CLIMATE RESILIENCE FRAMEWORK

Putting Resilience Into Practice

ISET-INTERNATIONAL'S MISSION

The Institute for Social and Environmental Transition-International catalyzes transformative changes toward a more resilient and equitable future. Through research, training and implementation activities, we improve understanding and elevate the level of dialogue and practice as society responds to natural resource, environmental and social challenges. We serve as a framework for equal collaboration among individuals and organizations in the North and South.

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RESILIENCE

The term resilience is increasingly applied in thinking through how to deal with climate change. On one level it can be applied as a way of bridging the historical divide that has existed between climate mitigation and climate adaptation. Climate resilience refers to both actions that reduce climate impacts as well as actions to respond to climate impacts. Resilience can be seen as a process of learning and innovation—we can always be more resilient.

There are different definitions of resilience in various disciplines. Reviewing the ways in which the term resilience has been defined is useful for understanding the challenge of dealing with climate change.

Importantly both of the definitions provided on the facing page emphasize the capabilities to learn and anticipate, as well as to respond to change.

RESILIENCE IS NOT ROBUSTNESS

People often think of resilience in terms of the popular psychological stance of toughness in the face of adversity. Being able to withstand a shock or stress and "getting back on one's feet" in a way that suggests lack of change, even promotion of a return to the prior state. This is not the concept of resilience that emerges from complex systems theory or ecological theory, but is closer to the meaning behind the term robustness. Something that is robust either does not change or returns to its prior state quickly when faced with a shock or stress. **Resilience allows the concept of fundamental change. After a shock or stress, a resilient system may be dramatically altered yet its primary functions and sense of value maintained.**

"Resilience is ...

the ability to absorb disturbances, to be changed and then to re-organise and still have the same identity (retain the same basic structure and ways of functioning). It includes the ability to learn from the disturbance. A resilient system is forgiving of external shocks. As resilience declines the magnitude of a shock from which it cannot recover gets smaller and smaller."

– Resilience Alliance

(www.resalliance.org/index.php/key_concepts/ – accessed June 2012)

The resilience concept

... looks into both reactive capabilities of people to cope with, recover from and adjust to various risk and adversities and their proactive capacity to create options and anticipate responses to health risks and adversities.

– The Social Resilience Website of the Institute of Social Anthropology, University of Basel

(www.socialresilience.ch/vulnerability-resilience/ – accessed June 2012)

CLIMATE RESILIENT DEVELOPMENT

Much of the scientific background of resilience comes from natural and physical sciences—only recently has the concept been taken up in the social sciences. In the natural and physical sciences a resilient system is composed of one or more sub-systems that interact with agents and together produce the system's output. An important aspect whenever system processes are considered is the need to define what is the system and what is, by that definition, excluded from the system. Many times in the physical and social sciences this is simplified by concentrating on the output of interest (e.g. power) or the service otherwise provided. But the defining of systems that have a social value and purpose requires special attention.

When applied to the social world and thus, within the development context, the concept of resilience needs to be refined. For the central problem that social sciences addresses, is to do with how the social meaning and value are constructed, how resources are accessed and controlled, and how their benefits are distributed. For social scientists, the challenge of the concept of resilience is in defining the system, and in determining what kind of resilience and for whose benefit.

Given the enormous societal challenges of poverty, inequality and justice that continue to persist, resilience to shocks and crises is not merely a matter of being robust, of bouncing back to these conditions—but also a matter of being able to advance and to fulfill the aspirations of development. This requires ensuring that there are the means to cope with shocks and crises (such as social protection measures, effective Disaster and Emergency warning and responses) but that also allows the transformations that address underlying vulnerabilities and risks. Many of these underlying vulnerabilities and risks are more structural and systemic in nature.

Underpinning our use of resilience in the Climate Resilience Framework (CRF) are commitments to justice, equity, fairness. The threats of climate change make it clear that the future will be more turbulent—that the many people that have not benefited from development so far will continue to be left out or even become worse off, and that many of those that have benefited will see those gains be undone. The purpose of urban climate resilience is thus to ensure human wellbeing by enabling people, through inclusive development processes, to adjust and transform their conditions and therefore, their lives.

Addressing these development challenges requires us to think and act in new ways.

PEOPLE, LAND, LIVELIHOODS—WORKING WITH COMPLEX SYSTEMS

The world is increasingly pulled together in more complex interlinked systems. For the first time in human history the majority of the world's population now lives predominantly in cities, and this trend is set to continue. Much of this urbanization will occur in Asia. The greater proportion of this urban growth is occurring in river basins, deltaic systems and coast—areas that are already vulnerable to climate related hazards.

A SHOCK IN ONE PART OF THE SYSTEM CAN CAUSE RIPPLE EFFECTS THROUGHOUT THE REGION.

With globalization and regionalization of production and markets, the distinctions between urban and rural can be rather murky. Urban areas depend on key resources—food, water, energy, labor—that originate in other areas, often areas beyond national boundaries. For example, the energy that drives industrial production in Thailand will increasingly be produced by hydropower generated in Laos, with labor in key industries often coming from Burma and Cambodia, and remittances from Nepali labor in Bangkok driving economic and social change in the Himalayan valleys. This means that shocks in one part of the system can cause ripple effects elsewhere. For example, urban rice consumers in Manila are exposed to rice production shocks in Vietnam and Thailand. We can no longer think exclusively in terms of traditional concepts of rural and urban.

There are no readymade solutions to these complex, dynamic challenges. Indeed, a core principle underpinning resilience approaches to climate change is the critical need for new ways of working, organizing, thinking and learning—that brings in more people, diverse knowledge, and creates space for informed public deliberation.

Climate Research Challenge: Predicting Regional Climate Change Response

One of the most challenging and uncertain aspects of present-day climate research is associated with the prediction of a regional response to global forcing. Although the science of regional climate projections has progressed significantly since the last IPCC report, slight displacement in circulation characteristics, systematic errors in energy/moisture transport, coarse representation of ocean currents/processes, crude parameterization of sub-grid- and land surface processes, and overly simplified topography used in present-day climate models, make accurate and detailed analysis difficult.

–RealClimate http://www.realclimate.org/index.php/archives/2007/08/regional-climate-projections/

CLIMATE CHANGE—A NEW CONTEXT

Climate change is a game-changer. It is a problem unlike other challenges that human society has confronted in the past. There is something special about climate change—in terms of the scale of global and local, the degree of complexity, and the intensity of risks.

This is not a matter of specific change leading to specific outcomes or specific impacts. Dealing with climate change is not just of adaptation to a set of changes that can be anticipated but one of building resilience to a new context of variability and uncertainty.

Climate change will be felt through all aspects of life and will generate changes and impacts at multiple scales. From the individual and household to the ward (neighborhood), village and city. From the provincial to the national to the regional, climate change will affect the complex systems level linkages within society and between people and the ecological systems on which we rely. It is at this scale of work, the scale of emergence, that resilience acts.

Climate change will not be experienced as one change leading to a specific impact. Rather, as climate is a non-linear, complex system, climate change will be variable, dynamic and impacts cumulative (Tyler and Moench in press).

Human history has been based on a degree of predictability—in the seasons, the timing and frequency of floods and storms etc. Whole city infrastructures have been built and are dependent on the predictability of climate hazard events and availability of key resources. Climate change unravels this predictability generating a huge degree of uncertainty. With the scale of potential impacts and consequences, the risks are enormous.

With this, climate change puts risk and uncertainty at the heart of development. Current scientific assessments provide a good, broad understanding of the ways in which we will be vulnerable. Yet the climate change science cannot state categorically what will happen where, or when it will happen. The effects of climate change will be felt differently by different people in different localities and contexts at different times.

While climate change responses need to be well informed and based on the best available science, it is not possible to simply 'predict and act'. This means that there is a need for more adaptive, responsive, inclusive and accountable development institutions and processes that draw on wide sources of information, and that create space for informed, critical public debate and decision-making. This requires better science that is more engaged, but also informed public arenas for deliberation and the integration of new information.

Due to its cross-sector, cross-national boundary nature and its pervasive impact, climate change fundamentally alters how we—societies—organize ourselves.

It makes resources constraints unavoidable and compels us to put ecological considerations—and finite resources—at the heart of economic and social development (Jackson 2009; Giddens 2009).

GOVERNANCE FOR RESILIENCE

The cross-cutting, systemic nature of climate change means that we have to work across different scales (time, space, landscapes, administrations, and organizational units). Climate change impacts and the actions taken to address those will inevitably create winners and losers. In order to ensure fairness and equity decision-making processes need to be informed, public, accountable and transparent.

With the scale of risks—and clear dimensions related to justice and equity—we need new ways of working and organizing ourselves—how to work out problems and actions, defining shared development pathways, bringing together different actors. But equally, much of the adaptation to climate change is autonomous—led by individuals, households, organizations—often without the institutional support of formal planning.

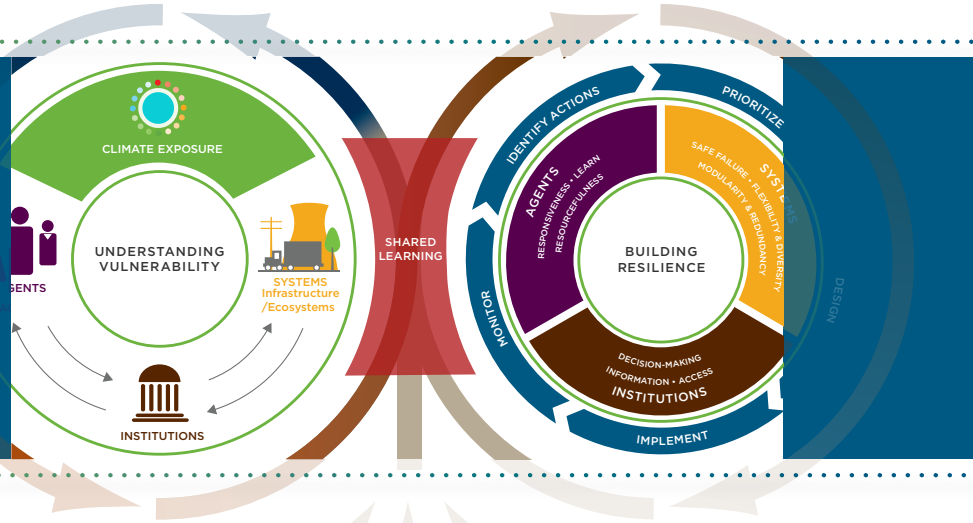
The core problem for application of resilience theory is that urban systems are not clearly defined systems. Rather cities are products of human design and aspiration (cf. Harvey 2008; Simon 2007; Sandercock 2003). The city is an emerging social system of values and relations. The boundaries are blurred—between cities and rural hinterlands but increasingly across regional and global scales—as resources, capital, labor and information move between and across urban areas in unimagined ways. What constitutes 'the city' in terms of its structure and function, but also its constituent communities is equally unclear. From a purely administrative perspective, the scale of government that has remit and responsibility for the 'city' or metropolitan area is not well established in Asia.

References

Giddens, A. (2009) The Politics of Climate Change. Polity Press: UK

Jackson, T., (2009) Prosperity Without Growth: The Transition to a Sustainable Economy. Sustainable Development Commission.

CLIMATE RESILIENCE FRAMEWORK



The Climate Resilience Framework (CRF) provides a conceptual framework for assessing vulnerabilities and risk, identifying resilience strategies—and creating an open, inclusive learning process to identify specific measures and processes that can address the uncertainties of climate change through action and implementation.

The CRF process is a collaborative planning process based on the core components of the resilience framework (systems, agents, institutions), and their characteristics. The resilience planning process includes three main activities: a **vulnerability assessment**, the development and implementation of interventions to **build resilience**, and an **iterative shared learning** approach to guide the whole process.

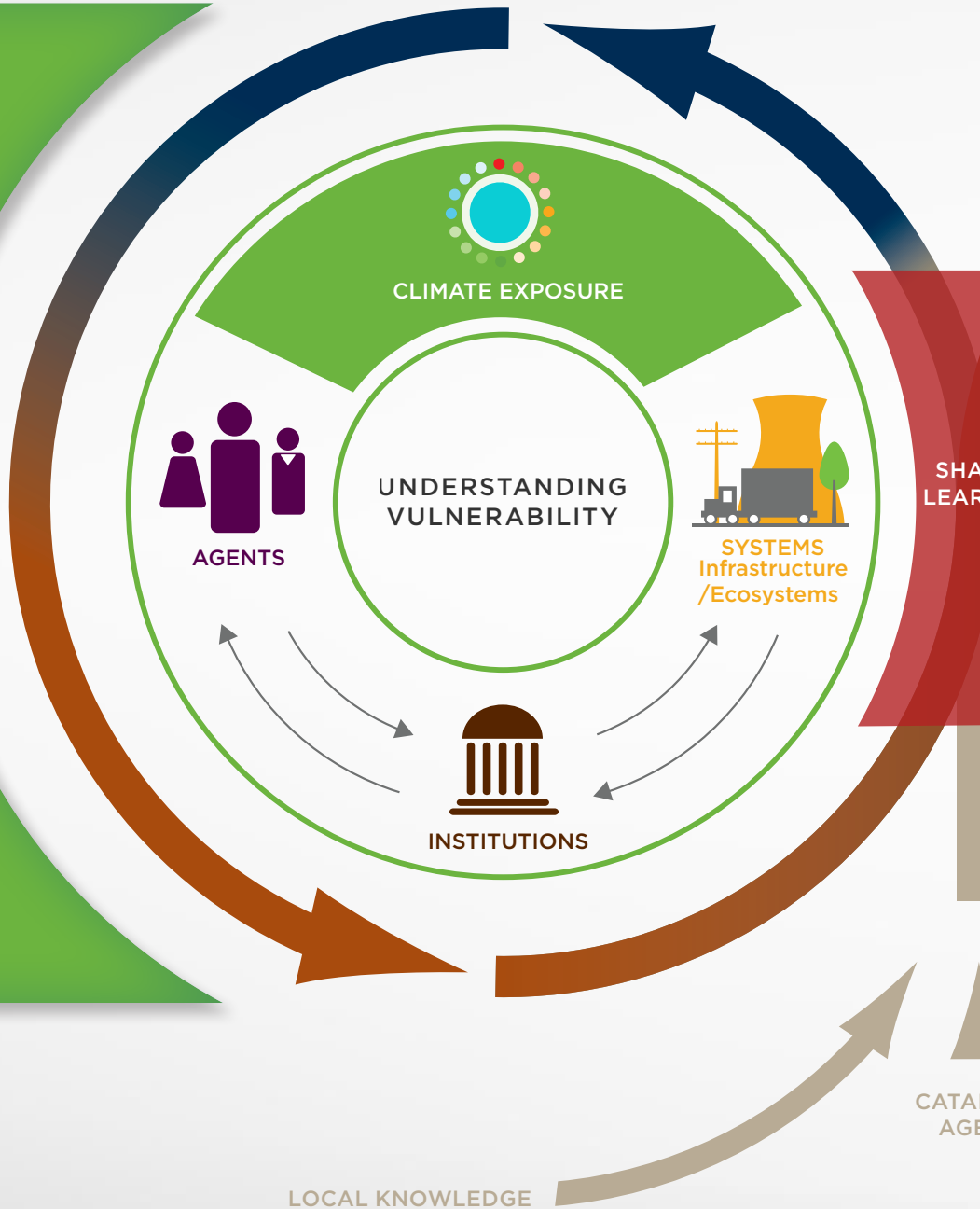
In general terms, the approach outlined is an iterative cycle of multi-stakeholder learning and dialogue that is informed by climate-development visioning and scenarios, vulnerability assessments, innovation and experimentation through actions on the ground, supported by further review and learning—to lead back into the iterative cycle of dialogues.

The CRF includes practical steps based on:

- Shared Learning Dialogue (SLD)
- Climate and development visioning and scenario exercises
- Vulnerability Assessments
- Resilience strategies and actions
- Learning, Monitoring & Evaluation, and Documentation

UNDERSTANDING VULNERABILITY

The left-hand loop of the framework helps clarify factors that need to be included in the diagnosis of climate vulnerability, and structures the systematic analysis of vulnerability in ways that clearly identify the entry points for responding.



BUILDING RESILIENCE

The right-hand loop of the framework supports strategic planning to build resilience to climate change, prompting new and practical ways of thinking about the challenges of adapting to climate change.

THE 3 COMPONENTS OF RESILIENCE

One way the issues of development and environment can be addressed is by understanding them as issues of complex social-ecological systems. When a system of interest is explored as a complex system, it is done so through an exploration of the component "sub-systems" and the "agents" that act on that system. A core part of how complex systems are used and valued is in institutions—the rules, laws and norms—that inform how and when agents can access the benefits of and act upon systems.

In the CRF, we explore vulnerability through the process of understanding the present vulnerability of the three components: systems, agents and institutions, understanding their inter-linkages and the impact that climate change is projected to have.

The Climate Resilience Framework is founded on an understanding of the inter-linkages between systems (infrastructure/ecosystems), agents and institutions. The value of the framework is in putting these three components together in a manageable conceptual framework that allows local stakeholders to strategize, conceive and implement actions that build climate resilience.

AGENTS

In the development context, the term agent refers to people and their organizations, whether as individuals, households, communities, private and public sector organizations, or companies. In the social sciences the concept of agency relates to human capacity to act in ways that respond to and shape the world around them, and to give the world social value and meaning. Through the lens of social value and meaning we as agents assess and adjust behaviors relative to the system of interest based on its output (e.g. natural resources) thus producing a pattern of output and behavior through time that, though it may never be static, remains within certain bounds.

We recognize that agents have different sets of assets, entitlements, and power—and that their ability to access systems, and thus their vulnerability and resilience, is differentiated on this basis.

CLIMATE EXPOSURE

Exposure to climate change encompasses the direct, indirect, and incremental pathways through which systems and agents are exposed to impacts from climate change.

INSTITUTIONS

The term institution refers to the rules, norms, beliefs or conventions that shape or guide human relations and interactions, access to and control over resources, goods or services, assets, information and influence. While institutions shape agents—equally agents are able to shape institutions thus opening the possibility of change

SYSTEMS
INFRASTRUCTURE/ECOSYSTEMS

For the purposes of this framework, systems are considered the combination of ecosystems and infrastructure systems. Ecosystems provide the basic foundational needs (water, air, food) as well as some more advanced needs such as coastal defense, and water absorption capacity. These ecosystem services are mediated and complimented by physical infrastructure (transport, water distribution, drainage, power, communications) that are central features of urban areas.

Resilient systems are able to maintain or more quickly recover their functions and linkages in the face of shocks and stresses. This is in contrast with robust systems, which are designed for the purpose of continuity of operation in the face of extreme events—but that require knowledge of what those extremes are—that tend to fail catastrophically when they encounter conditions past design thresholds.

THE CHARACTERISTICS OF RESILIENCE

Since we see justice, equity and fairness as inherent qualities needed to be more resilient—a goal of the CRF is to ensure that these issues are brought to the fore. It is therefore important to identify the factors and characteristics that are important to enhance and to identify indicators that measure success and can reveal social innovations and transformations, while also recognizing that we can always be more resilient.

CHARACTERISTICS OF SYSTEMS (Infrastructure/Ecosystems)

FLEXIBILITY AND DIVERSITY: The ability to perform essential tasks under a wide range of conditions, and to convert assets or modify structures to introduce new ways of achieving them. A resilient system has key assets and functions physically distributed so that they are not all affected by a given event at any one time (spatial diversity) and has multiple ways of meeting a given need (functional diversity).

REDUNDANCY, MODULARITY: The spare capacity for contingency situations, to accommodate increasing or extreme surge pressures or demand; multiple pathways and a variety of options for service delivery; or interacting components 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, which support each other; failures in one structure or linkage being unlikely to result in cascading impacts across other systems (Little, 2002).

CHARACTERISTICS OF AGENTS

RESPONSIVENESS: The capacity to organize and re-organize in an opportune fashion; ability to establish function, structure and basic order in a timely manner in response to a disruptive event or organizational failure. Agents are motivated and able to take timely action when required, including changes in organization or structure. Key functions can be restored in a timely fashion after a climate related shock or extreme event.

RESOURCEFULNESS: The 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. It also includes the ability to access financial and other resources, including those of other agents and systems in order to take action.

CAPACITY TO LEARN: The ability to internalize past experiences, avoid repeated failures and innovate to improve performance; as well as to learn new skills. Capacity exists to identify and anticipate problems. Lessons from past failures and feedback from users are internalized and system improvements implemented. Potential future risks are assessed on an ongoing basis.

CHARACTERISTICS OF INSTITUTIONS

ACCESS RIGHTS AND ENTITLEMENTS: Rights and entitlements to use key resources or access urban systems should be clear. Institutions that differentially constrain rights and entitlements can limit access to systems or services and thus reduce resilience. Structures of rights and entitlements should not systematically exclude specific groups from access to critical systems or capacities. They enable collective action, and foster access to basic resources.

DECISION-MAKING PROCESSES: Decision-making processes, particularly in relation to urban development and urban systems management, should follow widely accepted principles of good governance, chiefly: transparency, accountability and responsiveness (UNDP, 1997). This includes recognition of those groups most affected as providing legitimate inputs to decision-making (Huntjens et al., 2012). Decision-making processes are transparent, representative, and accountable. Diverse stakeholders have ways to provide input to decisions. Dispute resolution processes are accessible and fair.

INFORMATION FLOWS: 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 and making strategic choices for adaptation.

APPLICATION OF NEW KNOWLEDGE: Institutions that facilitate the generation, exchange and application of new knowledge enhance resilience. Many institutions (such as building or other professional codes) are designed to resist change—to preserve and maintain existing structures, authority, social conventions and ways of doing things. But resilience requires innovation in order to reduce risk in the face of changing circumstances.

THE SHARED LEARNING DIALOGUE

Fundamental to the application of resilience concepts in the development field are qualities of justice, equity and fairness. To further those aims the Shared Learning Dialogue process is the keystone of our approach that brings together different stakeholders and different types of knowledge both scientific and local.

Addressing climate change and promoting sustainable development cannot happen without the conveyance of information and its integration into the social, political and cultural context. We see the Shared Learning Dialogue process as a means to achieve this integration. The Shared Learning Dialogue process is intended to generate discussion and innovation based on new understandings of climate change, risk and uncertainty, and by considering patterns and trajectories of urbanization. But additionally, commitments to shared learning are founded on principles of meaningful public participation—bringing together stakeholders with different interests and perspectives, different information, knowledge and power—in a public arena of debate on a level playing field.

7 KEY ATTRIBUTES OF A SUCCESSFUL SHARED LEARNING DIALOGUE

SHARING
Participants agree to share the stage and/or microphone; to share a common purpose; and, to respond to the needs of others.

LEARNING
Information is provided and participants are engaged in a variety of ways to support different learning styles.

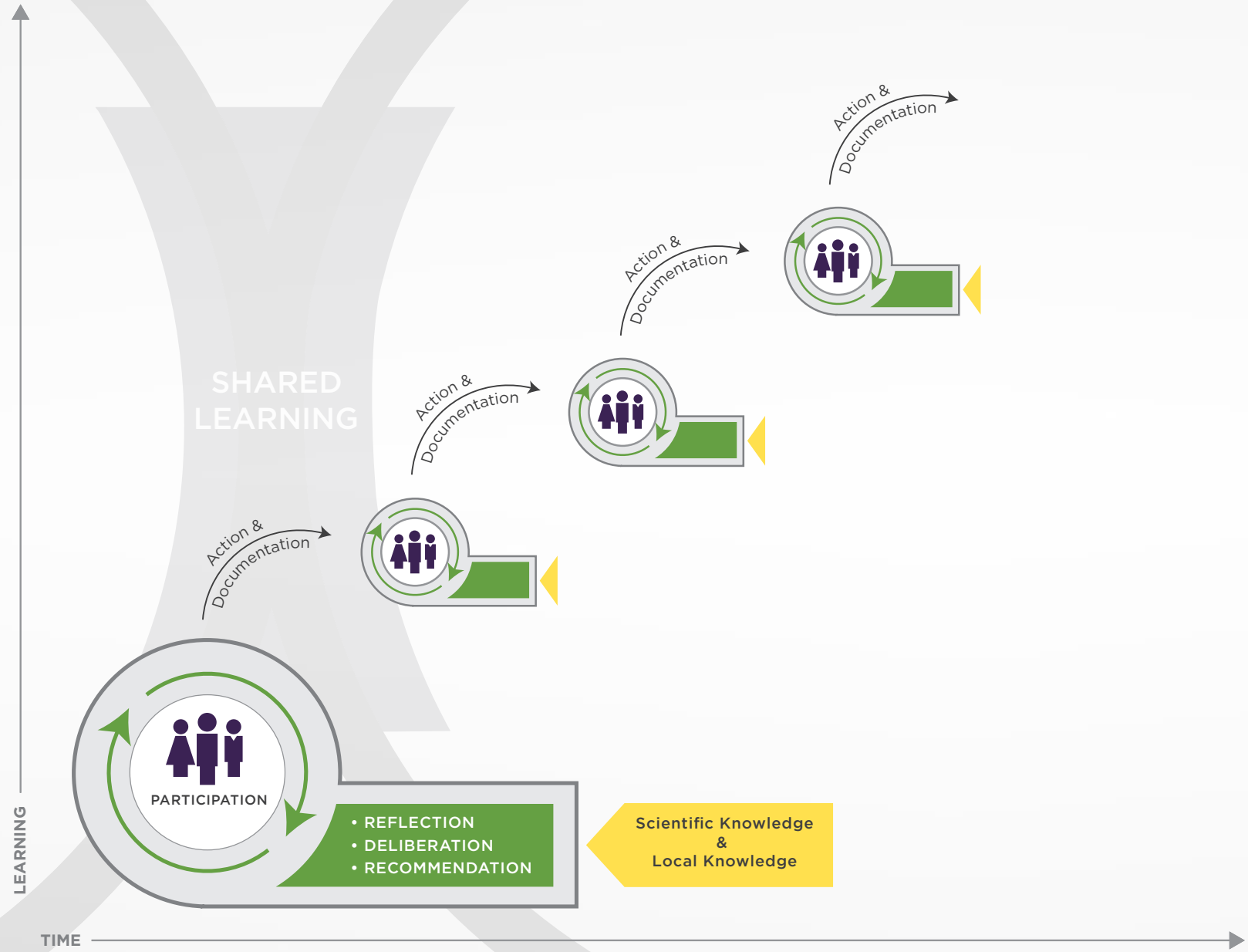
DIALOGUE
At least one dialogue technique or tool is used. Dialogue is essential to building relationships and interaction, and a prerequisite for collaboration and coordination.

RESPECT
Participants agree to listen with mutual respect and purpose.

FAIRNESS
Everyone has an equal chance to speak, with confidence they will be heard.

FEEDBACK
Participants can provide feedback in more than one way.

EVALUATION
Opportunity for evaluation that will lead to improvement of the process.


SHARED LEARNING
Action & Documentation
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Action & Documentation
PARTICIPATION
• REFLECTION
• DELIBERATION
• RECOMMENDATION
Scientific Knowledge & Local Knowledge
LEARNING
TIME

ELEMENTS OF APPLICATION

SHARED LEARNING DIALOGUE

Processes are iterative, transparent discussions that are informed by different kinds of information and knowledge, in order to create spaces for deliberative discussions for diverse stakeholders on a level playing field. Particular attention is placed on providing the dialogue tools and space for more marginalized people, including women and indigenous peoples.

SLDs provide an arena to share scientific knowledge with local and experiential knowledge. The SLD process guides stakeholders in identifying the constraints and opportunities in adapting to climate change, in understanding the complex systems within the community or city, and in working with a diverse range of actors. Bringing stakeholders together in this way builds capacities by providing access to information and evidence-based analysis to consider resilience options and identify courses of action.

CLIMATE-DEVELOPMENT VISIONING AND SCENARIOS

In order to move away from climate projections and assessments of impacts, the CRF process incorporates stakeholder aspirations and hopes for future development, historical, trend and trajectory analysis, and an assessment of a changing climate context. This requires the combination of participatory exercises supported by analysis and scientific information about future climate risks. This kind of exercise requires the consideration of how systems, agents and institutions at different scales work together.

VULNERABILITY ASSESSMENT (VA)

Vulnerability Assessments are studies that inform dialogue. For such studies to have influence they need to be owned, reviewed, and guided by key stakeholders. Those stakeholders then form a critical basis for learning and review, collectively identifying critical points of vulnerability—and intervention actions.

VA's examine the interplay of systems, agents and institutions; then critically look at processes of change—focusing on people, places and livelihoods. The interest here is in determining why people are vulnerable, and how they can respond.

This approach promotes identifying courses of action—for example, redesigning and managing resource delivery mechanisms.

PILOTS/DEMONSTRATIONS

Pilot actions allow for further social learning and scaling up. Demonstration activities cover a wide range—from studies, improved infrastructure for marginalized communities

The process of working on demonstration interventions requires and builds a high level of commitment among partners that allows for continued, sustained action.

LESSONS & LEARNING

By facilitating learning among stakeholders lessons can be identified and shared. Experience demonstrates that while different people learn in different ways, there is added value in supporting a process of critical reflection and documentation as a way of improving process and outcomes. Such documentation can be adapted for the range of needs and circumstances that might arise—either in language or format—and solutions can include the use of mobile phones, video and the internet. At a program level this also supports a process of Monitoring and Evaluation.

WE HAVE TO RETHINK WHAT WE MEAN BY 'DEVELOPMENT'

Increasingly, there is a call to revisit the meaning, values and direction of development and sustainability, putting both people and ecological considerations center-stage.

Human development—founded on principles of sustainability, equity, empowerment, efficiency and participation—are critical for helping people influence their daily lives, today and in the future.

That is not to say that growth is not possible or desirable. Interest is shifting to 'green growth' and 'low-carbon development.' This means a different type of development in which impacts on the environment and climate are minimized, human development objectives are prioritized and in which people are able to influence development processes. The challenge is framed as being "how to design a new model for human progress and development that is climate-proof and climate-friendly and gives everyone a fair share of the natural resources on which we all depend" (Jackson 2009).

M-BRACE & ACCCRN Cities

Asian Cities Climate Change Resilience Network (ACCCRN)

The work of ACCCRN focuses on building resilience at the city level in ten cities across four countries (India, Indonesia, Thailand and Vietnam). Early work focused on shared learning to develop demand-led, locally owned climate change resilience strategies and on their implementation. The ultimate objective of ACCCRN is to equip poor and vulnerable communities with the right resources, tools and methods for responding to existing and future climate risks.

Mekong-Building Climate Resilience in Asian Cities (M-BRACE)

The main focus of M-BRACE is building urban climate resilience in four medium sized cities, Hue and Lao Cai in Vietnam and Udon Thani and Phuket in Thailand. Through this effort the approach, and suite of tools and methods for building urban climate resilience that had been initially developed under the Rockefeller Foundation-funded ACCCRN program and other earlier efforts are being refined and replicated. The Climate Resilience Framework (CRF) has underpinned the approach.

PROJECT LOCATIONS

INDIA	INDONESIA	THAILAND	VIETNAM
Indore	Bandar Lampung	Chiang Rai	Da Nang
Gorakhpur	Semarang	Hat Yai	Can Tho
Surat		Phuket*	Hue*
		Udon Thani*	Lao Cai*
			Quy Nhon

* M-BRACE cities

The Climate Resilience Framework (CRF) is an analytical, systems-based approach to building resilience to climate change. The goal of this structured framework is to build networked resilience that is capable of addressing emerging, indirect and slow-onset climate impacts and hazards.

ISET-International is using this framework with cities across Asia to build local capacity for climate change resilience with funding from The Rockefeller Foundation, USAID and The American Red Cross, and the Climate Development Knowledge Network. The Climate Resilience Framework emerged from the initiation of resilience building activities in the Asian Cities Climate Change Resilience Network (ACCCRN) and the need to put activities into a conceptual context for dissemination and replication.

The CRF is informed by years of work in Asia and elsewhere by multiple actors and was refined through the M-BRACE program with support from USAID, and co-funded by The Rockefeller Foundation through the ACCCRN program.

The CRF has proven helpful for cities working with numerous multi-stakeholder, cross-sector issues that arise when trying to address issues of climate change, uncertainty, and planning. Ten cities in Asia have produced resilience plans from which over 35 proposals have been written and over 20 of which have been funded. As such the CRF proves itself practical in hollistically addressing issues of local need while offering an avenue to reach clear, specific actions.

More information on the Climate Resilience Framework and a suite of training materials providing guidance on the tools, methodologies and processes needed to implement the framework is now available on the web at training.i-s-e-t.org.

We invite you to visit

TRAINING.I-S-E-T.ORG

Contact us: Training@I-S-E-T.org

Journal Article: A Framework For Urban Climate Resilience
http://tinyurl.com/o98b6fr

Website: Training.i-s-e-t.org

Journal Article: "Shared learning" for building urban climate resilience – experiences from Asian cities
http://tinyurl.com/oh3dd7n