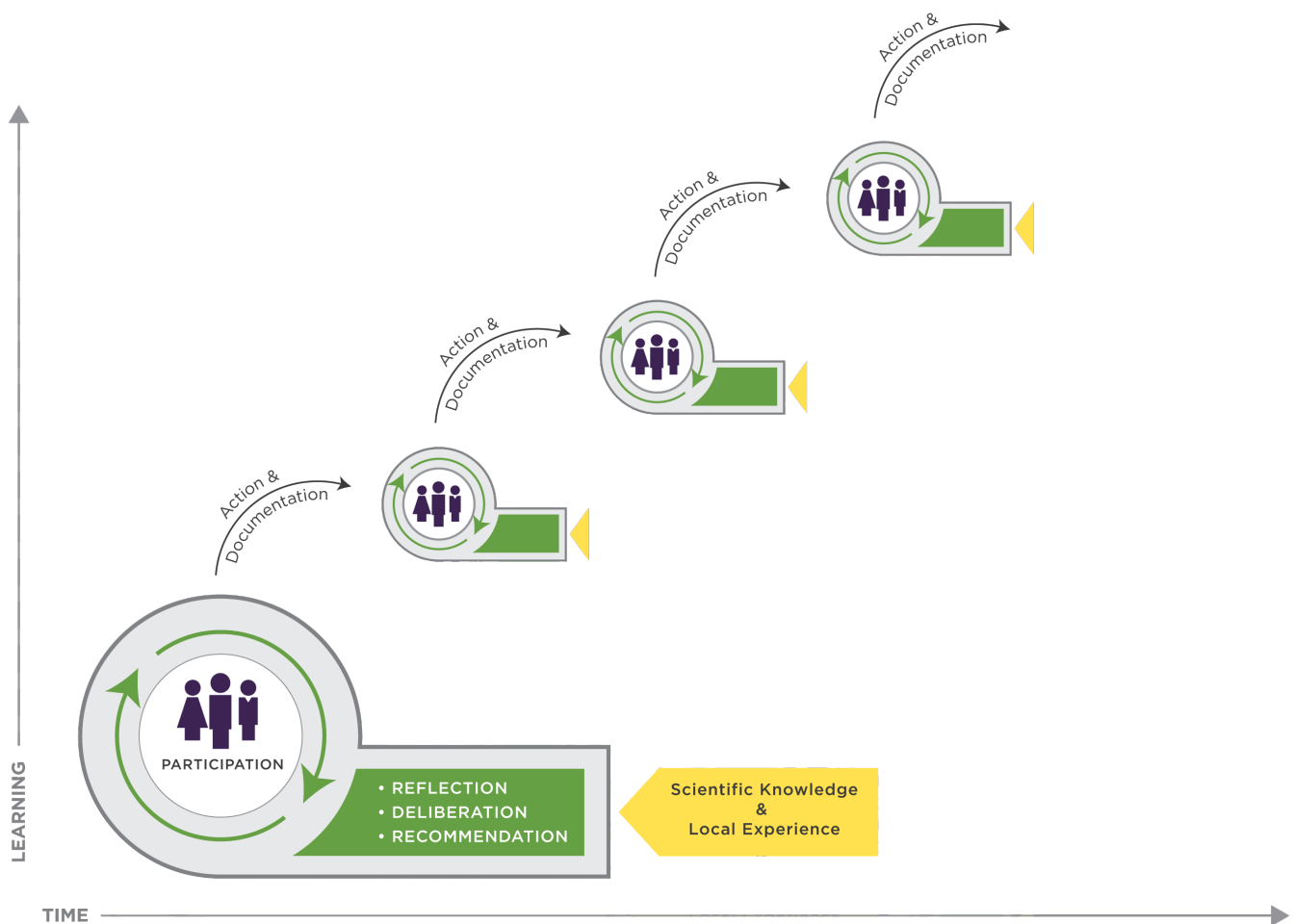
The Training Materials do not teach new skills, nor do they give step-by-step instructions for addressing climate and vulnerability. Instead, they teach a thought process—how to combine existing skills and capacities with global and local knowledge in targeted, focused ways to build resilience in the face of an uncertain future. In application, we have found that communities can fairly rapidly pick up the basic framework, can use it to identify sensible actions and points of entry, and can quickly begin implementation of small-scale actions. Over time, as communities become more comfortable in the approach, they take on larger actions, and in many cases begin lobbying higher governance levels for broader replication of their actions.

The Training Materials are:

- **Designed for training of trainers**—in effect, we assume they will be used by a broad, high capacity organization (or "catalytic agent") to train and support local actors to apply the Framework and to guide a core group of local stakeholders through the process of learning about and building resilience.

- **A meta-set of material that can be adapted for local conditions**—we have designed the materials to provide broad guidance relevant to multiple countries, regardless of political or social structure. For local application, the materials should be reviewed and tailored to local conditions.

- **Modular**—facilitators, working with local resilience planning groups, can pick and choose from subjects and component pieces. In some communities, it may make sense to follow the materials fairly linearly; in others, many steps may have already been completed and more streamlined or differently sequenced trainings will be more efficient.

The materials are also designed to be iterative, collaborative, creative, and reflexive. These are characteristics that are core to the Climate Resilience Framework, to resilience planning, and, we believe, should be core to any pedagogical approach to learning and teaching resilience planning.

Because the Framework and Training Materials build on existing skills, tools and capacities, and because they are designed to be relatively scale and situation-insensitive, this approach can be delivered across a broad range of conditions and to a broad range of communities and stakeholders. ISET has used these materials equally effectively in Surat, India, population 4.5 million, in Chiang Rai, Thailand, population 200,000, and in rural villages in Nepal.

KEY ASPECTS OF THE CLIMATE RESILIENCE FRAMEWORK CURRICULUM

There are four key elements of the Climate Resilience Framework Training Materials, elements that have been developed and refined based on field engagement and that we have found critical to successful implementation of the Framework. These include:

1. How and when climate change science is introduced;

2. Systems analysis as the gateway to assessing vulnerability;

3. A focus on the characteristics of resilience; and

4. Regular, multi-stakeholder communication via Shared Learning Dialogues.

1. CLIMATE CHANGE

One of the foundational aspects of the CRF Training Materials is that they do NOT start with climate change. Instead, they start by establishing a core working group, reviewing the policy landscape in which the resilience building process will operate, identifying a broad array of stakeholders, and developing resilience principles on which the work will be founded. The process then moves into a vulnerability assessment, but here too, past development trends are explored prior to introducing climate exposure, climate change and changing climate risk.

We have found that this approach is critical when beginning climate resilience work in communities unfamiliar with climate change and climate change science. If the work leads with climate change information, the focus rapidly becomes solely climate and climate disasters, and there is a pull to attribute

all disasters to climate. However, as was illustrated by the 2011 flooding in Bangkok, Thailand, climate disasters are more often about development pathways than climate. In Bangkok, there may be climate change component that exacerbated the flooding, but the primary cause of the flooding is lack of planned drainage and floodwater routing. Similarly, regular flooding in Ho Chi Minh City, Vietnam now occurs when rainfall during intense precipitation events is captured behind dikes designed to protect the city from river floods. In exploring future climate change risk, it is critical to identify these development-caused risks if the impact of climate change on these risks, and the possible avenues for risk reduction, are to be fully understood.

2. SYSTEMS ANALYSIS

Understanding how development creates or exacerbates vulnerability and future climate risk is explored via systems analysis. Access to, or lack of access to, systems is at root of much of vulnerability. Lack of access can be:

- **Agent driven**—for example, when prioritizing development, the needs of or the impacts to vulnerable communities are overlooked or downplayed by decision-makers;

- **A result of system fragility**—the systems available to vulnerable communities are fragile to climate impact and fail at critical junctures. For example, poor housing which is flooded or collapses during typhoons; and/or

- **Due to constraining institutions**—the needed systems exist, but vulnerable groups are prevented from accessing them by policies, laws or cultural norms. For example, residency requirements for attending school or owning land can disenfranchise large sections of the urban population.

All of these serve to hold vulnerabilities in place, and no amount of attention to climate change and future impacts will address those vulnerabilities until the underlying issues are addressed. By methodically examining systems, and how agents, system fragility, and institutions regulate system access, the entry points for building resilience can be readily identified.

3. CHARACTERISTICS OF RESILIENCE

There is a great deal of discussion about "building resilience" and "resilient systems", but limited exploration of what this looks like at the city level, and even less concrete guidance on how to achieve it. What constitutes a "resilient city"?

In the CRF and Training Materials, we introduce key characteristics of resilient systems, agents and institutions, and then use these as metrics in our systems analysis and in developing, prioritizing, and monitoring resilience actions. Regularly referring back to these characteristics is a critical element in ensuring that assessment of and actions taken to build resilience actually increase city resilience. For this reason, the resilience characteristics of systems, agents and institutions are explicitly included in the right-hand loop of the CRF graphic shown in Figure 1. These resilience characteristics are described below.

Systems
Urban systems include infrastructure and ecosystems that support the high density of human occupation and economic activity in cities, and are essential to create the productive opportunities central to urban life. In particular, core or "critical" systems are essential to urban function (Little, 2002). Their failure seriously jeopardizes human well-being in all affected areas, and precludes higher order economic activity until their function is restored. These systems include water supply, food supply and the ecosystems that support these, as well as energy, transport, shelter and communications. Resilient systems possess (Tyler and Moench, in review):

- **Flexibility and diversity:** the ability to perform essential tasks under a wide range of conditions. Key assets and functions are physically distributed so that they are not all affected by a given event at any one time (spatial diversity) and there are multiple ways of meeting a given need (functional diversity).

- **Redundancy and/or modularity:** spare

capacity is available for contingency situations; there are multiple pathways and a variety of options for service delivery; and/or interacting components are composed of similar parts that can replace each other if one, or even many, fail. Redundancy is also supported by the presence of buffer stocks within systems that can compensate if flows are disrupted (e.g., local water or food supplies to buffer imports).

- **Safe failure***:* the ability to absorb sudden shocks (including those that exceed design thresholds) or the cumulative effects of slow-onset stress in ways that avoid catastrophic failure. Safe failure also refers to the interdependence of various systems that support each other; failures in one structure or linkage are unlikely to result in cascading impacts across other systems.

Agents

Agents are actors in the urban environment. They include individuals (e.g., farmers, consumers); households (as units for consumption, social reproduction, education, capital accumulation); and private and public sector organizations (government departments or bureaus, private firms, civil society organizations). Key capacities that contribute to agent resilience include (Gunderson and Holling, 2002; Diduck, 2010):

- Responsiveness: capacity to organize and re-organize to establish function, structure and basic order in a timely manner in response to a disruptive event or organizational failure.

- Resourcefulness: capacity to identify and anticipate problems, establish priorities, and mobilize resources for action. This includes the capacity to visualize and plan, which may require collaboration, and the ability to access financial and other resources.

- Capacity to learn: ability to learn new skills, internalize past experiences, avoid repeated failures and innovate to improve performance.

Institutions

Institutions are the rules or conventions that constrain human behavior and exchange in social and economic transactions. Institutions may be formal or informal and are created to reduce uncertainty, to maintain continuity of social patterns and social order, and to stabilize forms of human interaction in more predictable ways (Tyler and Moench, in review).[1] Institutional characteristics that support resilience include:

- **Access:** Clear rights and entitlements to use key resources or access urban systems.

- **Decision-making:** Transparent, accountable and responsive decision-making, particularly in relation to urban development and urban systems management.

- **Information**: Facilitation of the generation, exchange and application of new knowledge. Private households, businesses and other decision-making agents should have ready access to accurate and meaningful information to enable judgments about risk and vulnerability, and for assessing adaptation options.

4. SHARED LEARNING

Shared Learning Dialogues are used to connect and deliver the various components of the CRF. Shared Learning Dialogues are structured interaction processes designed to bring together often widely divergent communities, sources of knowledge and perspectives in a manner that builds common understanding and enables diverse responses to different interests (Reed et al., 2011). SLD processes can be focused on the urban area as a whole or on specific systems or groups of agents that have particular vulnerabilities or relevance to urban resilience.

In application in the CRF, the Shared Learning Dialogue process is used to combine top down and bottom up

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1   The word "institutions" is sometimes used in everyday speech to refer to organizations structured to focus on a particular purpose (e.g., financial institutions, educational institutions). This leads to some confusion. *In this text, we use "institutions" to mean the rules of the game, or the mechanisms to enforce those rules, while organizations, group, and individuals are the players or "agents".*

information in an environment that equally values both types of knowledge and experience. This requires the removal of artificial hierarchies and barriers and conscious building of lines of collaborative communication. Initial dialogues focus on engaging both the agents who manage and depend on systems and external technical or scientific experts to share knowledge from different perspectives. Later dialogues provide the space for more targeted interactions, for the active inclusion of marginal groups, and for building greater understanding among all those engaged regarding how the four core elements of the framework (systems, agents, institutions and exposure) interact *in the local context*.

RESILIENCE BUILDING COMMONALITIES ACROSS CULTURES

There is nothing particularly new about the Climate Resilience Framework. It is simply a structured approach for taking what are often segregated efforts and providing an actionable, practical way of combining them. However, this is precisely the greatest strength of the CRF. Anyone can implement it. Everyone will have some piece that resonates: engineers will find the system analysis aspects completely familiar; social scientists will already be conversant with the agent and institutional analysis; urban planners will identify with the planning and implementation loop. The challenge of implementation, then, is fostering coordination, of pushing the boundaries of sometimes highly segregated departments and institutions, of meaningfully incorporating the voices, concerns and knowledge of the most vulnerable into the core of the process, and of doing this in a way that fosters new ways of thinking and innovative solutions.

Interestingly, though this sounds highly ambitious, what ISET has found in application is that the Shared Learning Dialogue process, when thoughtfully applied and well facilitated within the CRF, naturally meets

most if not all of these challenges. This has proven equally true in rural Nepal, in exponentially growing cities in Vietnam, and in the urban centers of India.

There are, however, five foundational elements that have proven necessary to successful implementation in all the communities that we have worked:

1. Establish a dedicated city working group
2. Maintain engagement and participation
3. Timelines need to be flexible
4. Provide time for translation
5. Secure buy-in

1: ESTABLISH A DEDICATED CITY WORKING GROUP

A working group needs to be identified that will coordinate or conduct vulnerability and risk assessments, identify and prioritize resilience activities and policies, ensure such things are implemented, and manage the day-to-day activities associated with resilience processes. The members of the working group need to be decided by the city. The most effective working group members for resilience planning are not necessarily those with technical skills, but rather people and agencies who have the authority and capacity to coordinate technical expertise, as well as keep momentum going through multiple election cycles. This group should include organizations, groups, and communities who will be directly and clearly affected by climate change, such as:

- Staff from various government departments,
- Researchers from universities and institutes,
- Members of community and religious groups,
- Members from various businesses or economic sectors,
- Members of under-represented and minority communities, and
- Non-governmental organizations.

2: MAINTAIN ENGAGEMENT AND PARTICIPATION

Successful implementation of the CRF requires engagement with multiple stakeholders—community and religious groups, private businesses, service and health care providers, and non-governmental organizations, among others—beyond those involved in the city working group. Groups who will be directly impacted by climate change need to be engaged using a variety of techniques, such as holding meetings, conducting interviews, workshops, targeted shared learning dialogues, focus group discussions, and community visits.

Consistent participation of the members of the working group is equally critical. The working group can not effectively coordinate the process or conduct the necessary research unless the same people attend all working group meetings and are involved at all steps of the process. Ensuring the participation of working group members—especially of government staff in developing countries—can require special arrangements with government leaders to secure local staff time. In developed countries, designated staff should be allocated on a full-time basis.

3: TIMELINES NEED TO BE FLEXIBLE

Resilience processes require a flexible timeline. There are a number of aspects to resilience building to which it is difficult to assign timeframes. Ideally, a flexible timeframe will be established to allow for:

- Absorption of new information and feedback;

- Reflection on existing information and re-evaluation of previously held ideas and beliefs;

- Building trust and collaboration between members of the city working group and larger sets of stakeholders;

- Dealing with unexpected challenges and delays; and,

- Rethinking how the city should plan for the future.

Time is critical to a successful outcome and to building relationships with key stakeholders throughout and beyond the initial engagement. If part of the resilience process is funded by external donors, these actors need to be kept informed of the process and convinced of the need for flexibility in timing to ensure that true resilience begins to be built.

4: PROVIDE TIME FOR TRANSLATION

The resilience building process must be communicated and conducted in the local language. This means that time must be built in for translation of complex new terminology and reaching consensus on definitions. This is true whether the process is conducted in English or in another language.

Translation is a special example of the time required to introduce new concepts and practices to local practitioners. It takes time to develop the capacity of translators for this technical work. Prior to embarking on the resilience building process, a lexicon of technical terms should be prepared in the local language. Stories, songs, and local theater examples can also provide means of introducing and translating new concepts, through formats that are more familiar to local stakeholders.

Time should be provided, in any language, to discuss, explore and refine the definitions being used for various terms. Resilience, adaptation and climate change terminology are complex, and words can sometimes be only subtly different. It is important to make sure that everyone involved in the resilience building process has a shared understanding of the terms and is using the same language throughout the process.

5: SECURE BUY-IN

Securing the support of city leaders, such as the mayor or municipal commissioner, can help to ensure participation of other key players and increase the likelihood that results will be integrated into decision-making. Ultimately, it will be necessary for city government to become key stakeholders

that are willing and able to integrate climate change priorities into their activities. However, it can be risky to rely on a few key figures that may leave office or change positions because of elections. Involving multiple government staff in the working group ensures a wider base of knowledge and their support reduces the risks of changing leadership.

Ownership of the process and results is also enhanced by authorship. The resilience strategies and adaptation actions identified and proposed as part of this process are more likely to be implemented by the city government or relevant organizations if they are involved in all phases of the resilience process. Though this last point may look self-evident in the developed world context, it is not always assumed in the developing world, either by outside agencies or locals. Yet, it is equally critical there if resilience efforts are to be sustained and expanded.

LOCAL ADAPTATION

Though we have found broad commonalities across a wide spectrum of cultures and capacities in our implementation of the CRF, we have also found that successful implementation of the CRF requires local tailoring. Every community that engages with this work will bring to the process different sets of needs and capacities.

In Thailand, stakeholders became perplexed with issues around systems, their boundaries, and whether agents and institutions aren't part of the system in some cases. Increasing our focus on opening with systems analysis and the role agents and institutions play in mediating system access prior to introducing the system, agent, institution language has proved highly effective in this context.

In Indonesia, issues of scale and how to set boundaries for analysis have been an issue. Here, an emphasis on how the materials can be used

iteratively at multiple scales, from district of neighborhood to national levels, has proved helpful.

In India, where social hierarchy can effectively silence those lower in social standing, particularly women, the poor, and the disabled, conducting SLDs as a series of smaller dialogues, where a facilitator or facilitation team convey information from one venue to another proved a successful adaptation.

In Vietnam, where there is a national directive under which all provinces must prepare a climate change strategy, broad policy mapping in the early stages of engagement was unnecessary. However, an emphasis on broad, multi-stakeholder engagement was critical in what is a highly segregated political landscape.

Unfortunately, without detailed local knowledge, advance directives about how to tailor the materials are meaningless. This is where working with local players, such as a local NGO or convening department, to tailor and deliver the materials becomes critical.

Interestingly, however, we have found that many of the activities that are included in the Training Materials can be delivered across cultures and contexts with little to no modification. In particular, activities informed by mass-media, such as Pop Idol and similar reality-TV games, may work even better in developing-world cities than in the developed world.

IMPLICATION FOR U.S. AND GLOBAL CLIMATE CHANGE ADAPTATION EFFORTS

There are increasing numbers of local efforts, at the community and city level, to address climate change in the United States. Though historically these have focused

primarily on mitigation, this is beginning to change, with increasing interest in adaptation and resilience strategies. This increasing activity includes actions within National Agencies, such as the Bureau of Reclamation's West-wide Climate Risk Assessment. If the US federal government were to officially recognize climate change, these activities would no doubt rapidly expand.

However, the United States is late on a national level to the game relative to many other countries. Consequently, there is great potential for learning and sharing between the US and communities across world. In particular, there is a lot the US can learn from the developing world, where a greater emphasis on non-engineering and/or lower-tech solutions due to resource constraints may prove far more resilient in the face of climate change than heavily engineered, technical solutions.

In particular, our work with cities across South and Southeast Asia, has fostered the growth of a community of urban climate change resilience practitioners. Our partners in India, Thailand, Vietnam and Indonesia are now some of the leading voices in their countries and regions around this work. ISET would welcome the opportunity to connect these communities and their growing knowledge base with the U.S. resilience community.

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