The background of the entire page is a photograph of a fisherman in a small wooden boat on a body of water. The fisherman is in the foreground, wearing a blue patterned wrap and holding a large, light-colored fishing net. In the background, two other boats with fishermen wearing yellow hats are visible on the water. The sky is a clear, pale blue.

# REDUCING RISK

and Building Resilience  
to Disasters and Climate Change



Uzbekistan – Colin Spurway/  
Mercy Corps 0802.  
Cover: India – John Watt for  
Mercy Corp 0206

This document was developed by the Environment, Energy and Climate Technical Support Unit as part of Mercy Corps' global resilience initiative. It was prepared by Chris Allan and Karen MacClune, under the guidance and with input from Eliot Levine and David Nicholson of the Environment, Energy and Climate Technical Support Unit.

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## I. Introduction

### I.1 Purpose of this document

Disasters of all kinds are not only human tragedies for millions of people every year, they are also substantial impediments to the attainment of development objectives. The World Conference on Disaster Risk Reduction, held in Hyogo, Japan in 2005 by the United Nations International Strategy for Disaster Reduction (UNISDR), produced a ten-year plan for global Disaster Risk Reduction: the “Hyogo Framework for Action 2005-2015: Building the Resilience of Nations and Communities to Disasters” (HFA).

During the decade since the Hyogo accord, the disciplines of both Climate Change Adaptation (CCA) and resilience have matured, offering new approaches, methodologies, and tools that Disaster Risk Reduction (DRR) practitioners have begun to utilize. Resilience in particular has influenced both key donors (USAID, DfID) and practitioners as development efforts have been continually lost due to reoccurring crises. As these fields have grown along with DRR, Mercy Corps has developed a wealth of knowledge and experience in understanding the design, implementation and evaluation of these activities. However, this knowledge is not always unlocked and shared among country programs or peer organizations which are striving to

understand, and link, these sectors to find effective ways to integrate the thinking into their relief, recovery and development objectives.

This document is designed to clarify and guide Mercy Corps team members through approaches to DRR and CCA, and illustrate how these approaches can add value to integrated programming and form key parts of broader resilience building efforts. It is written for Mercy Corps project teams that are either working with DRR or CCA programs, or who are integrating these activities into their general program work. The boundaries between these approaches and the overlap across them can be confusing to practitioners, and the wealth of conceptual and procedural frameworks can be overwhelming. This guidance document maps out the principles and connections across these approaches, and points to tools that may be helpful in designing programs that take advantage of their many important insights. This document will *not* show you all the steps needed to put together and manage a program. There are many tools for that, and while the document suggests tools that have been useful, there is no space here to include the tools themselves and instructions in their use. What this document *does* do is give you an understanding of the key concepts, help you understand why you might want to use one tool or another, and clarify what you are using the tools *for*, so the results are meaningful and useful.

## I.2 DRR, CCA, and Resilience – what are they and how are they related?

Disaster Risk Reduction, Climate Change Adaptation, and resilience deal with related issues, but they are not the same. Let's start with some definitions so we are clear what we are talking about.

Disaster Risk Reduction is defined as: "The concept and practice of reducing disaster risks through systematic efforts to analyze and manage the causal factors of disasters, including through reduced exposure to hazards, lessened vulnerability of people and property, wise management of land and the environment, and improved preparedness for adverse events."<sup>1</sup>

Climate Change Adaptation is:

- a) Adapting development to **climate effects**—gradual changes in average temperature, sea-level and precipitation; and,
- b) Reducing and managing the risks associated with **increased climate variability**—more frequent, severe and unpredictable extreme weather events.<sup>2</sup>

Resilience is: the capacity of communities in complex socio-ecological systems to learn, cope, adapt, and transform in the face of shocks and stresses.<sup>3</sup>

In plain language, we can say that Disaster Risk Reduction seeks to minimize the vulnerability of people to disasters. Climate Change Adaptation helps people manage the changes in weather and the environment that result from natural climate variability, climate change effects, and the increased climate variability associated with climate change. And resilience is a concept that looks at the interaction of society, economics and the natural environment to help people plan for and deal with shocks and stresses, recover quickly, and continue

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1 Turnbull, M., Sterrett, C.L., and Hilleboe, Amy, Toward Resilience, Practical Action Publishing, Warwickshire, 2013, p. 2

2 Adapted from Toward Resilience, p. 4

3 Mercy Corps, "Resilience at Mercy Corps," May 2013

to develop under new conditions. We will examine these approaches in more depth later on, but for the moment these definitions are sufficient to help us see how they are related.

Traditionally Disaster Risk Reduction activities focus on reducing risks from any kind of natural hazard (such as storms, floods, fires, earthquakes), technological hazards (such as industrial accidents, chemical spills), economic shocks, and civil conflict. Climate Change Adaptation also seeks to reduce risk from hazards, but only those influenced by changing climate. This includes storms, floods, and wildfires, which are already addressed by Disaster Risk Reduction activities but are likely to intensify with climate change, and also slower onset effects such as increasing average temperatures, changes in rainfall patterns, sea level rise, more variable, unpredictable weather, and all the associated changes these factors will have on livelihoods, health, and poverty. *Resilience is not a set of activities; it is a property of a system, like its size or age.* A resilience lens helps us to understand how complex systems interact and how to minimize risk and promote development in the face of uncertainty. Climate Change Adaptation and Disaster Risk Reduction are approaches which if done in a particular way can contribute to building resilience. There are approaches and tools available which guide how we design, implement, and monitor DRR and CCA programs that help to ensure that programing is contributing to resilience.

*All three concepts – DRR, CAA and resilience – go beyond our traditional thinking that separates emergency relief work from development work. Instead, all three see disasters – rapid or slow onset – as disturbances to a development path.* To best use this new thinking, development programs must be designed recognizing that disturbances can quickly reverse any gains made over the years. The best programs increase the resilience of individuals, communities, countries and regions to these disturbances in a way that protects development gains and sustains them into the future.

### **I.3. The Value of a Resilience Lens**

The first issue that most practitioners encounter when trying to develop programs to reduce risk and adapt to climate is that they are trying to predict the future. While this has always been a difficult thing to do, the rapid changes caused by climate change have increased uncertainty about future events beyond what we have encountered before. People have always adapted to changing climate, so that is not new. *What is new is that the climate is changing at a faster pace than ever before in human history.*<sup>4</sup> Traditional DRR work has been based on an assumption of “predict-and-prevent”: looking at the record of what kind of disasters we have had before, and how bad they were, tells us how much work we have to do to address those kinds of disasters in the future. Instead of trying to anticipate every event, practitioners are learning how to take a more dynamic view. Practitioners are helping communities to build capacity to adapt to a variety of hazards at a variety of scales, and are building this ability to adapt into all development work.

To help understand this more dynamic view, many practitioners have developed the concept of resilience: to adapt to changing conditions, we need to set up our social and environmental systems to survive and do well under a wide range of possible future conditions. In other words, resilience thinking helps to figure out how to reduce our vulnerabilities to shocks and stresses even when there are many interacting people, organizations, and systems to take into account. It is a way of hedging our bets about what will work.

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<sup>4</sup> Solomon, S., D. Qin, M. Manning, Z. Chen, M. Marquis, K.B. Averyt, M. Tignor and H.L. Miller (eds.), *Contribution of Working Group I to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change, 2007*, Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA. A wealth of information on climate science, including summaries for policy makers, can be found on the IPCC web site, <http://www.ipcc.ch/index.htm>.

## I.4 Resilience Principles at Mercy Corps

Before examining DRR and CCA more deeply, it will be helpful to look at how Mercy Corps staff are thinking about resilience. At Mercy Corps, there are four basic principles of resilience that we can apply to nearly any program.

### 1. *Complex Dynamics Require A Systems Approach*

Mercy Corps' resilience approach is founded on analysis and understanding of the systems that communities rely on to cope with risks and shocks, and adapt to change. Systems encompass actors, institutions, infrastructure and environment, as well as the formal and informal structures that govern and manage them. Systems are inherently relational and are affected by power dynamics. Any intervention needs to consider three types of systems: economic, ecological (including climate), and social. The quality of our interventions depends on our commitment to think holistically; conduct ongoing analysis; and combine global experience, local knowledge and scientific expertise to understand the context of our work. This is crucial to help us understand and focus on our program goal, and to be clear on who we are helping build resilience, and why we are doing so.

### 2. *Our Role Is One Of Facilitation*

Resilience depends on capacities and relationships that enable complex social-ecological systems to adapt in the face of change. Our role is to facilitate actors' learning, resourcefulness and responsiveness to solve critical issues that prevent poor and vulnerable communities from becoming resilient. We aim to catalyze improved, inclusive resilience through building collaboration, trust and transparency. We work with stakeholders at multiple scales, stimulating linkages, opportunities and innovation to drive change.

### 3. *Strong Partnerships Transform Systems toward Pro-Poor Resilience*

Resilience is a neutral term, and many resilient systems do not include the interests of the poor and vulnerable. There are resilient systems supported by manipulation of bad governance, corruption and use of perverse incentives. To facilitate change toward *pro-poor* resilience, we engage with stakeholders from the most vulnerable to the most powerful, always conscious of incentives, motivations and power dynamics. We believe partnerships and shared learning drive new ideas, adaptation, and ultimately, support identification and promotion of shared

#### Using Economic Incentives to Reduce Risk

The Managing Risks through Economic Development (M-RED) program supports vulnerable populations in 64 disaster-prone communities in Nepal and Timor-Leste to develop Disaster Risk Reduction (DRR) strategies directly linked to economic security. By taking a systems approach, the program reinforces traditional community-level solutions for risk reduction, and strengthens them by incorporating sustainable, market-based opportunities for long-term economic development that specifically incentivize risk reduction. For example, by planting grasses used for animal fodder in the growing dairy sector of Far Western Nepal, the program is able to promote slope stabilization and reduce soil erosion in landslide-prone areas. These grasses are also directly linked to market potential through dairy production, and in this way incentivize the application of risk-reducing grasses on unstable slopes.

Source: Mercy Corps, "Resilience Hubs: action and evidence," no date.

interests. This belief is embedded in our [Vision for Change](#) and guides the way we work. It requires humility and the recognition that building resilience is complex and thus necessitates the contribution of multiple perspectives and skills sets.

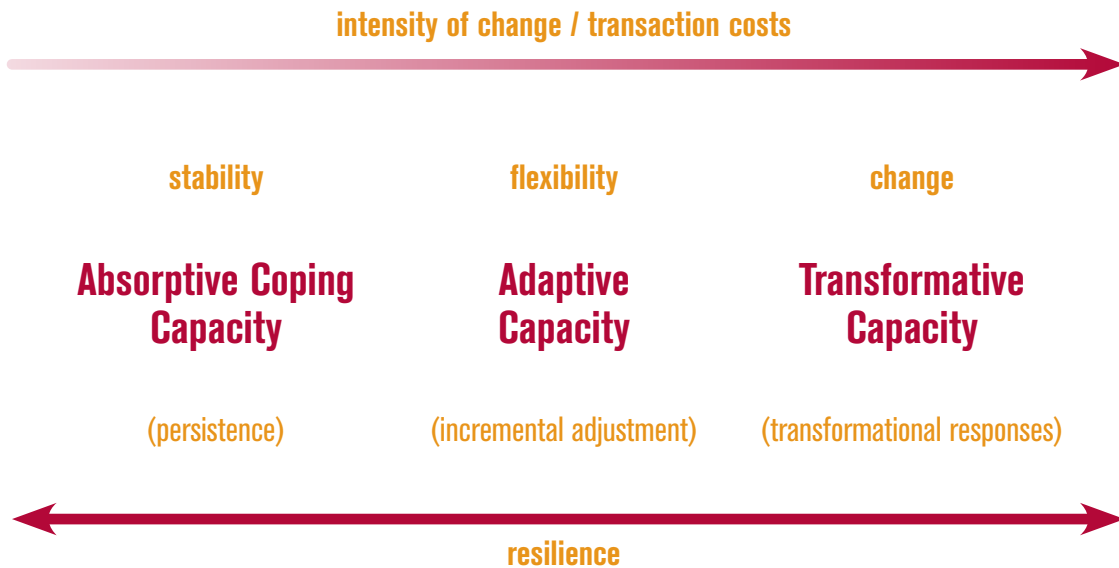
**4. Model, Test And Iterate To Build An Evidence-Base Toward Resilience**

Design, implement, test and improve program strategies through iterative learning cycles that focus on resilience as a long-term goal, bolstered by short-term wins for communities. Begin with simple proven models, closely monitor experiments, and use both as a platform to build insight into how to move large and complex systems toward higher states of resilience.

**Programs to Build Resilience**

Since resilience is an all-encompassing concept, we need to set some boundaries around any program if it is to be manageable. For any programming to build resilience, change agents must start by asking themselves four questions.

**Core Capacities for Achieving and Maintaining Resilience**



Source: Bén , Christophe, Rachel Godfrey Wood, Andrew Newsham and Mark Davies. "Resilience: New Utopia or New Tyranny? Reflection about the Potentials and Limits of the Concept of Resilience in Relation to Vulnerability Reduction Programmes." IDS Working Paper, Volume 2012 Number 405. CSP Working Paper Number 006. Institute of Development Studies (IDS) and Centre for Social Protection (CSP). September 2012; Eliot Levine, "Resilience 101: Resilience at Mercy Corps," Power Point presentation.



### ***Four Questions, and Sample Answers***

1. Resilience of what? Examples include households, ten villages in a district, neighborhoods in an urban area, or freshwater ecosystems
2. Resilience for whom? Examples include women & girls, landless people, small scale farmers, or urban poor
3. Resilience to what? Examples include earthquake, ecological degradation, variable climate, conflict, political regime change, or economic shocks
4. Resilience through what?
  - a. Absorptive Capacity—the ability to minimize exposure to shocks and stresses
  - b. Adaptive Capacity—the ability to proactively modify conditions and actions based on an understanding of social, economic and ecological conditions
  - c. Transformative Capacity—the enabling conditions that facilitate systemic change.

On this last point—resilience through what? Mercy Corps breaks resilience building activities down into three sets of capacities. These are listed above and illustrated in the figure below.

**Absorptive coping capacity** includes the ability to weather shocks or stresses. People call on savings, relatives provide housing and assistance after disasters, early warning systems function well, and seed varieties are able to produce under a wide variety of conditions.

**Adaptive capacity** refers to the ability to change what you are doing as conditions change. House building styles change to accommodate longer and more intense heat waves, wells are drilled deeper and more local dams are built, people start second and third businesses to diversify income and take advantage of new opportunities.

**Transformative capacity** refers to more fundamental changes people make when conditions change enough that adaptive capacity is not sufficient. Farmers' children become civil servants, producers organize into cooperatives and connect with international value chains, civil society organizations organize for greater government accountability, culture shifts to allow women to work outside the home more easily.

It is tempting to see these capacities as separated over time, that is, first people absorb, then they adapt, then they transform. In reality they are all happening at the same time—while people use savings to manage current difficulties, they are sending their children to school, and are organizing into social organizations to push their economic interests or defend their socioeconomic rights. A system where farmers have diversified their crops may not need to call on their absorptive capacity in a drought, because their adaptive capacity allowed them to shift to a system where the shocks or stress don't affect them. Or people who have already transformed their relationship with government so that roads and markets serve them well may not need to call on absorptive or adaptive capacities in a hazard since they have already greatly reduced their vulnerability in a transformative way. The role of the development organization is to facilitate people to do all these things at least risk and with maximum benefit.

## I.5 Characteristics of Resilience

What builds the capacity of people to deal with change? How can you know what makes systems more resilient? Most conceptual frameworks of resilience identify a few characteristics of organizations, systems, or communities that make them more resilient. The following are some typical characteristics of resilience. If you keep these in mind when you are designing programs, you have some simple ideas that can help determine which interventions will build resilience.

CHARACTERISTIC	WHAT IT MEANS	EXAMPLES
<b>Flexibility</b>	The ability to meet needs when conditions change	<ul style="list-style-type: none"> <li>• There are multiple evacuation routes in disasters instead of just one</li> <li>• Community centers double as flood shelters when needed</li> <li>• Staff in an organization are cross-trained so that the organization can continue to function when some staff can't get to work</li> <li>• There is more than one trader to buy farming inputs from or sell crops or livestock to.</li> </ul>
<b>Diversity</b>	Different parts of the system are not identical, different types of things perform similar functions	<ul style="list-style-type: none"> <li>• Staff have different sets of skills</li> <li>• Farmers plant multiple varieties of crops</li> <li>• Families have different sources of income, including remittances from the city or abroad</li> </ul>
<b>Redundancy</b>	Systems have back-up options for when things go wrong, systems are broken down into independently functioning parts	<ul style="list-style-type: none"> <li>• A village has multiple sources of water in case one dries up or is contaminated</li> <li>• Farmers keep livestock in different places tended by different people</li> <li>• A city has more than one water treatment plant. The hospital has a back-up generator</li> </ul>
<b>Connected through multiple relationships</b>	People and organizations are part of networks	<ul style="list-style-type: none"> <li>• Connections with neighbors, family, local government officials, as well as people in distant places such as other villages, cities, or other countries</li> <li>• Businesses have multiple suppliers</li> <li>• Government has relationships with NGO service providers who can be mobilized quickly in disasters</li> </ul>
<b>Resourcefulness (including financial resources, knowledge, information, etc.)</b>	The knowledge and means to get things done.	<ul style="list-style-type: none"> <li>• A city or village has the financial reserves, technical knowledge, and ability to organize and run a safe water system. When disaster strikes, local authorities can borrow money to rebuild infrastructure</li> <li>• Communities know how to operate their early warning system, and how to connect to the national level system</li> </ul>
<b>Safe Failure</b>	Systems are designed to fail in ways that do not cause further disaster	<ul style="list-style-type: none"> <li>• Dams are built with spillways so they can fill up and let water continue to flow without damage</li> <li>• Crop insurance pays farmers in case of crop failure</li> </ul>

CHARACTERISTIC	WHAT IT MEANS	EXAMPLES
<b>Ability to Learn</b>	People adapt systems with each experience to improve their situation—bouncing forward rather than merely bouncing back	<ul style="list-style-type: none"> <li>• People adapt their farming systems to deal with increasingly unpredictable weather, such as changing planting times, setting up irrigation options, and planting a greater diversity of crops</li> <li>• Engineers built back bridges and roads after disaster to make them stronger than before</li> <li>• There are opportunities for public and private discussion of lessons learned from dealing with shocks and stresses.</li> </ul>
<b>Transparent, accountable and responsive decision making</b>	Methods for making social decisions allow for clear and fair decisions that take into account power dynamics in society and favor the poor and vulnerable	<ul style="list-style-type: none"> <li>• Land use regulations governing fair compensation for agricultural land or restricting where you can build are open, straightforward, and equitably enforced</li> <li>• Groups such as women, ethnic or religious minorities, or the elderly or handicapped are not excluded from planning or decisions</li> </ul>

Resilience frameworks help you to apply these concepts to the particular situation you are working on. Even without the broader systems thinking that frameworks provide, keeping these simple ideas in mind can help you get a feel for the kinds of activities that build resilience and the factors that get in the way.

## I.6 Understanding Complex Adaptive Systems

The resilience principles above talk a lot about “systems” and “complexity.” Why are these terms important for doing DRR and CCA work?

Both DRR and CCA work on complex adaptive systems. “Complex adaptive systems” is the formal term for things consisting of many diverse and autonomous parts which are interrelated, interdependent, linked through many interconnections, and behave as a unified whole in adapting to changes in the environment.<sup>5</sup> In a complex adaptive system, it is impossible to say what effect a change to one part of the system will have on the rest of the system.

Cities are complex adaptive systems—millions of people interact in unpredictable ways with ecosystems, other cities and countries, rural areas, systems of food, transport, energy, communications, etc. Livelihood systems are another example—people make a living from agriculture, employment, remittances from relatives, etc. They have a variety of systems they depend on to do so, from fertile farming systems to transportation for their products and needs to dependence on a postal or banking system, roads, and communications network, all within the demands of laws and cultural assumptions. Changes to distant parts of the economy, degradation of the environment, impacts to local or distant communications or transportation networks, or changes in cultural norms can all affect individuals and families in unpredictable ways, requiring people to then adapt to new conditions, in an endless series of changes and adaptations.

<sup>5</sup> <http://www.businessdictionary.com/definition/complex-adaptive-system-CAS.html>

To really use DRR and CCA tools well, we need to appreciate this complexity and continuous change. We need to always think of systems at multiple scales, and not just focus on isolated communities. For program work, this suggests that linear logic can sometimes lead to inaccurate conclusions. For example, a program designed to help farmers produce more milk on the assumption that then they will sell more, get more income, their children will go to school, and they will eat better may not actually represent what happens. In fact, these linear progressions of events are rare. In many cases, producing more milk creates opportunities for secondary markets for collecting the milk of other farmers, new products for dairy production that farmers can become the local supplier of, or increased value for traders to come to the area. Farmers may bypass local markets and sign deals with large retailers in urban areas.

On the negative side, how money from milk sales is used can strongly affect outcomes – whether it goes to men or women, whether money is accrued on a daily basis or once a quarter from a cooperative (“lumpy payments”), etc. If the program is very successful, the price of milk may be reduced, or increased competition with large dairy companies may lead to different tactics or marketing strategies. To best design such a program, we need to understand not only how to improve milk production, but also gender and ethnic relations, and how farmers can take advantage of a dynamic market.

So in following these resilience principles, we may not need to predict every output specifically. Instead, we look at what conditions need to change for farmers to benefit, and what relationships they need to strengthen to make the program a success. In other words, we focus more on outcomes, that is, what it is that we are trying to achieve in the big picture, and on the factors that can influence those outcomes.

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## Complex Adaptive Systems

What all complex adaptive systems have in common:

- The whole is greater than the sum of the parts;
- It is difficult to predict what any input to one part of the system will result in later on in another part; and
- The system is self-organizing, and behaves in unpredictable ways despite leadership or coercion.

Remember that “complicated” and “complex” are **not** the same thing. Some things may be very complicated, but results can be predicted with enough expertise, success can be repeated by following similar steps, and there is a high degree of certainty about the outcome. An example of a complicated task is building an airplane or planning a conference. An example of a complex task is raising a child. Siblings may grow up in the same house with the same life chances, yet turn out completely different.

For DRR and CCA programming, this means:

- People will assess their personal situation and respond in the best way they can. Change in policy or government regulation will lead people to react in ways that may not be expected. This is often termed “**autonomous adaptation.**” For example, evicting people from flood plains may lead them to settle in even more susceptible areas if there is a lack of housing, transportation, agricultural land, etc. So DRR and CCA programs need to anticipate that no matter how well planned the program, no matter how many workshops we do or how well we monitor, people will make their own personal decisions about their participation, and how they make use of the program benefits available. People will use their innate genius to find the best benefit they can, whether or not that was in the project proposal. Since we seek to build community capacity, often this local initiative can produce results different – and better – than anything we planned. Setting programs that are flexible and adaptable can take advantage of local creativity.
- Working on just one part of the system – livelihoods at the local level, national emergency response policy, early warning systems, etc. – may miss other critical parts of the system that are important for what you are trying to do. Early warning systems may let people know that a disaster is coming, but if there are no safe routes to get out, or there is no provision for the elderly and handicapped, then the effectiveness of the early warning system is greatly reduced. You don’t have to work on the whole system, but you do need to look at the whole system and anticipate how elements you aren’t working on may affect those that you are working on.

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A useful resource for social practitioners in this area is Westley, F., Patton, M. Q., & Zimmerman, B, [Getting to maybe: How the world is changed](#). Toronto, Random House Canada, 2006. It provides a wealth of examples of how programs can work on complex social problems.



## II. Disaster Risk Reduction

Using a resilience lens allows practitioners to think systemically about their work and improve their support to communities to reduce risk.<sup>6</sup> This section will review the evolution of DRR thinking, discuss how a resilience lens can help, and describe some processes and assessments that can be helpful in designing programs.

### II.1 Evolution of Approaches to Disaster Management

People have always responded to disasters, primarily at community level. The modern version of a disaster response organization dates at least to 1863 with the founding of the Red Cross and Red Crescent Movement. For years, the primary paradigm was to train people and gather materials that would be useful in disasters. This model of disaster preparedness has been developed into a very sophisticated set of practices and principles all over the world.

<sup>6</sup> At Mercy Corps we use the word “community” to generally refer to groups of people living within a close proximity to one another, but recognize that it is a broad category that encompasses small pastoralist communities in rural Africa to neighborhoods in Indonesia’s largest cities. Community may also refer to “communities of interest”—people with HIV/AIDS, and ethnic minority, Traditional Birth Attendants, etc.

In the last 50 years, this prepare-and-respond model evolved to incorporate the insight that *the way an organization responds* affects the outcome of the disaster and subsequent recovery. As a result, practitioners developed methods of building on local assets and abilities during disaster response to speed recovery and put people back on a development path. For example, “Rising from the Ashes” introduced the concept of vulnerability and capacities analysis in 1989.<sup>7</sup> This approach included simple actions such as using local skilled people in refugee camps for needed tasks, rather than bringing in outsiders, and organizing refugees by local community rather than the order in which they arrive in a camp. Disaster responders learned to think about a disaster-recovery-development cycle. The thinking behind the disaster-recovery-development cycle is that all societies are hit with disasters from time to time. The goal is not just to respond, but to then recover and move back into development, and to move through response and recovery as quickly and effectively as possible so as to maximize time in development before the next disaster strikes.

Disaster managers have pushed this thinking even further, realizing that while it is important to be prepared to respond to disasters, it is also possible to reduce the effects of disasters by looking closely at what makes a situation disaster-prone in the first place. *Disasters are inevitable, but extensive human damage and loss are not.* In other words, there is not much that is “natural” about damage from natural disasters. If people do not live in floodplains, if buildings are built to withstand earthquakes, if gas, electricity, and water utilities are built to withstand fires and floods, if pastoralists have freedom of movement during droughts, if most children are vaccinated, if coastal mangrove forests are intact, then the risk from disasters is reduced. In 1990, as this thinking about reducing risk before disasters ever happen was developing, the United Nations started the International Decade for Natural Disaster Reduction. At the end of that decade, the UN established the United Nations International Strategy for Disaster Reduction (UNISDR), representing the international consensus that risk reduction was important. By 2005 the UN adopted the “Hyogo Framework for Action 2005-2015: building the resilience of Nations and communities to disasters.”

<sup>7</sup> Mary B. Anderson and Peter J. Woodrow, *Rising from the Ashes: Development Strategies in Times of Disaster*, Boulder, Westview Press, 1989.

### With and Without – How DRR Interventions Help in the Next Disaster

In the plains of Far Western Nepal, Mercy Corps and partners facilitated the formation and training of Disaster Preparedness Committees in communities and schools, and then worked with these committees and local government to expand flood early warning systems, create search & rescue and first aid teams, and carry out slope stabilization and bioengineering along riverbanks to protect homesteads and fields. When floods hit the next year, casualties in communities with Disaster Preparedness Committees were negligible, whereas casualties remained high in neighboring villages.

In coastal regions of West Sumatra, Indonesia, Mercy Corps formed, trained, and equipped Disaster Management Teams, and then worked with these teams and local government on response plans, evacuation routes and shelters, and tree plantation. When an earthquake and tsunami warning hit the following year, local government officials remarked that these Disaster Management Teams were among the first and best prepared responders.

These interventions increased the organizational capacity of these communities to absorb shocks.

Source: Mercy Corps, “Strategy Summary: Mercy Corps’ Climate Change and Disaster Risk Reductions in South East Asia,” no date.

## II.2 The Hyogo Framework for Action

The Hyogo Framework for Action has been a touchstone for the DRR community ever since. It lays out five basic areas of work that governments, NGOs, and businesses can do to reduce risk.

***Priority Action 1: Ensure that Disaster Risk Reduction is a national and a local priority with a strong institutional basis for implementation.***

Countries that develop policy, legislative and institutional frameworks for Disaster Risk Reduction and that are able to develop and track progress through specific and measurable indicators have greater capacity to manage risks and to achieve widespread consensus for, engagement in and compliance with Disaster Risk Reduction measures across all sectors of society.

***Priority Action 2: Identify, assess and monitor disaster risks and enhance early warning.***

The starting point for reducing disaster risk and for promoting a culture of disaster resilience lies in the knowledge of the hazards and the physical, social, economic and environmental vulnerabilities to disasters that most societies face, and of the ways in which hazards and vulnerabilities are changing in the short and long term, followed by action taken on the basis of that knowledge.

***Priority Action 3: Use knowledge, innovation and education to build a culture of safety and resilience at all levels.***

Disasters can be substantially reduced if people are well informed and motivated towards a culture of disaster prevention and resilience, which in turn requires the collection, compilation and dissemination of relevant knowledge and information on hazards, vulnerabilities and capacities.

***Priority Action 4: Reduce the underlying risk factors.***

Disaster risks related to changing social, economic, environmental conditions and land use, and the impact of hazards associated with geological events, weather, water, climate variability and climate change, are addressed in sector development planning and programmes as well as in post-disaster situations.

***Priority Action 5: Strengthen disaster preparedness for effective response at all levels.***

At times of disaster, impacts and losses can be substantially reduced if authorities, individuals and communities in hazard-prone areas are well prepared and ready to act and are equipped with the knowledge and capacities for effective disaster management.

The Hyogo Framework for Action will be renewed and revised in 2016.

## II.3 Integrated Programs

In recent years, DRR thinking has continued to develop, and a more integrated view of the disaster-development-disaster cycle has evolved. In the "Expand-Contract" model of disaster management, there is no longer a cycle of disaster-development-disaster. Instead, disaster management and development activities all



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## Risk Transfer – Back-up Systems and Financial Resources

In April 2014, 101 pastoralists (30 of whom were women) owning 2,186 insured animals in the pastoral Wajir County of northern Kenya were the first to benefit from an important insurance product introduced by Mercy Corps with support from The Bill & Melinda Gates Foundation.

Index-Based Livestock Insurance (IBLI) combines sharia-compliant financial instruments with innovative use of satellite-based measures of vegetative cover to predict average livestock mortality experienced by local communities. The pilot program, run by Mercy Corps Kenya in partnership with the International Livestock Research Institute (ILRI) and Takaful Insurance of Africa (TIA), paid out approximately \$5,800 for the loss of sheep, goats, cattle and camels during the long dry season that ended in March.

Following the rollout of IBLI in northern Kenya the initiative has been linked to a 33% drop in reliance on food aid. With increased use of this innovative strategy, insured households will reduce their dependence on dangerous coping mechanisms like consuming fewer meals and selling off livestock, as they progress towards greater resilience and increased self-sufficiency.

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Source: Mercy Corps, "Resilience Hubs: action and evidence," no date.

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go on simultaneously, but the emphasis varies with the need. Disaster management activities are continuous, expanding when there is a crisis and contracting in stable periods, but never stopping. In parallel, every development effort is undertaken with the idea of building in disaster mitigation.<sup>8</sup>

This more integrated view is summarized here:

"Increasing resilience among chronically vulnerable populations affected by recurrent shock requires that humanitarian assistance operations, livelihood security development interventions, climate change adaptation, social protection, peace building and governance activities are designed and implemented in such a way that together they reduce disaster risk and strengthen adaptive capacity among target populations."<sup>9</sup>

Ideally, every development program should take into account the risks that could undermine any development gains it achieves and seek to reduce them if possible. For example, a Mercy Corps program in Georgia was designed to improve incomes of dairy farmers by improving their access to the value chain for dairy products. In talking to farmers, Mercy Corps staff heard that one issue farmers faced is that a bridge they use to get their products to market washes out frequently during storms. So part of the project involved improving the bridge to reduce the risk of it being washed out. While normally this might be considered a Disaster Risk Reduction activity, it is at the same time a development intervention since it allows farmers to continue selling their milk. Looked at in this way, there is no sharp division between "development projects" and "Disaster Risk Reduction projects." They are both about seeing risks and opportunities and finding ways to deal with them.

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8 See for example <http://www.adpc.net/casita/course-materials/Mod-4-Disaster-Mgmt.pdf>

9 Frankenberger, T., T. Spangler, S. Nelson, M. Langworthy, "Enhancing Resilience to Food Security Shocks in Africa," TANGO International Discussion Paper, 7 November 2012, p. 10.

## II.4 Review of Key Concepts

### II.4.1 Hazard, Risk, Vulnerability and Capacity

So now we understand how humanitarian agencies came to see Disaster Risk Reduction as an important thing to do. Let's focus on four fundamental concepts needed to make this idea a reality: "hazard," "risk," "vulnerability," and "capacity." For DRR, these concepts have specific meanings.

**Hazards** are events – natural or human-caused – that disrupt the normal state of things. We can divide them into four types:

1. Natural – includes climate related hazards such as extreme weather, drought, flood, and sea level rise, and non-climate related events such as earthquakes and volcanic eruptions
2. Political – civil conflict, radical changes in policy
3. Economic – rapid devaluations or contractions in investment or employment
4. Technological – chemical or nuclear accidents, or infrastructure failure such as widespread power outages, collapsed buildings or highways.

UNISDR defines **disaster risk** as the potential disaster losses, in lives, health status, livelihoods, assets and services, which could occur to a particular community or a society over some specified future time period. The difference between hazard and risk is that hazard refers to the event itself – earthquake, civil conflict, etc. – while risk more specifically talks about actual damage or loss of life that matters to people.

You may also see a more general definition of **risk**, which is the probability of a negative event and the potential damage it could cause. This more general definition is sometimes useful because it brings in the idea that while an event is very unlikely, the damage it would cause is very large. For example, Kathmandu in Nepal has not experienced a large earthquake since the 1930s – which makes it a rare event – but the damage it would cause is enormous, so emergency planners need to plan for it.

**Vulnerability** is a more complicated concept. It refers to the characteristics and context of a community or system that makes it susceptible or sensitive to hazards. Recalling the resilience lens discussion above, vulnerability looks at where people, systems, or things fit in a broad social and environmental context to understand where hazards might cause trouble.

**Capacity** is the combination of all the strengths, attributes and resources available to get things done. It includes not only physical infrastructure, ecosystem health, institutions, knowledge and skills, and wealth, but also social relationships, leadership and management.

Pulling it all together, DRR practitioners summarize these ideas in the following loose formula:

$$\text{Risk} = \text{hazard} \times \text{vulnerability} / \text{capacity}$$

That is, a hazard is not a problem until it meets vulnerable people. And the more capacity a community has—early warning systems, adequate income and wealth, healthy environment, supporting local institutions, supporting government agencies, etc.—the less the risk is. The best example of this concept is the difference between hazards like typhoons that strike developed and developing countries. Because capacity is higher in developed countries, fewer people are injured and the physical damage is less. The same typhoon in a developing country can kill thousands of people and cause billions of dollars in damages.

Not everyone exposed to a given hazard is at the same level of risk—some are at more risk than others. This is the key to DRR—who is vulnerable to what risk, and what can we do ahead of time to reduce that vulnerability. Taking the example of a tsunami, risk is lower for someone who

- lives farther from the beach
- lives in a stronger house
- has access to an early warning system
- is able to evacuate more easily, due to better health, not being handicapped, not being female or a child.

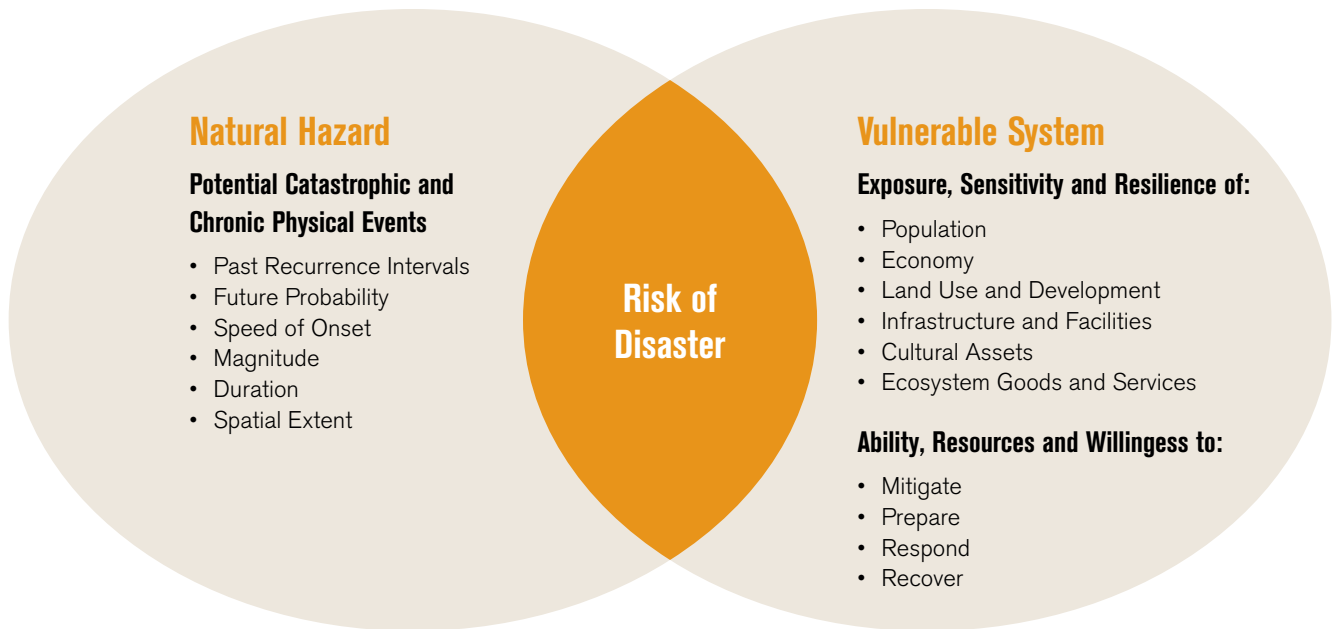
These are examples of vulnerabilities that DRR practitioners look for.



Liberia — Mark Fischer 02/14

The graphic below illustrates how hazards and social systems overlap to create disasters. On the left, hazard events occur periodically. But the degree to which a hazard turns into a disaster is determined by how vulnerable people are to that hazard. Vulnerability can be due to the fact that you live near a natural hazard, but it is also affected by many other social factors. Figuring out what these social factors are, for whom they matter, and why they matter is what DRR frameworks are useful for.

**Understanding Risk**



Adapted from USGS-Oregon Partnership for Disaster Resilience Research Collaboration, 2006

Note also how the resilience lenses described above help here. They show that exposure to a hazard differs for people, depending on how flexible their livelihood strategies and surrounding infrastructure are, the capacity of the local economy and organizations to deal with the shock, the health of local land and water systems, and the ability of all social groups to access information and resources. Fragile infrastructure and ecosystems, poorly developed organizations and governments, and laws and customs that reduce flexibility all make people vulnerable, thereby increasing their risk.

## II.4.2 Confusing Use of Terms

Because the DRR and CCA communities have developed separately, you will often see the same terms used in different ways. Both DRR and CCA practitioners look at hazards, risks, and vulnerabilities, but they define them somewhat differently. In the CCA world “vulnerability” is defined as the potential to be harmed and is a function of three things: Exposure, Sensitivity, and Capacity. According to the Intergovernmental Panel on Climate Change,

- **Exposure** to climate is primarily a function of geography. For example, coastal communities will have higher exposure to sea level rise and cyclones, while communities in semi-arid areas may be most exposed to drought. You can think of exposure as roughly equivalent to the term “hazard” in the DRR formula.
- **Sensitivity** is the degree to which a given community or ecosystem is affected by climatic stresses. Like similar concepts in DRR practice, sensitivity includes social capacity and livelihoods, and is not limited to biophysical factors.
- **Adaptive capacity** is defined as the ability of a human or natural system to adjust to climate change to reduce potential damages, to take advantage of opportunities, or to cope with the consequences. In this sense, the CCA definition of capacity is very similar to the DRR definition.

### Exposure, Sensitivity and Adaptive Capacity

One easy way to remember how the climate change community uses these terms is to think of a boxer.

- **Exposure:** Number of times you are punched
- **Sensitivity:** How much that punch hurts
- **Adaptive Capacity:** Your ability to get out of the way.

Putting these together, the IPCC defines vulnerability to climate change as:

The degree to which a system is susceptible to, or unable to cope with, adverse effects of climate change, including climate variability and extremes. Vulnerability is a function of the size and kind of climate variation to which a system is exposed, the sensitivity of that system, and its ability to adapt to those changes in climate.<sup>10</sup>

Use of both sets of terms can take you to the same place: figuring out what parts of the social and environmental systems make people prone to disasters, and what you can do about it. Neither definition is better than the other – as long as you understand how people are using the terms, you can avoid confusion and miscommunication.

## II.4.3 Disaster Risk Reduction Frameworks

Reducing risk requires knowledge of what disasters could occur before they happen, how those disasters would affect natural and social systems that already are interacting in dynamic ways, and how individuals and organizations might react to new crises and opportunities. This is a complex situation that requires

<sup>10</sup> The definitions in this section come from the Intergovernmental Panel on Climate Change (IPCC) Working Group 2, 2001. [Third Assessment Report, Annex B: Glossary of Terms.](#)

specialized tools to understand and plan responses. DRR has developed conceptual and process frameworks to help. These frameworks are based on the idea that vulnerability to disaster does not come just from being in harm's way – instead, social and economic pressures make some people more vulnerable than others. In particular, historical and cultural factors, such as ethnic groups that are historically excluded from economic opportunities, can make some populations more vulnerable than others. These factors can be exacerbated by current policies that make it difficult for those groups to reduce their vulnerability, such as women with no access to bank loans to improve their businesses, or regions of the country that receive little government support for development. As a result of these root causes, some people will live in more unsafe conditions than others, and have lower capacity to handle a shock or stress when it arrives.<sup>11</sup>

To address these problems and reduce risk, DRR practitioners look at building capacity. Keeping in mind the characteristics of resilience can help you choose capacity building interventions that are more likely to build resilience. For example, if one of the issues is dependence on one or two crops in a rain fed agriculture system, interventions that diversify ways of making a living will give people more flexibility in their livelihoods. If access to government support or influence over policy is a major issue, then organizing communities and connecting them with other sympathetic civil society groups or government departments can increase their connections, build their resources, and increase accountability of decision making processes.

In more recent years practitioners have developed these ideas into newer conceptual frameworks that put resilience at the center. They can be very effective for reducing risk and building capacity, though they are framed in slightly different terms. We explore resilience frameworks in more depth in Section V.

This is the big picture of how to think about reducing risk. But what should you look at to figure out what the underlying causes, dynamic pressures, and unsafe conditions are in your case? And, once you know what they are, what do you do about them? While field practitioners have been helping people to answer these questions for some time, a resilience lens makes it easier to consider and address the

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11 These ideas were first developed in Wisner, Blaikie, Cannon and Davis, *At Risk: natural hazards, people's vulnerability and disasters*, Second edition, 2003. It is commonly referred to as the "Pressure and Release" or "Crunch and Release" model of Disaster Risk Reduction. 2003. More training materials on these concepts are available at <http://www.adpc.net/casita/course-materials/Mod-4-Disaster-Mgmt.pdf> and <http://www.unisdr.org/2005/wcdr/thematic-sessions/presentations/session1-4/tearfund-mr-oxley.pdf>.

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### Building Capacity to Build Back

One key difference between high and low resilience communities is the ability to mobilize resources quickly after a disaster. When households and businesses can call on reserves of cash and insurance payments, they do not have to sell off assets, they can reconstruct more quickly, and they can get back to economic productivity more quickly. Industrialized countries have public and private disaster recovery mechanisms that get money into people's hands quickly. In developing countries these facilities are rare, and so resilience is lower.

The Indonesia Liquidity Fund after Disaster (ILFAD) project works with 135 microfinance institutions (MFIs) in 9 disaster-prone provinces to deliver services and remit cash to their disaster-affected clients at the time of disasters, through the creation of liquidity facility mechanism and capacity building for MFIs. ILFAD aims to build the capacity of MFIs to reduce the economic impact of disasters and speed recovery efforts for affected communities. MFIs receive strategic and tactical guidance on designing, implementing and strengthening new microfinance products and services.

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Source: Personal correspondence, Mercy Corps Indonesia staff, September 2014.

## Gender, DRR and Resilience

Disturbances and crises often reinforce, perpetuate, and increase inequality, making already bad situations even worse for marginalized gender groups, especially women and girls. In the Sahel, men, women, boys, and girls all experience vulnerabilities to shocks and stresses that decrease their capacity to adapt. But women and girls are often exposed to additional, gender-specific, barriers—due to gender roles and power relations—that consistently render them more vulnerable. These barriers prevent them from utilizing their specific skills and knowledge to improve adaptation outcomes for their households and the broader community.

**Increasing women's and girls' access to and control of various kinds of assets improves resilience at both the household and community levels.** At the household level, it allows women and girls to:

- Diversify their livelihood opportunities and their strategies for coping with disturbances; and
- Participate in and influence household and community decision-making.

When women and girls have increased influence over **household decision-making** (and they are able to utilize more diverse livelihood opportunities and strategies for coping), the ability of the entire household to absorb, adapt, and transform in the face of shocks and stresses is increased.

At the community level, increased access to and control of various assets allows women and girls to:

- Have the resources, assets, and skills necessary to actively participate in **community-level processes**.
- Be more empowered to utilize both tangible and intangible assets to engage in community-level processes.

When women and girls are better engaged and have the resources, assets, and skills necessary to influence **community processes**, then critical processes for **community collective action are possible**, especially those that are needed to respond to shocks and stresses. These can include disaster risk recovery, natural resource management, conflict management, and social protection. When these processes are more inclusive, community collective action will be more sustainable, and ultimately, more effective in the long-term.



India — Colin Spurway/Mercy Corps 0603

Source: Mercy Corps, "Building Resilience in the Sahel: Why Gender Matters"

multiple scales of thinking and systems that people depend on. A resilience lens provides a systemic run-through of all the relevant factors that make people vulnerable. In that way, using a resilience lens can make DRR practitioners even more effective.

## II.5 Disaster Risk Reduction at Mercy Corps

What principles guide Mercy Corps DRR strategy? The following summarizes DRR thinking at Mercy Corps.

Mercy Corps focuses efforts to reduce disaster risks on three levels – at local communities, at national and international DRR policy, and at programming within our own agency.

### A. *Strengthening communities*

We incorporate DRR in our work to help communities become more resilient to hazards and less likely to have their progress undermined by a disaster. This includes analyzing the impact of climate change and minimizing its compounding effects on current hazards through appropriate adaptation strategies.

- **We engage communities and local partners to increase their own resilience:** Meaningful and inclusive participation in DRR assessments, planning and decision making at the household, community, and local government levels is crucial to empower communities to ‘own’ their solutions and to identify and protect their most vulnerable members (e.g., children, people with disabilities).
- **We use a multi-hazard approach (including considering climate change):** Communities reduce more risk and benefit most by preparing for several hazards they are likely to face (rather than just one). Often preparations are similar for different hazards. Before DRR programs are implemented, the community assesses its situation by completing a hazard, vulnerability, and capacity assessment (HVCA), which includes risk analysis and planning.
- **We aim to strengthen local DRR capacities:** Local needs and priorities are the starting point for strengthening communities and their institutions. We strive to increase community capacity to lead risk

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### Intervening at All Scales – Sometimes the solution lies somewhere else

In both Nepal and Indonesia, multiple Mercy Corps projects have helped to link disaster prone communities and sub-districts to national DRR frameworks through practical planning and action. This includes strengthening action committees and disaster preparedness teams; conducting vulnerability and capacity assessments, formulating action plans that reflect expert-vetted community and sub-district priorities; linking to central and sub-national government master planning budgets and DRR policies; and capital investments for disaster mitigation. Our practical approach ensures that communities not only have plans to cope with the next disaster, but have made critical investments and built relationships instrumental to their success, while influencing the disaster policies and practices that impact their long term resilience.

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Source: Mercy Corps, “Resilience Hubs: action and evidence,” no date.



assessments (e.g., local hazard mapping, HVCAs), local action planning, preparedness activities (e.g., community-wide disaster drills), and to develop budgets and proposals.

### ***B. We advocate DRR-supportive policies and funding to multilateral and bilateral donors***

Change at the community level will not be sustainable without supporting adjustments at the national and international levels. The Hyogo Framework for Action is the international platform for DRR and we organize our work to achieve the HFA's 5 priorities.

### ***C. We advance our DRR agenda by integrating a DRR perspective into existing programs***

Our goal is to integrate DRR in all our programming, but especially in areas with a high hazard risk.

- We respond to natural hazards and complex emergencies by 'building back better' and adapting to climate change risks to create more resilient communities. In programs after the earthquake in Haiti, participants cleaned rubble and drainage canals to prevent flooding during hurricanes.
- In countries experiencing economic transition, we aim to build economic resilience by protecting livelihoods and diversifying the economy. In Georgia, our work developing the meat and dairy market includes emergency plans for flooding and forest fires.
- In conflict-afflicted countries, we use DRR to bring groups together and we try to ensure that natural hazards do not intensify differences. In Ethiopia, farmers are more resistant to drought *and* conflict through veterinary care and access to weather-related information.<sup>12</sup>

## **II.6 Tools for doing DRR assessments**

The basic tools used by DRR practitioners are designed to figure out what vulnerabilities and capacities are. When you are able to figure these out, then you can see more easily how to reduce disaster risks. Doing a DRR assessment with a resilience lens calls on you to do these analyses not just at the community level, but at every level where there may be an impact on the communities with which you are working. The resilience lens also helps you see which organizations you need to partner with, since no organization can be good at working in every sector and at every level.

Most of the analysis tools available are based on Participatory Rural Appraisal, a basic technique developed in the 1980s. Practitioners have added much to this basic foundation over the years, especially in bringing in government and NGO partners, using secondary data from sources outside the community, and expanding the analysis far beyond the boundaries of any community. The most common name for these improved toolsets is Participatory Disaster Risk Assessment (PDRA). You will also see similar tools referred to as Vulnerability and Capacity Analysis (VCA) (which are most often used for considering climate-induced hazards). Different organizations use these terms differently – the point is that these types of tools all support a process of engaging community members to collectively identify their capacities and vulnerabilities and what they need to increase their resilience.

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<sup>12</sup> Mercy Corps, "Disaster Risk Reduction: Investing in DRR saves lives, empowers communities, and protects development," no date

## II.6.1 Oxfam's Participatory Capacity And Vulnerability Analysis

In facilitating community discussion about risk reduction you will need to adapt existing tools to the local context. One example to start from is **Oxfam's Participatory Capacity And Vulnerability Analysis**.<sup>13</sup> It outlines a multi-stakeholder risk analysis and planning process designed to help staff and partner organizations engage with communities in contexts where natural disasters are significant drivers of poverty and suffering. You can use it to design a new DRR program or advocacy campaign, or to integrate DRR into an existing program.

The Oxfam guide walks you through the following steps.

**1. Making preparations** – Define where you will be working, who will be part of the assessment, and the logistics and timing of the assessment.

**2. Collecting secondary data** – Collect existing information from government and private documents, studies, and plans about the community or issue you are working on. This secondary data will both inform you about key issues before consulting with the community and provide perspectives that may not be available to community members themselves. It will also suggest what stakeholders there are other than community members themselves – businesses active in the area, other NGOs, government departments. These initial contacts may pay off later in choosing partners to work with to leverage your own skills and resources.

The actual data you need will of course depend on what you are trying to do. The Oxfam guide gives some hints as to how to narrow down what you are looking for.

**3. Beginning work with the community** – This is the step where you begin to engage with community members themselves. Its main purpose is to generate a shared understanding of the community's demographic composition, social and political structures, livelihoods, and resources. The Oxfam guide presents key questions about who lives there, how gender relations are set up, how people make a living, what the important institutions in the area are, etc. It provides guidance on who to encourage to participate in community meetings and focus groups, and how to facilitate those meetings and groups.

**4. Analyzing hazards, the impact of climate change, vulnerabilities, and capacities** – Enable the community members themselves to analyze their vulnerabilities and capacities when it comes to natural hazards, weather and the impact of climate change. This step includes a series of exercises that produce a hazard, capacity and vulnerability matrix – a visual representation of the community's views about what makes them vulnerable, and how they analyze disaster risk.

**5. Prioritizing risk** – The guide shows some simple techniques for helping the community to see which risks are the most probable and which risks would have the most impact. It is important to bring in secondary data at this point, since sometimes local perception leaves out certain risks, either because they are only evident from outside the community (such as climate change, or regional or national development or economic plans) or because they have not occurred in many years (such as earthquakes or tsunamis).

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<sup>13</sup> Turnbull, Marlise and Edward Turvill, *Participatory Capacity And Vulnerability Analysis: A Practitioner's Guide*, Oxfam GB, June 2012.

**6. Developing a risk reduction action plan**—Using the results of the previous stages, the community again comes together to decide what to do about the risks and vulnerabilities that the process has highlighted. By looking at effectiveness and sustainability, the community develops a plan.

**7. Putting the action plan into practice**—Since the actual planning process is completed with the creation of an action plan, the Oxfam guide does not provide step-by-step instructions for how to implement the action plan. However, the guide does suggest the creation of local committees to oversee action plan implementation, and the creation of an “accompaniment team” to assist community members as they put the plan into action.

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## Good Practices Overview

The Water-Related Disaster Risk Reduction Initiative (DRRI-Water) was composed of six diverse Disaster Risk Reduction projects on three continents. From these projects, the Initiative consolidated program insights into four good practices in engaging communities, forging stronger community and government linkages and enhancing the sustainability of water-related DRR initiatives. The project report provides examples of these good practices in action for the benefit of NGOs, companies, government entities and communities seeking to deepen their practical understanding of key principles in DRR.

- Ensuring diverse representation (e.g. gender, age, ethnicity, caste) in community working groups leads to better understanding of the challenges, better solutions and increased buy-in from the participating community.
- Identifying and engaging with key stakeholders (e.g. community thought leaders, religious leaders) early in the process and understanding their motivation to participate sets the stage for successful project implementation.
- A “quick win” at the outset of a program helps build trust and increase engagement throughout the project.
- When programs call for increased training and access to technology, the ongoing supporting infrastructure must also be developed.

These practical field-based insights support the growing body of knowledge among Disaster Risk Reduction practitioners around addressing DRR and Climate Change Adaptation challenges in an integrated manner, which results in programs that are more sustainable, more efficient, have more impact and are more coherent for program participants.

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Source: Mercy Corps, “Strengthening Government and Community Linkages to Save and Improve Lives: Good Practices in Action: Water-Related Disaster Risk Reduction Initiative (DRRI-Water),” from the Water-Related Disaster Risk Reduction Initiative (DRRI-Water) partnership between Mercy Corps and Xylem Watermark.

## II.6.2 Bringing in Other Scales – Managing Risk through Economic Development (M-RED)

Like many tools in this field, the Oxfam guide focuses on local community planning. In most cases, though, it is important to incorporate outside perspectives and partners into the planning process, since many local problems have solutions located outside the community. Many practitioners have added to the basic PDRA techniques to take into account important factors, influences, and opportunities beyond the community level. Mercy Corps staff developed one such approach, building on basic community consultation and analysis processes, for the **Managing Risk through Economic Development (M-RED)** program in Nepal and Timor Leste.

For the M-RED assessment, staff conducted a Vulnerability and Capacity Assessment (VCA) at the beginning of the program. A VCA is a systematic assessment of the exposure and sensitivity of people and their natural and physical infrastructure to existing hazards, taking into account the variability and potential future changes in those hazards, and the capacity to adapt. As part of the M-RED VCA, staff followed a Participatory Disaster Risk Assessment to generate community level information. The program then added in other assessments to address additional scales and stakeholders: a market analysis was conducted at a local scale and studies of climate, governance, policy, and key actors were analyzed across scales ranging from country level down to regional and local community levels.

The assessment process was organized as follows.

**1. Design Workshop** – Staff organized a one week workshop to develop:

- a. A detailed process map of the assessment outlining key steps, stakeholders and tools and how the information gathered/produced would be analyzed;
- b. A draft set of tools to support the VCA roll-out; and
- c. An initial work plan for the roll-out of the VCA.

**2. Tool Adaptation and Design** – To gather the necessary data, staff adapted the PDRA tool described in Section II.6.1, and created tools for a Market Environment Scan, Climate Change Study, and Environment Study with help from the Mercy Corps Technical Support Unit.

**3. Data Collection & Analysis Methodology** – Staff and partners then conducted the various analyses with the proposed communities. For climate data, they used community observations, supplemented in Nepal by existing government data. For market analyses, they interviewed key informants and then observed markets. The actual tools themselves, and guidance on their use, is available from the Mercy Corps Technical Support Unit.

**4. Consultations** – Following the data collection and analysis, staff invited government staff to advise on technical solutions within communities. Staff then conducted a series of workshops in communities and at district level with representatives from community level Disaster Management Committees, local government and private sector to present the findings from the PDRAs, market environment scans, climate analysis and technical site visits. The goal of the workshops was to obtain agreement on the most appropriate M-RED areas of focus. These workshops were critical for engaging stakeholders at multiple levels, and for ensuring sound technical design for the program.

By combining sectors and scales in this assessment process, Mercy Corps staff were able to develop a program that had buy-in not just from community members but also from other stakeholders who were important to program success. By bringing in outside expertise to the design process, the program also increased the likelihood that the proposed technical solutions would be sound and appropriate.<sup>14</sup>

A list of useful tools for doing assessments and evaluations can be found in the Appendix on Resources.

## II.7 Guidelines for Reducing Disaster Risk

1. **Integration**—While we often talk about DRR programs as focusing only on disaster, ideally every program will have a DRR component in it. Any development program can be undermined by disasters, and by building risk reduction into development programs, we increase the chances that people will weather those disasters and actually benefit from the development gains generated. Social protection programs can also be DRR programs, by allowing vulnerable people to get through difficult periods with some assets intact.
2. **Build Community Capacity at Multiple Scales**—The traditional strength of NGOs like Mercy Corps is our ability to work closely with communities and build their capacity to solve their own problems. DRR work, especially when done with a resilience lens, requires us to also move beyond the local community and work on its links with wider social and environmental systems. This does not mean we abandon our original strength. Instead, it means continuing to build local capacity, while adding in capacity building to make these wider connections. We need to link our communities up with outside partners, private and public. We need to help them see how their local problems sometimes require solutions far away, and provide them with the skills and connections they need to solve those problems. Sometimes this means slight adjustments to local solutions. Other times it requires new forms of community organization and connecting to wider advocacy efforts.
3. **Partnership**—Our increasing understanding of resilience shows that one of the most critical factors in surviving and thriving in the face of shocks and stresses is how well a community is connected. Local connections—neighbors to neighbors, NGOs to NGOs, businesses to communities and suppliers, government to communities, etc.—are vital, as DRR practitioners have long known. But building resilience to disasters and climate change also requires creating connections with formal and informal organizations elsewhere as well. No community, or NGO, has all the skills needed to solve all the issues that make a community vulnerable. In many cases a bit of looking around and networking will show a wealth of partners who have those skills we lack—advocacy skills and connections, economic understanding of the root causes of problems, technical abilities in bioengineering, agriculture, water management, commercial connections, etc. Communities and NGOs do not have to develop all these skills themselves if there are others who are already good at them. We need to develop our ability and that of our communities to network and to work in coalition with others.
4. **Scales, Shared Learning, and the Root Causes of Problems**—Sometimes the best programs don't achieve their goals because they are undermined by something far away. Changes in government policy undermine our agricultural cooperatives, our flood control program is rendered less useful when dam

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<sup>14</sup> Mercy Corps, "Case 1: Managing Risks Through Economic Development (M-RED) Vulnerability and Capacity Assessment (VCA)," no date.

managers change their practices, exchange rate shifts undermine our small loan program, etc. Reducing risk and building resilience require us to build broader perspectives and relationships into our programs from the start. We can consult with people with widely varying perspectives and skills, locally and far away, and we can bring them together into a shared learning process. Climate scientists, economists, business leaders, and advocacy specialists can sit down with community members and local NGOs and teach one another what they know and what their values are. The result is not only a more resilient program, but also stronger relationships that pay off in the future when problems shift and new solutions are needed. Building learning opportunities into our programs increases the chances that we will survive and thrive; the ability to learn from previous experience makes us more resilient.

5. **Multi-Hazard Perspective**—Previous disasters guide us to reducing risk for future disasters. Yet it is natural for people to “fight that last war,” that is, to prepare for the disaster we’ve had most recently, forgetting that there are other hazards that threaten us. Applying a resilience perspective broadens that focus, increasing the chances that we will weather the storm when the next disaster is not the one we anticipated. Recalling the resilience characteristics—when we are flexible, have multiple connections in our community and outside it, have redundant sets of staff and infrastructure, etc.—we increase our chances of surviving the unforeseen and bouncing back quickly. This perspective is not a universal solution—when we build resilience, we are building resilience *to* something—but building these characteristics into our programs can help us hedge our bets.



Indonesia — Marisa Elliott/Mercy Corps 0412

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## Systems Thinking and the Importance of Looking at Multiple Scales

Mercy Corps Indonesia implemented a program to bring clean, fresh water to the urban poor of Jakarta. The program was a success, with an innovative water delivery system implemented in the city. However all of those gains were lost when rainwater originating in the mountains moved through the city flooding the slums, the very place where MC was working. Good development that took months of work and good money to implement was destroyed.

Why did this happen?

- Mountain areas outside of the city have been increasingly deforested to make way for villas and other building developments.
- City towns have expanded on cleared agricultural land.
- Green spaces have all but disappeared as Jakarta has joined with neighboring municipal areas
- An increasingly dense population is producing increased amounts of solid waste which, because of insufficient waste collection and meaningful protection of flood canals, is collecting in and blocking flood canals.

What was the result?

- Rain, coming in regular storms in the mountains, runs down the now deforested slopes and over urban and peri-urban development where formerly it would have been absorbed.
- The water enters the city, fills and then overflows the clogged canals, and floods the communities Mercy Corps was seeking to help.
- The vulnerable, therefore, bear the brunt of deforestation, disorganized urban sprawl, and poorly maintained infrastructure and social services.

What can we learn from this?

This sort of understanding, of how change at various scales can impact the places we are working, is exactly what we mean when we talk about systems thinking. A systems approach, applied at multiple scales, allows us to see these changes, track them, and intervene as necessary.

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Source: Eliot Levine, "Resilience 101: Resilience at Mercy Corps," Power Point presentation.



## III. Climate Change Adaptation

### III.1 Review of key concepts

#### III.1.1 What is climate change?

Climate change refers to long-term changes to average weather conditions or to patterns of weather events. The climate is the weather you expect—monsoon rains starting in a particular month, colder weather in winter, typical dry periods. Weather is what you get—the actual rain or sun, heat or cold. Weather includes typhoons and tornadoes, thunderstorms, or droughts. Weather also includes a cold day during the hot season, or a rainstorm during the dry season. The difference between weather and climate is defined by their timescale. Weather happens over a period of anywhere from minutes to months, while climate is the pattern of weather conditions over a longer period.

Climate varies naturally. Large changes in climate hundreds or thousands of years ago have had large impacts on human habitation, making parts of the world more habitable, or less. There are stories on almost every continent of ancient civilizations that no longer exist because the climate changed in ways that made their way of life unsustainable. Climate also varies on smaller scales, from a year or two to decades. Climate variability can cause typically rainy seasons to be much drier or occur earlier or later, or make a cooler season much warmer than in previous years. It can also cause incidents of extreme weather to increase, making floods and droughts more likely. Natural climate variation has always occurred, yet the pace of change of the climate right now is much faster than most previous periods. As a result, people have much less time to adapt than we have had historically. This is going to be an increasing challenge in the future, and will be layered on top of current challenges. This is particularly problematic given that, in many places around the world, communities, technologically advanced or not, are currently struggling to cope.



To clearly identify long-term changes in climate, you need to look at a period of thirty years or more of data. When we look at the climate of today, it's different from the climate of 30, 50, and 100 years ago. The current period of change is being driven primarily by human activity. The two most influential factors are the production and release of greenhouse gases (GHGs) like carbon dioxide (CO<sub>2</sub>) into the atmosphere (think car exhaust), and the destruction of the earth's natural ability to store CO<sub>2</sub> through activities like wide spread deforestation. The result of these changes is a gradual increase in global temperature. However, the impact of that gradual global warming on local weather is likely to be far more problematic than it sounds at first. Current climate change has already and will continue to result in:

- **Increased temperatures**—temperatures are increasing globally. Temperatures on land, particularly in inland locations, are likely to increase more than temperatures over the oceans or near coasts. Cold season and nighttime temperatures may increase more than warm season and daytime temperatures;
- **Rising sea levels**—sea levels are rising in response to increased temperatures. Higher temperatures cause the oceans to expand as they warm, and higher temperatures melt land-based ice, increasing the amount of water in the oceans. Sea level is likely to rise by about 30 centimeters by 2050 and about one meter by 2100;
- **Changes in precipitation timing, quantity and intensity**—in general, dry regions and dry times of the year are likely to get drier, and wet regions and wet times of the year are likely to get wetter. When rain falls, it is likely to fall as more intense rainstorms;
- **Increased melting of snow and ice**—in areas that experience freezing, precipitation will fall increasingly as rain rather than snow, snowpack will melt earlier, and glaciers will melt faster and at increasingly higher elevations; and,
- **Weather will become more variable**—climate hazards (typhoons, flooding events, extended droughts, and heat waves) are likely to occur more often and may be more intense than past events. Some people summarize this increased variability and intensity by talking about “climate weirding”—increasingly, individual places are likely to see climate events they've never seen before and may not even have thought could happen.

In particular, the increase in climate variability is likely to be one of the most problematic effects of climate change as it stretches the limits of historically effective and productive strategies for dealing with change.

### III.1.2 What are climate change adaptation and mitigation?

Climate Change Adaptation (CCA) refers to actions to reduce vulnerability to actual or expected changes in climate. Adapting to climate change and climate variability is essential for communities to continue to prosper and develop. This is especially true in developing countries where basic infrastructure and safety nets, which help buffer households and communities from impacts of climate change, are often not available. In many cases, climate change will cause existing challenges to intensify. For example, communities living in arid lands are likely to experience even drier conditions, see traditional rainy seasons shorten, and experience increases in temperature, ultimately increasing evapotranspiration.

Climate change mitigation refers to actions to eliminate or reduce concentration of greenhouse gases in the atmosphere in order to slow the pace of climate change. These efforts can include new technologies and

renewable energies, making older equipment more energy efficient, afforestation, the protection of existing forests, and sustainable land management practices.

Many people immediately jump to climate change mitigation when they think of developing a climate change plan or plan to address climate change. Though climate change mitigation is critical, it is not the same as Climate Change Adaptation. Due to past emissions, we are locked into a significant degree of climate change. Even if global emissions stopped today, adaptation would still be necessary to counter continuing changes in the climate. Climate Change Adaptation thus accepts that there are changes that are inevitable (although to what degree may not be clear) and that we must act using the best available information to adapt to current and potential changes.

## III.2 Climate Information

It is the use of climate information in decision-making, qualitative and quantitative, that defines CCA. Simply put, if climate information of some type is not utilized when making a decision, designing a program, or deciding on an individual activity then it's not CCA. There are three primary means through which climate information can be accessed.

1. The first is to look at **historic observations** and identify any patterns or trends, such as rising temperatures, decreasing annual rainfall, or increasing variability.
2. Second, we can **ask those living in the area** and experiencing the climate how things have changed over time. Particularly in areas that do not have good weather data, this method has significant value.
3. Lastly, there are **climate change models** that can provide projections of how future climates may behave. This method is the only one that considers the future, and is the most uncertain since the future hasn't happened.

Because of the uncertainty and complexity inherent in climate models and their output, we don't recommend starting from climate model results. Instead, start by reviewing what has happened in the past, what your community notices is changing, and where your community is already impacted by climate events.

### III.2.1 Historic Climate Observations, Patterns and Trends

The strongest place to start when thinking about climate, climate change, and climate adaptation is to look at historic climate information for your area of interest. However, for much of the world, available climate data is limited. In looking for climate data, you may have to rely on information from the nearest town of significant size rather than information directly from your location. In some places, climate data may be considered nationally sensitive information and be very difficult to locate at all. In finding and using historic climate information, it is important to be flexible in your expectations and adapt your analysis to what you can find to work with.

Ideally, your local climate information will include daily maximum, minimum and average temperature, average daily humidity, total daily rainfall and perhaps even peak daily wind speed data going back 10 or more years. Even more ideally, this information will be at a location near or within the community you are working with. If your location is significantly different from your data location—one is on a large body of water and the other

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## Indonesia: Addressing the Challenges of Climate Change and Urbanization

In Semarang – a bustling port city on the Java Sea – the impacts of climate change are a day-to-day reality. Flooding, landslides and unpredictable seasons threaten the city’s economy, coastal lands, public health and groundwater.

One of the first cities to join the Asian Cities Climate Change Resilience Network (ACCCRN), the Semarang government formed a City Team – made up of stakeholders in and outside of government – to better understand, prepare for and respond to the challenges of climate change and urbanization. Mercy Corps has facilitated and supported the Team’s participation in more than 60 learning dialogues, trainings and conferences.

The city is also:

- Improving coastal ecosystems and fishermen’s livelihoods in partnership with a local youth group and government agencies. The project is restoring mangrove forests, reviving fishponds and educating residents on climate change and alternative livelihoods, such as ecotourism.
- Strengthening the health sector to reduce incidences of dengue fever. The Ministry of Health and University of Indonesia are conducting the country’s first ever assessment to investigate the ties between dengue fever and climate change. Community health workers are documenting disease and promoting behavior change to reduce the spread of disease.
- Improving preparedness and response to floods in the city’s most vulnerable neighborhoods. Local groups are developing flood information systems, early warning systems and evacuation strategies, as well as identifying temporary shelters.
- Sharing its knowledge with other cities. The Semarang City Team is building local, national and international networks to share their knowledge and experience as a member of ACCCRN.

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Source: Mercy Corps, “Resilience Hubs: action and evidence,” no date.

isn't, they are in very different ecosystems, they are at very different elevations—the data will only give you a very broad picture of climate that you will have to supplement by talking with local people. If there are local climate specialists, they should be able to help you understand how the available climate data is or is not relevant for your area.

Using this data you will want to understand:

- How variable are temperatures and rainfall in this location? Are day-to-day changes small or large? How about season-to-season? What's the difference between daily maximum and minimum temperatures? This can give you a sense of how large past variability has been and how much flexibility local people are likely to have in adapting to existing weather variability.
- What are the seasonal patterns and how do they differ from year to year? Is there an extended dry season? Is it hot during that season, or cold? Is there a monsoon? Does it show up every year? This will help you get oriented, understand what types of weather events might constitute problems for people, and understand when problem weather events might occur.
- What are the extreme weather events that cause problems for people? When it's really hot, is humidity low or high? High temperatures coupled with high humidity are much harder on human health. When it's dry, how long is the stretch between rain events? When it's wet, how much rain can fall in a day? This can help you think about droughts and floods. Your goal in looking at extreme events is to understand what happens to make weather a problem and how often that has happened in the past.

You can learn a lot about an area just by working with historical weather data. Take the time to really explore whatever data is available. Look both at averages and the extremes, but keep in mind that any data set will have errors!

As you review the data, ask about unusual events—particularly high or low temperatures, periods of extended high temperature and humidity, big rain or wind events, extended dry periods. These are things you will want to discuss with the community you are working with. Did these events happen in their community? If so, were they a problem?

### **III.2.2 Community Perception**

Once you have reviewed available climate data ask those living in the area about their climate, about memorable climate events (floods, droughts, wind events, hot or cold events), and about how climate or weather has changed over time. Particularly in areas that do not have good weather data, this method has significant value. However, even in areas with good data, this type of discussion is necessary for understanding what it is about climate that becomes a problem for people. Only when climate is a problem do you need to think about how to adapt to it.

What makes climate a problem differs from location to location. In many parts of Vietnam, flooding is inconvenient but not considered a “problem” until it's a meter or more in depth. In contrast, in most of the developed world, a centimeter of water in a living space or business would be considered unacceptable. In France, thousands of people died in a heat wave in 2003 when maximum temperatures rose to between 36 and 39 degrees C for more than five days, even though humidity (which exacerbates the impact of high temperatures) remained relatively low. In contrast, in Gorakhpur, India in May daytime high temperatures

generally reach 39 degrees C with a recorded high of 49 degrees C, with relatively high humidity. Clearly, what constitutes problem high temperatures in Paris is different from what constitutes problem high temperatures in northeastern India. This is true everywhere.

Consequently, it is very important to discuss with your community when weather has historically been a problem for them. They may not be able to tell you “when temperatures are above 42 C” or “when it rains more than 2 inches in an hour” or “when the monsoons rains are 2 weeks late or more.” However, if you note the times when they say weather has been a problem and what sort of problem resulted, you can then go back to your climate data and quantify what type of measureable weather statistics are associated with those problem periods. Once you know these weather thresholds, you can begin to explore how these thresholds might change in the future, and what types of impacts those changes could have on your community.

Be cautious about community perspectives as well. People do not always remember weather events accurately, and tend to emphasize recent events more. Combining local knowledge with outside data is your best bet for getting an accurate picture.

### III.2.3 Climate Models

Climate model results should be the last component of your climate information collection effort. Climate model results are only useful once you understand current and past conditions and understand how current and past climate and weather have or haven't been a problem for your community. While you may not need to investigate climate projections in depth, it is helpful to know what they are and how they work. For most development programs, it is sufficient to know the general trends that are expected.

Climate model data is useful because, as noted above, it can provide a lot of information and guidance regarding possible future conditions that we need to prepare for. However, climate models can't tell us for certain what the future will look like. As a result, we refer to climate model output as “projections”—indications of what the future **might** look like. Climate model results are **not** “predictions”—indications of what we **expect** the future to look like. This is a very important difference and is why climate model information shouldn't be where you start when you think about Climate Change Adaptation.

Earth's climate is complex and built of a combination of different climate systems, such as global air currents, movement of water and water vapor, and ocean currents. Climate models are computer-based simulations of how these various systems interact. Models that represent these various systems and how they interact are called General Circulation Models (GCMs).

There are about 30 GCMs in use by the Intergovernmental Panel on Climate Change (IPCC<sup>15</sup>). Different modeling groups in a variety of countries have developed their own models and each model represents physical processes slightly differently. The goal of the models is both to accurately represent past climate, which shows the model is realistic, and to allow us to experiment with how different future conditions might affect future climate.

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15 The Intergovernmental Panel on Climate Change (IPCC) is the leading international body for the assessment of climate change. It was established by the [United Nations Environment Programme \(UNEP\)](#) and the [World Meteorological Organization \(WMO\)](#) in 1988 to provide the world with a clear scientific view on the current state of knowledge in climate change and its potential environmental and socio-economic impacts. In the same year, the UN General Assembly [endorsed the action by WMO and UNEP in jointly establishing the IPCC](#).

There are significant differences in the results produced by the GCMs. These differences arise from several sources of uncertainty:

1. There are differences in how different GCMs are built. All models take physical processes and represent them with mathematical equations. The equation you use, or even whether you choose to include or omit a certain process, influences your model results. For example, how cloud formation is represented in the models can make a big difference in the model output (such as how much change in precipitation can be expected), and currently there is no one agreed upon way to model clouds.
2. GCMs divide the earth up into large blocks and make calculations for each block assuming average conditions for that block. Different models divide up the world in different ways, and so they get different results. Differences between GCMs will be biggest for coastal and mountainous areas where climate conditions change significantly over short distances.
3. To run the models, we need to describe future land use, population, energy use and consumption and how this affects greenhouse gas concentrations in the atmosphere. These descriptions are called scenarios—different scenarios will include no change, high emissions, low emissions, etc. However, we don't know what will happen in the future, so whatever we use to run the models is an assumption. Different sets of assumptions generate very different results.

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### What to consider when looking at historic climate information

- Be flexible in your expectations and be ready to adapt your analysis to the data you find.
- Quality is more important than quantity or proximity. Data from one well-maintained, quality-controlled site such as an airport or station that reports internationally may be far more useful than data from, for example, the local town where data collection may be haphazard, where instruments may be poorly maintained, and where data quality may not be reviewed.
- Use the perspectives and input of local residents to interpret and understand the data you have.
- Try to find data that includes daily maximum, minimum and average temperature, average daily humidity, total daily rainfall, and peak daily wind speed. But don't worry if you can't find all of this.
- In analyzing the data, look at things like: how variable are temperatures and rainfall in this location, what are the seasonal patterns and how do they differ from year to year and what are the extreme weather events that cause problems for people?
- If you have more than 10 years of data, look at trends in things like daily or seasonal rainfall totals, in daily maximum and daily minimum temperatures, in the timing of the onset of monsoon rains (i.e. how are problem weather events changing?) If you have less than 10 years data, skip this step. Your data set is too short to give accurate information about trends.
- REMEMBER – all data sets have errors! Recorded weather data is very useful in understanding the past, but it is only one piece of the picture. It's greatest value is in combination with the perspectives and input of local residents.

This doesn't mean climate models are not useful! *The uncertainty is not whether climate will change, but how fast and how much it will change.* Unfortunately, modelers can't answer that question precisely. However, they can provide ranges of possible future conditions that can be used to inform planning.

On a large scale, climate models can help highlight key geographic risk areas, and key climate risks, that could affect populations. If we can state with some confidence that rainy periods will be shorter and more intense across the Horn of Africa, then we can begin to plan accordingly – this is the value of climate models. When making investment decisions, climate models can offer some high-level guidance on the likely infrastructure/technology requirements and therefore potentially offer future payback on initial capital investment. Ultimately, these models mean that while we may still be guessing about the future, we're doing so with the best scientific research available.

Ideally, the best climate projections come from working with a climate modeler who can help you obtain meaningful model output for your area and who can help you interpret model output and what it means for the community you are working with. However, this is often not an option, so you may need to fall back on more general information. Most off-the-shelf model data, used without significant interpretation, is of dubious value to CCA planning. In this case, you may be better off just using the basic description of likely future climate change impacts presented at the beginning of this section:

- Temperatures will increase, particularly in inland locations. Cold season and nighttime temperatures may increase more than warm season and daytime temperatures;
- Sea levels will rise, likely by about 30 centimeters by 2050 and about one meter by 2100;
- Precipitation timing and intensity will change. Dry regions and dry times of the year are likely to get drier, and wet regions and wet times of the year are likely to get wetter. When rain falls, it is likely to fall as more intense rainstorms;
- In areas that experience freezing, precipitation will fall increasingly as rain rather than snow, snowpack will melt earlier, and glaciers will melt faster and at increasingly higher elevations; and,
- Weather will become more variable, and climate hazards (typhoons, flooding events, extended droughts, and heat waves) are likely to occur more often and may be more intense than past events.

Though this may seem like an oversimplification, when coupled with a strong understanding of past climate and when past weather events have posed a problem, this is enough to start moving forward with a CCA initiative. There are more specific projections for most countries which are often available to the public. The national meteorological service is often a good place to start. Agricultural departments, government offices dealing with storms, floods and early-warning, or international NGOs with experience in this area may also be able to help find more specific information.

The most important thing to remember is that climate models should accompany planning and development, rather than be the basis for it. We should certainly not disregard them simply because they manifest uncertainties – we use uncertain economic and population projections all the time. However, we should also refrain from taking climate projections as precise predictions of what will happen. Rather, we should consider

these tools to help us to conceptualize various climate futures, consider which projected future may be most likely, and adapt development to protect populations from potential climate risks.

### III.2.4 Guidance on using climate information

Here are some guidelines for the use of climate information in adaptation development planning:

1. **Past to present.** Begin with a solid understanding of past and present climate, based on historical data. Complement this with community perception; this will give insight not only to potential risks, but also to the vulnerabilities that are present or likely to develop and existing coping mechanisms and capacities. Combining these sources of information can help develop climate “stories” that provide the foundation for considering the future.
2. **Climate thresholds.** A solid understanding of where weather is already a problem will dramatically aid in interpreting the potential impacts of future climate change. Collect community input around times weather has been a problem for them and then go back to historical weather records to determine the specific conditions that led to those problems and how frequently those conditions have occurred in the past. Armed with this information, you can now look much more critically at climate projections and more accurately visualize the impacts of potential future changes.
3. **More is better.** Future climate data is, and always will be, uncertain. If at all possible, use data from multiple climate models to establish a range of possible future conditions, and consider various future scenarios to understand best/worst case outcomes. Increasingly this is how future climate projections are being presented. However, if the climate projections you are given are just a single set of numbers representing average change, understand that planning for these specific numbers is dangerous. These numbers are just the center-point of a potentially VERY large range in conditions. This is particularly true for precipitation projections.
4. **Direction, not specific data points.** Concentrate on the trends shown by historic data and model projections. Given the complexity and variability in both past and potential future climate, avoid focusing too much on a particular data point, and focus more on the direction, intensity, and rate of change.
5. **Development first.** Climate-related challenges are a real threat. However, so are many other existing and future issues such as conflict, poor governance, and inadequate infrastructure. Some of the biggest challenges will come from climate-related stresses further exacerbating other non-climate issues. As such, climate change should be factored into existing development goals rather than treated as a separate set of activities. After an assessment of current climate and non-climate challenges, future climate projections can be used, along with other sources of information, to help identify adaptation options. Development can then begin with the acknowledgement of climate change concerns and be prepared for different possible future conditions. The uncertainty of the future requires flexible development options, and adaptation should be monitored so that further adjustments can be made.

## III.3 Tools for Climate Change Adaptation Programming

There are a number of guides available for how to incorporate climate information into program analysis and design. The first and most important thing is to make sure you do it—*incorporate climate information into*



*program analysis and design.* Your goal is to make sure your programs are not undermined by unexpected changes due to climate.

There are many guides available; here we describe three that have proven useful to Mercy Corps programs around the world.

### III.3.1 USAID Climate-Resilient Development<sup>16</sup>

In March 2014 USAID developed a process framework for understanding and addressing climate change. Central to the framework is the understanding that

“Climate-resilient development is about adding consideration of climate impacts and opportunities to development decision-making in order to improve development outcomes, rather than implementing development activities in a completely new way. Climate risks cannot be eliminated, but negative impacts on people and economies can be reduced or managed. Climate-resilient development helps minimize the costs and consequences of climate impacts so they do not hinder progress toward development goals.”

The framework lays out six steps.

**1. Scope**—Identify the development goals of the country, community or sector you are working with, and what the inputs and enabling conditions are needed to reach them. By “inputs” the framework means physical, social, human and economic factors that are necessary to reach development goals. These inputs align with the five types of capital used in the Sustainable Livelihood Framework.<sup>17</sup> “Enabling conditions” are the wider social, economic, and political conditions needed to achieve goals. These conditions can include things like the regulatory environment, market mechanisms, and means of governance.

Then the analysis identifies at a high level what climate or non-climate stressors could undermine efforts to reach those development goals. The reason to include both climate and non-climate stressors is that they often interact in important ways, such as when poor urban governance leads to blocked storm drains, exacerbating flooding that is already intensifying due to increasingly intense rainfall.

**2. Assess**—The high level scoping of step one identifies some possible trouble areas. In the second step, the analysis focuses on possible trouble areas in more depth with a vulnerability assessment. A variety of methods can be used here, including desk studies, consultations and workshops, technical analyses, field visits, and modeling.

**3. Analyze**—Gather stakeholders to figure out what the findings from the assessment mean. This may be done in workshops, using GIS risk mapping, cost benefit analysis, or any other format that makes sense of the assessment information and that generates understanding on the part of stakeholders.

**4. Design**—Having developed a better understanding of which sectors, populations, or areas are most vulnerable to what stressors, this stage lays out the plan to deal with them. There are four steps: 1) identify

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<sup>16</sup> United States Agency for International Development (USAID), “Climate-Resilient Development: A Framework for Understanding and Addressing Climate Change,” March 2014.

<sup>17</sup> Chambers, Robert and Gordon Conway, “Sustainable Rural Livelihoods: Practical concepts for the 21st Century,” IDS Discussion Paper 296, IDS, Brighton, UK, February 1992.

adaptation options, 2) select evaluation criteria, 3) evaluate options, and 4) select a course of action. These steps work best when a wide variety of stakeholders are incorporated into the process. Some of the criteria recommended for choosing among program options are:

- Effectiveness
- Feasibility
- Cost
- Unintended consequences
- Additional benefits
- Implementation timing
- Flexibility
- Robustness

**5. Implement and Manage**—At this stage the program is implemented, follow the practices and principles in use for other existing programs.

**6. Evaluate and Adjust**—As with all programs, this guidance calls for evaluation and adjustment. However, it recognizes that, given the dynamic nature of climate change, it may be challenging to attribute performance successes or problems to program design or the uncertain behavior of the climate.

Along with the USAID Climate-Resilient Framework, there are a number of companion documents that go into more depth on a number of issues raised in the framework. They are:

- Climate Change Vulnerability Assessment: An Annex to the USAID Climate-Resilient Development Framework
- Evaluating Adaptation Options: An Annex to the USAID Climate-Resilient Development Framework
- Climate Change and Water: An Annex to the USAID Climate-Resilient Development Framework
- Climate Change and Coastal Zones: An Annex to the USAID Climate-Resilient Development Framework
- Governing for Resilience: An Annex to the USAID Climate-Resilient Development Framework
- Working with Marginal Populations: An Annex to the USAID Climate-Resilient Development Framework
- Climate Change and Conflict: An Annex to the USAID Climate-Resilient Development Framework

### Flexibility – Green infrastructure

As climate changes, storms become more intense, and sea levels rise, engineers can no longer know how high to build a sea wall to protect a village from the sea; instead, we can plant mangrove forests and restore reefs to protect people on the coast from whatever storm comes. This bioengineering has the benefit of supporting fisheries and providing other sources of income during good times, while protecting us during storms.

Similarly, in India farmers built bamboo walls to protect sloping riverbanks. Trees and shrubs were planted on the banks and nearby land to protect and stabilize the riverbanks, preventing erosion and reducing shallow landslides. The type of vegetation planted was carefully selected to catch debris, reinforce the soil, anchor the surface layer, support the slope, and facilitate drainage. The bamboo structures are strong at the beginning. As their strength gradually decreases, it is replaced by the growing strength of the plants and their root structures.

Source: Mercy Corps, "Disaster Risk Reduction: Investing in DRR saves lives, empowers communities, and protects development," no date.

### **III.3.2 CARE Climate Vulnerability and Capacity Analysis<sup>18</sup>**

One of the original guides to incorporating climate into programming was developed by CARE in 2009. This tool fits into the USAID process framework above in the first four phases, but is particularly useful in the assessment and analysis phase. Recall that in Participatory Disaster Risk Assessment discussed above in the section on DRR, a vulnerability and capacity analysis is important there as well. This tool can serve that purpose, and ensure that climate information is taken into account.

The CARE process is based on an understanding of Community Based Adaptation, which involves four inter-related strategies:

1. Promotion of climate-resilient livelihoods strategies in combination with income diversification and capacity building for planning and improved risk management;
2. Disaster risk reduction strategies to reduce the impact of hazards, particularly on vulnerable households and individuals;
3. Capacity development for local civil society and governmental institutions so that they can provide better support to communities, households and individuals in their adaptation efforts; and
4. Advocacy and social mobilization to address the underlying causes of vulnerability, such as poor governance, lack of control over resources, or limited access to basic services.

Recognizing the importance of an enabling environment for effective community based adaptation, the CARE strategy is not limited to promoting change at the community level. CARE's approach also endeavors to influence policies at regional, national and international levels with community-based experience. This involves evidence-based advocacy as well as constructive engagement in key decision making processes.

Each step in the analysis looks at these four strategies at various levels – national, local government/ community level, and household/individual level. The CARE guide provides Guiding Questions to bring out essential information. It suggests using tools that have become common in Vulnerability and Capacity Analyses and that are derived from Participatory Rural Appraisal tools: hazard mapping, seasonal calendars, historical timeline, vulnerability matrix, Venn diagram of local institutions.

In practice, this type of analysis focuses largely on the community, like many of the PDRA techniques used in DRR. As noted in our discussion of DRR tools, a resilience lens reminds us to consider multiple scales and integrate local perspectives and priorities with those of actors on wider scale to ensure that activities recommended take into account that the solutions to local problems are often found far away.

### **III.3.3 Mercy Corps Climate Change Adaptation Planning<sup>19</sup>: Guidance for Municipal Decision Makers in the Southern Caucasus**

This third planning methodology and guidance was developed for Mercy Corps and CENN as part of the program “Enhancing local capacity and regional cooperation for Climate Change Adaptation and biodiversity

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<sup>18</sup> Angie Dazé, Kaia Ambrose and Charles Ehrhart, “CARE Climate Vulnerability and Capacity Analysis Handbook,” CARE, May 2009, [www.careclimatechange.org](http://www.careclimatechange.org)  
<sup>19</sup> Eliot Levine (Mercy Corps), Giga Sarukhanishvili and Nino Kheladze, “Climate Change Adaptation Planning: Guidance for Municipal Decision Makers in the

conservation in the South Caucasus.” This process differs from the other two above in that it was designed to help development practitioners combine existing climate information with development information to come up with a practical plan.

Step 1: Identify Analysis Units—understand which components of the municipality you want to analyze

Step 2: Identify your current challenges—understand the current socio-economic and ecological challenges facing the municipality

Step 3: Climate Scenarios & Direct Impacts—understand how the climate is changing and what the potential direct impacts might be

Step 4: Combined Impacts—understand how climate change will interact with existing development challenges

Step 5: Identification of Adaptation Actions—develop strategies to address the direct impacts of climate change and combined impacts identified in the earlier steps

Step 6: Cost Benefit Analysis—determine if a potential activity is a worthwhile investment

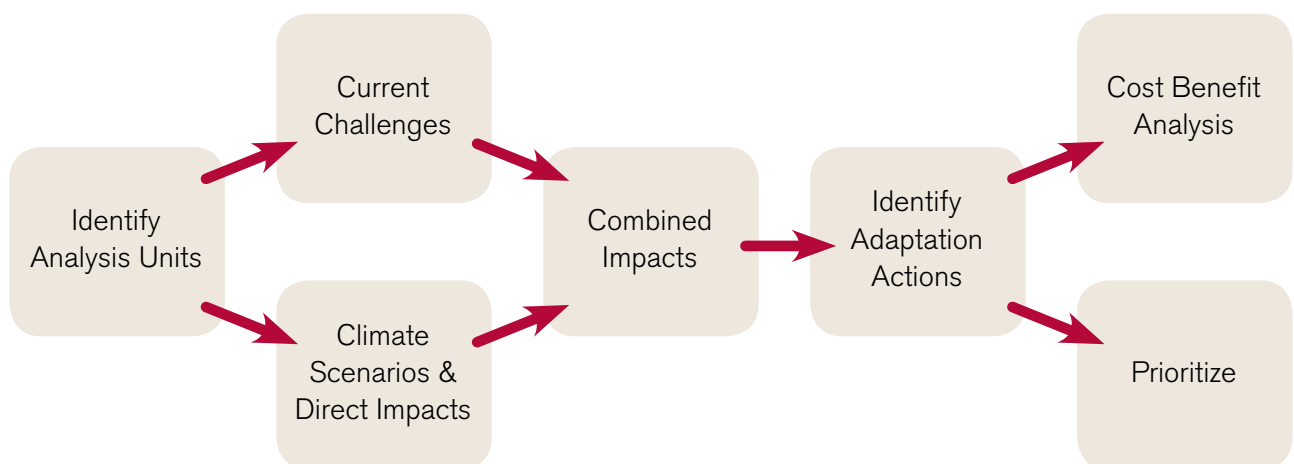
Step 7: Prioritize & Strategize—prioritize which activities you wish to engage in based on the cost benefit analysis, and begin to develop a strategy for implementing them

At each step, the guidance provides the steps and tools needed to complete the tasks. The process is summarized in the graphic below.

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Southern Caucasus,” Caucasus Environmental NGO Network (CENN) and Mercy Corps.

### Climate Change Adaptation Planning



Levine et al.

A list of useful tools for understanding and guiding communities to address Climate Change Adaptation can be found in the Appendix on Resources.

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### Climate-Smart Agriculture

In Eastern Sri Lanka and North Eastern India, Mercy Corps worked with farmer groups to introduce System of Rice Intensification (SRI) and partial-SRI methods that reduced water requirements in the face of increasingly unpredictable rain patterns, and in some cases also linked farmers to micro- insurance solutions.

In two districts of Timor-Leste, Mercy Corps and partners are working with farmers to adopt Sloping Agricultural Land Technology (SALT), and to introduce maize seed varieties that are more tolerant of rainfall variations, to help farmers recoup yields that are falling under traditional cultivation practices.

In Nepal, Mercy Corps helped flood-prone communities to trial new raised water point designs and improved home-plastering techniques to help households protect their health and belongings in the face of more frequent inundation. In some of the same locations, Mercy Corps is trialing sugarcane-based siltation reduction measures that help control yearly siltation in agricultural fields while generating income.

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Source: Mercy Corps, "Strategy Summary: Mercy Corps' Climate Change and Disaster Risk Reductions in South East Asia," no date.



## IV. Integrating Programs at Mercy Corps

How are Mercy Corps programs putting all of this together? The goal at Mercy Corps is to mainstream risk reduction and Climate Change Adaptation into humanitarian and development programming via adaptation programming with partnerships that can build a response of effective scale. To do this, Mercy Corps must work with community members, stakeholders, and private and public sector actors to do the following things:

- **Climate & Disaster Risk information** – Increase the use of risk reduction and climate information decision-making at institutional, household, and community scales through increasing the access and availability of regularly updated climate and non-climate information and increased understanding of vulnerability and capacity profiles.
- **Policy, Governance & Institutions** – Integrate CCA and DRR information and practices into institutional processes and policies across national, regional, district, and local scales through the formation of advocacy and planning networks, building capacity of key personnel, and improving the evidence base of successful approaches.

- **Economic Diversification**—Diversify economic opportunities through strengthening and expanding key environmental and climate-smart livelihoods, including new opportunities generated by strengthening climate-smart market systems, and by strengthening key ecosystem services and resources that support livelihoods.
- **Coping Capacity**—Improve the capacity of communities to cope with destabilizing events (climate and non-climate related) by increasing coverage of risk reduction systems, by enhancing the ability of target populations to understand risks, and by increasing the capacity of target populations to respond to both climate change and variability as well as non-climatic disasters.

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### Colombia: Flood Prevention Through Regional Coordination

Colombia's regional and local disaster response agencies focus primarily on emergency response, placing very little emphasis on disaster prevention or reducing the risk posed by future flooding. The few existing prevention and reduction efforts are disconnected and uncoordinated. The DRRI-Water program strengthened local- and state-level disaster preparedness coordination and response agencies in the vulnerable coastal state of Atlántico, and acted as a pilot to generate best practices. It also helped communities access resources, plan, and execute a preparedness project.

Through the project, Mercy Corps helped establish a Coordination Alliance with Atlántico's state-level government agencies, developed a regional disaster preparedness strategy, and created community-level flood prevention committees. These committees completed water-focused community assessments and preparedness activities in five target communities.

Beyond the five municipalities in Atlántico where the program was implemented, the project provided a mechanism that is adaptable and replicable in other regions of Colombia. The project worked with local stakeholders at the municipal and community level to generate best practices for reducing the negative impacts of flooding. These locally generated initiatives fed into the formulation of a region-based strategy solidly grounded in the reality of the situation on the community level.

## V. Resilience Frameworks at Mercy Corps

With an understanding of the basics of DRR and CCA, we can now look at some of the newer thinking that tries to pull DRR and CCA together. Finding ways to reduce risk and adapt can be tricky since conditions are always changing, and what makes sense today may help less in a few years. Consequently, for both DRR and CCA activities, using systems thinking to anticipate future conditions is central. A resilience lens is helpful here, since it helps us to guide communities through action under a variety of social, economic, and environmental conditions. Many conceptual frameworks of resilience have been developed in recent years, and they can structure nicely our approaches to facilitating community risk reduction and adaptation in ways that protect development programs from disaster. This section presents two resilience frameworks that staff in Mercy Corps have found useful.

### V.1 TANGO Resilience Assessment <sup>20</sup>

This conceptual framework grows out of the Livelihoods Framework used by DFID for many years, and so it is well adapted for working on livelihoods issues, especially in rural areas. It can be a powerful tool to help us see where communities are vulnerable and where to build resilience to shocks and stresses.

Using the TANGO framework, you first guide people through a discussion of the historical and cultural context they live in, identifying broad factors that make certain groups vulnerable. Next, you choose what level of aggregation you will be looking at, or in other words, what scale is relevant for figuring out how to reduce risk. Then you look at the disturbances, or hazards, that are likely to disrupt this system and cause people problems. Finally, add in what people are exposed to—the magnitude, frequency and duration of hazards and shocks to which they may be exposed.

Having developed a sense of what people are up against, the TANGO Resilience Assessment then looks at people's adaptive capacity. Adaptive capacity here is made up of three things:

1. Livelihood Assets— all the financial, physical, political, human, social, and natural assets that people have to help them make a living
2. Structures and Processes— all the legal, cultural, political, and social structures that either enable or inhibit resilience
3. Livelihood Strategies— the combination of activities that people actually do to make a living.

Putting this all together gives you an idea of what shocks and stresses people are sensitive too. Reducing these sensitivities can put people on a path to resilience rather than a path to vulnerability.

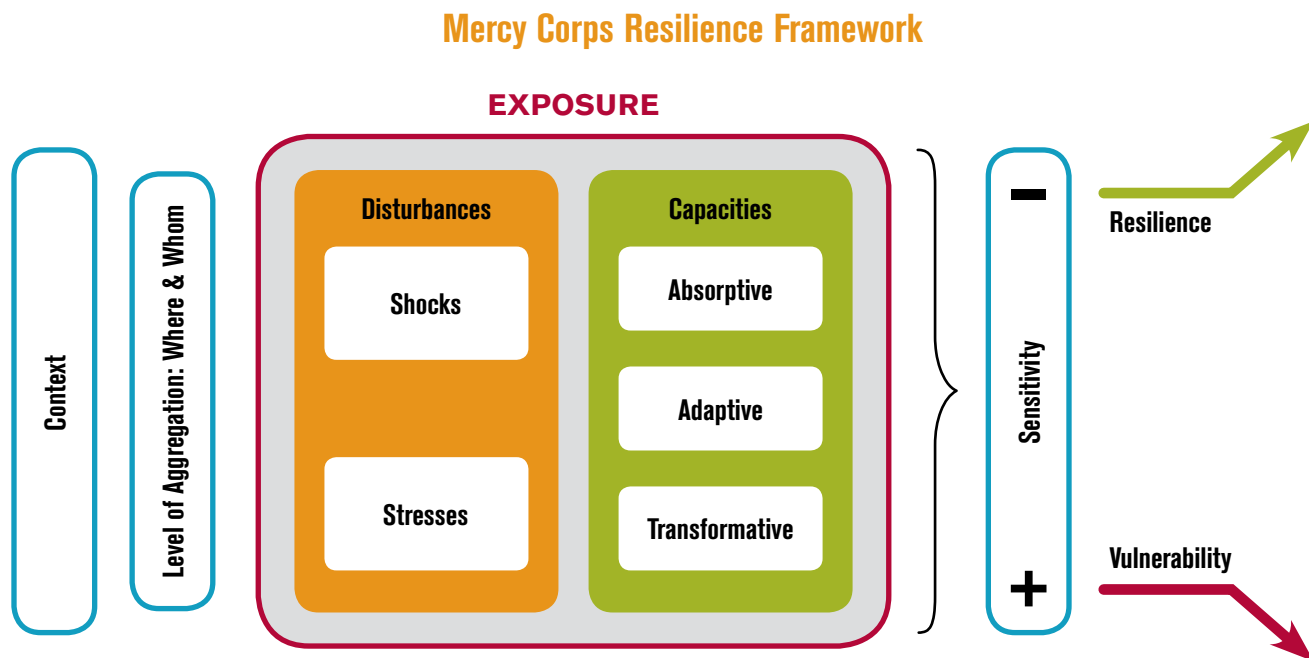
Mercy Corps staff have adapted this framework to bring it in line with Mercy Corps program principles. Instead of looking at Livelihood Assets, Structures and Processes, and Livelihood Strategies, Mercy Corps programs look at the three types of capacity discussed above: Absorptive, Adaptive, and Transformative.

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<sup>20</sup> Frankenberger, T., T. Spangler, S. Nelson, M. Langworthy, "Enhancing Resilience to Food Security Shocks in Africa," TANGO International Discussion Paper, 7 November 2012.



This updated framework is summarized in the following graphic.



Adapted from Frankenberger et al, 2012.

## V.2 ISET Resilience Framework<sup>21</sup>

Mercy Corps staff working in Southeast Asia have used a different conceptual framework for designing interventions: the ISET Resilience Framework, developed under the Asian Cities Climate Change Resilience Network.

Like the TANGO framework described above, this conceptual framework takes a look at entire systems to discern where people are vulnerable, and goes from there to figure out adaptation options. The Resilience Framework looks at four things:

1. **Exposure**—the degree to which a system, service, person or organization is in a location prone to a particular hazard, such as floods, earthquakes, tsunamis, landslides, drought, civil conflict, or economic downturn.

<sup>21</sup> Tyler, S. and M. Moench, "A framework for urban climate resilience," *Climate and Development*, 4 (4) (2012), pp. 311–326

2. **People and Organizations** – individuals, households, communities, the private sector, businesses, and government entities; it includes everyone who makes decisions, the actors in society. Resilient people and organizations are responsive, resourceful, and able to learn.
3. **Infrastructure, services and ecosystems** – infrastructure, services, and functions such as water supply and wastewater treatment systems, roads, power lines, food distribution, health, education, finance and ecosystems such as agricultural land, parks, wetlands, fishing grounds. Resilient infrastructure, services and ecosystems are: flexible and diverse; modular; and designed to fail in predictable ways.
4. **Legal and Cultural Norms** – the rules, laws, customs, social norms and conventions that guide, enable, and constrain people's and organizations' behavior. Resilient legal and cultural norms are accessible to all, transparent, accountable and responsive.

In this framework, vulnerability results when *People and Organizations* have limited capacities, when the *Infrastructure and Ecosystems* they need to survive and thrive are fragile and prone to failure, and when *Legal and Cultural Norms* restrict people's options and access to resources. This is summarized in the graphic below.

### ISET Resilience Framework



Resilience is achieved under the opposite conditions – when *People and Organizations* have adequate resources and capacities, when *Infrastructure and Ecosystems* are healthy and accessible, and when *Legal and Cultural Norms* support access to resources and the development of capacity. This resilience is tested by *Exposure* – to shocks, stresses and disruptions caused by disasters and other events, both slow and fast onset.



Nigeria — Mercy Corps 0513

## VI. Managing Change in Complex Adaptive Systems

A resilience lens reminds us that we live in complex adaptive systems. Our socioeconomic systems are based in ecosystems, and they are changing each other all the time. It is very difficult to say with confidence that intervention A and B will lead to outcome C, since the relationships between our social, economic, political, and environmental systems are complex. For people who manage programs, what does management look like if we take complex adaptive systems seriously?

### 1. Conditions for change vs. fixed targets

Putting together programs with a resilience lens urges us to think of the conditions that need to be in place to promote change, as opposed to fixed targets made up in advance for our intervention. That is, what has to happen for farmers to adopt climate resilient methods? What coalition of social pressures will bring about a change in government policy to maintain social protection programs for the most vulnerable people? What value chains need to be in place for poor people to take advantage of existing or even liberalized markets? Using a resilience lens can help identify the constraints on people that inhibit their economic opportunities or increase their vulnerability to shocks and stresses, at whatever scale these constraints act.

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## Outputs and Outcomes – What is Success?

The Development Assistance Food Security Program (DAP) in Tajikistan was designed to improve the nutritional status of women and children under five in mountain villages. Two important activities were promotion of kitchen gardens, and food preservation. The program trained women in nearly 100 villages in growing nutritious vegetables and preserving them for use throughout the cold winter months.

After providing the training, Mercy Corps staff followed up and found that in every village, households participating in the program had more food stored for the winter than the year before, and the food stored was more diverse. Staff were extremely pleased that they had successfully met the outputs of the program.

After successful completion of the first year of the program, staff embarked on separate training to improve their skills in conducting focus groups. Staff chose 20 of the villages in this program to try out their new found skills, and returned to talk to people there. On returning from the mountains, staff were very unhappy with what they had learned.

It turns out that while households did in fact have more and better food stored, the women and children were not the ones eating it. Since in this area there is a strong “guesting culture,” families sought to provide the best food for their guests from other villages, which meant these preserved vegetables. In addition, each family took turns providing, and showcasing, their best food for the community gatherings on Friday after services at the local mosques. Since only men attended the Friday services, the vegetables were feeding the men in the village. While the program achieved its planned outputs, it was not in fact achieving its outcomes, the ultimate purpose.

Staff realized that there was a gap in the logic used in the design of the program. Fortunately, the team figured this out in time. They were able to then work with these communities and the local religious leaders to engage men in nutrition education, and therefore help people meet their social obligations and their nutritional needs at the same time.

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## 2. Managing across scales

A related concept is the idea that we must manage programs across scales. Development organizations can be powerful when they are firmly rooted in communities, gaining trust, building capacity, and helping to solve problems. Yet as we have seen, many problems cannot be solved *only* at the local level, and so program managers need to develop organizational structures and procedures that allow them to build two-way communication from the lowest scale to the highest. Community priorities need to inform the broader network of partners – whether it is a producers’ cooperative or an advocacy organization – and those operating at national or international level need to be feeding their insights back to their base.

## 3. Managing for learning rather than outputs

If we set up our management systems so we are learning rapidly as we go, we can make constant adjustments to what we are doing. Our program may call on organizing women’s groups for agricultural production, but when women decide to use their organization to run for representation on the Village Development Committee instead, a fixation on predetermined outputs would consider that program a

failure. A learning program would see this as an additional strategy that the program can support, and make adjustments accordingly.

One step in this direction is to measure Outcomes as well as Outputs. While this is normally harder—Outcomes are larger and harder to see changing in the short period of a project—it allows us to see if we are achieving our goals even though our individual activities may not seem to be successful.

Learning is a critical component of resilient systems. In development programs, it usually requires frequent but quick check-ins with the program’s constituency—participants, volunteers, managers, etc. It requires open planning methods that allow new ideas to be brought up, tested, fail or succeed, and move on.

#### **4. Clumsy Solutions**

Traditional planning requires us to anticipate the outputs and outcomes ahead of time. This is excellent planning process for simple or complicated projects. But in complex adaptive systems, this is by definition impossible to do. Instead of the perfectly crafted program and solutions, we need to look for “clumsy solutions.” This does not mean poor planning—on the contrary, working in complex systems requires us to use all our skills, relationships, and analytical tools to understand the situation and react to it. Clumsy solutions refer to the fact that few solutions work out exactly as planned. People are constantly scanning their situation and making up their own minds what they should do about it. Programs that create the conditions for solutions allow people to use their own genius in ways that planners perhaps would never dream of, but in fact are adaptive for the people we are trying to help. The women’s empowerment program where the women decide to run for town council rather than planting improved seeds or starting microenterprises, the Central American farmers who decide their local market is not as profitable as selling their organic vegetables to traders in Miami, refugees who sell their free blankets and food rations to buy a sewing machine, these are all examples of people co-creating solutions with a program, but in ways that we did not anticipate.

Each clumsy solution then sets the stage for the next possible solution. Relationships are altered, people’s situations have changed, and we must change with them if we want to help. There is a growing consensus that “wicked problems” are actually solved by many partial solutions rather than one elegant big solution. From this perspective, 100 1% solutions are more likely to succeed than a single 100% solution. Our programs need to be designed to allow good management *and* freedom for creative innovation.

#### **5. Importance of networks and partnerships**

Work in DRR and CCA with a resilience lens quickly shows that no one organization can achieve everything. In fact one of the dangers of this kind of systems thinking is that it can appear that you must do everything, and you must do it at the same time. This can be overwhelming, and discouraging.<sup>22</sup> But few organizations are good at the whole span of work that social change requires, such as community mobilization, agricultural technology, microenterprise, and advocacy at national and international scales. And there is no reason for one organization to do so, since so many opportunities exist to develop partnerships and coalitions that combine

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<sup>22</sup> Broad systems thinking can lead one to think that a program must do everything at once, just because we can draw connections in our heads about how things work. It is instructive to remember the experience of the Integrated Rural Development trend that was popular among development agencies in the 1980s. IRD projects included interventions in every sector that was considered important—agriculture, small business, health, etc. These projects overestimated the power of a socially engineered project, thinking that rational intervention could change everything in the “right” order, so that health interventions made people more productive, which allowed them to make more money, which allowed them to invest in local infrastructure, etc. Social change rarely occurs in this linear and programmed order, which is a key insight of understanding societies as complex adaptive systems.

the skills of many different organizations working toward similar goals. A resilience lens can show where the trouble spots are in a system, and program managers can then map the organizational landscape on these issues and see where potential allies are. Social change rarely occurs in response to one or two interventions by one or two organizations. Instead, social change usually involves the growth of organizational infrastructure and leadership across a variety of sectors, a reframing of understanding about what is possible, and a long time horizon. Partnerships and networks are a key tool in doing this, and they require a different set of skills and orientation from single organization management. These skills are as easy to learn as any other, but program staff see the importance of it and have clear goals for working in networks if they are to succeed.

Since all organizations have different cultures, organizational requirements, and funding sources, these networks must necessarily be loose enough to accommodate those differences while operating on common ground. As a result, many networks have replaced the traditional Management by Objectives practices with Management by Values. Instead of sitting down in advance and developing a detailed strategic plan with agreed on objectives, activities, and monitoring indicators, networks instead agree on values that all will pursue, and then they apply their local genius to making them happen in their own way. Values can be things like advocacy for pro-poor policies, transparent finances, collective decision making, environmental protection, etc. Networks still have broad goals – improved nutrition for children under five, climate smart agricultural methods adopted by farmers, etc. – but the means for getting there can be much more varied. Members of networks can use their particular strengths in a flexible way, responding to opportunities as they arise, know that they are operating in line with the values agreed on by the wider network.

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### **Be Ready to Adapt the Plan**

In a project promoting potato production and value chain in Peru, a local NGO partner was apologetic because it hadn't met output targets, falling short of the number of farmers engaged and amount of potatoes sold locally. But further inquiry revealed that farmers had in fact been successful in getting municipal government to put on a regional potato fair, had begun transporting potatoes to urban markets on the coast, and were even selling to a firm that was processing potatoes into organic chips for European export market. But the partner hadn't thought to report on these because they weren't strictly part of the output metric on local marketing!

Flexibility by the partner and adapting quickly to take advantage of opportunities allowed the project to achieve its goals, but by different means. Slavish adherence to the original project outputs would have missed these opportunities.

## VII. Conclusion – Pulling together the concepts of uncertainty, resilience, and risk reduction for DRR and CCA programs

As we work to incorporate DRR and CCA activities into programming, a resilience lens is nearly always useful to get a handle on a confusing mix of socioeconomic systems, rules, practices and challenges. Resilience concepts help us take this tangle of interacting things and put them in enough order that we can understand them.

The analysis that resilience frameworks guide us through should sound familiar to DRR practitioners, who have been doing this kind of systems thinking for many years. The beauty of resilience frameworks is that they lay out everything that communities need to be looking at to know what questions to ask in nearly any situation. For example, if our concern is earthquakes in Nepal, we know to look at how buildings are built, what government building codes are, how the private sector actually builds things, how people in the area make a living, what constraints there are on them from making a living in other ways, what emergency services are available, and what suggestions we can make to reduce the risks that these questions all reveal. It also suggests that communities need to engage with new partners who can influence these risks.

Using a resilience lens also reminds us to consider all scales. In so many cases, local problems can *not* be solved with only local solutions. Sometimes the causes of them actually are far away—dam management in another province causes floods here, changes in government policy in the capital inhibit livelihoods in the villages we are working in. Systems thinking guides us to follow the root causes of issues wherever they may be, which in turn guides us to effective solutions. Again, this calls on practitioners to help communities to team up with non-traditional partners.

Because they have grown up in different times and for different reasons, we have unfortunately developed the practices of development programming, DRR and CCA interventions independently. It is more helpful to see them as parts of an overall whole. Yes, DRR programs seek to reduce the damage when the inevitable disasters strike. But they also protect the gains made from development programs that may be affected by disasters. And development programming seeks to increase capacities over a variety of areas, yet if reducing risk is not part of the thinking, even the most successful program results are in jeopardy. And as we learn to anticipate what climate change has in store for us, we find we are treading the familiar territory of DRR as we look at increased variability and intensity of weather events like droughts, floods, typhoons, etc. This realization leads us to make sure that climate considerations are factored in to any DRR analysis, understanding that past events are unlikely to be a good predictor of the future. Yet by seeing CCA as simply a subset of DRR, we forget that CCA also teaches us that there are long term trends that will be changing our daily reality. Yes, we can expect more disasters due to climate change, but we can also anticipate a “new normal” when it comes to temperature, rainfall, and disease. We will need to change our farming practices, how we build our houses, how we manage our public health systems, how we build our bridges, roads, and hospitals, and the way we manage our water. The DRR focus on disasters may overlook these longer trends, and we need to incorporate these CCA insights into our development and DRR programming.



## Appendix I – Glossary

The following glossary provides brief definitions of the key terms used in the document.<sup>23</sup>

**Adaptation**—taking action to minimize the impact of, take advantage of, or cope with shocks and stresses that are occurring or are expected to occur; the ability to change strategy to respond to changes, or expected changes, in conditions.

**Capacity**—the combination of all the strengths, attributes and resources available to a community or society to get things done. It can include not only physical infrastructure, ecosystem health, institutions, knowledge and skills, and wealth, but also social relationships, leadership and management.

**Climate**—a long-term (i.e. years, typically 30 years or more) averaging of weather conditions for an area, which accounts for the average variability in conditions but also includes observed extremes.

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<sup>23</sup> The Glossary has been adapted from ISET's Lexicon, which is available in English, Vietnamese, and Thai at <http://training.i-s-e-t.org/tools/>.



**Climate change**—shifts to the historical climate that result in weather conditions that are unexpected or new, such as generally warmer nighttime temperatures during the cold season, hotter or longer hot spells in the summer, shifts in the timing of the wet season, or changes in the frequency of intense rainfall events. Climate change can also result in extreme conditions that exceed those historically observed, e.g., heat waves that exceed anything previously on record, droughts of longer duration or earlier onset than previously experienced, etc.

**Climate impact**—how a particular climate hazard event affects a particular system. A climate impact is only partially a result of the climate event itself; the majority of the impact is the vulnerability of the system affected by the climate event. For example, high precipitation events only have a large and problematic impact in areas with poor drainage.

**Climate risk**—the likelihood of a climate hazard event and its consequences to a particular system as a result of that system's vulnerability. For example, the climate risk of flooding for a city built on a slope, several meters above sea level and with good drainage, though the city may experience large storms and heavy precipitation events regularly, is likely very low as floods very rarely occur.

**Disaster**—the occurrence of an extreme hazard event that affects vulnerable communities, causing substantial damage, disruption and possible casualties, and leaving the affected communities unable to function normally.

**Disaster Risk Reduction**—the concept and practice of reducing disaster risks through systematic efforts to analyze and manage the causal factors of disasters, including through reduced exposure to hazards, lessened vulnerability of people and property, wise management of land and the environment, and improved preparedness for adverse events

**Downscaling**—taking the results from a global model (see **Global Circulation Model** for related definition), where the output is applicable over a very large area such as 100 by 100 kilometers, and using either a Regional Climate Model (RCM) or statistical methods to refine those results to the local topography. Downscaling ultimately produces results on a much smaller scale, perhaps 1 by 1 kilometer, making them far more useful to local decision-makers. This is particularly true in areas with significant topography, complex land-use patterns, or near coasts or other complex water bodies.

**Early warning system**—any system designed, installed and used to provide advance warning of a future danger so that the danger can be prepared for, thereby mitigating or avoiding many of the potential impacts. For example, storm forecasts are used by fisherfolk to identify and return boats to safe harbors before typhoons make landfall; tsunami warning sirens alert residents of potential incoming tsunamis and allow them to move to higher ground; flood early warning systems allow residents in at-risk neighborhoods to move household goods to higher locations and, if the risk is high enough, to evacuate.

**Ecosystem**—a biological system consisting of all the organisms (animals, plants, bugs, etc.) living in a particular area and all the non-living, physical components of the environment with which those organisms interact, such as air, soil, water and sunlight.

**Ecosystem services**—resources or benefits obtained from a particular ecosystem. For example, a forest ecosystem bordering a city might provide clean water, air filtering, cooling, recreational opportunities,

livelihoods for peoples living on its edges in the form of using the forest as grazing or range land for animals, collecting fruit, mushrooms and firewood, harvesting lumber, etc.

**Emission scenario** – also referred to as **Climate change scenarios**. Each scenario is a set of assumptions or estimates about possible future conditions. Factors such as future population levels, economic activity, the structure of governance, social values, and patterns of technological change are combined and used to develop estimates of greenhouse gas emissions. These emission levels are then used to run Global Circulation Models, producing model results *for that particular emission scenario*.

**Exposure** – the degree to which a system experiences impacts, either positive or negative, from a particular shock or stress, such as temperature increases, rainfall variability and change (including extremes), or changes in the frequency or intensity of tropical cyclones and storms. For example, high elevation inland cities do not directly experience the impacts of sea level rise, so their exposure to that hazard is low.

**Extreme event** – a weather event significantly different from the average or usual weather pattern. Climate scientists define it as a climate event that exceeds the 10<sup>th</sup> and 90<sup>th</sup> probability percentiles. For example, an extreme flood could, for a given city, be a 100-year flood, an event that, based on historical records, occurs once every 100 years, assuming the city has planned and maintains drainage, dike and floodways to handle water levels up to but not exceeding the 100-year levels. However, if the city has failed to maintain drainage and floodways and the effective capacity can only handle a 1-in-3 year flood (i.e. 60<sup>th</sup> percentile), then the 60<sup>th</sup> percentile, 1-in-3 year flood *and any flood larger than that* will become the effective extreme events.

**General Circulation Model (GCM)** – a global-scale climate model capable of modeling past climate and used to generate future climate projections based on various different assumptions about development pathways, population, consumption of resources, and fossil fuel burning. About 30 different GCMs are in current use across the globe. Each has been developed by a different research group using slightly different representations of climate physics and slightly different representations of the oceans, atmosphere and land surface. As a result, each GCM produces different results, even if they start from the same starting conditions and experience the same inputs. In using GCM results, this range of outcomes needs to be taken into account, as it is impossible to say, a priori, which result is most likely.

**Global warming** – the continuing rise in the average temperature of Earth's atmosphere and oceans. There may be a small component of the current global warming that is due to natural variation in global climate. However, the bulk of observed and projected future global warming is caused by increased concentrations of greenhouse gases in the atmosphere, resulting from human activities such as deforestation and burning of fossil fuels.

**Hazard** – events, whether natural or human-caused, that have the potential to cause harm or loss. They may be natural, political, economic, or technological.

**Indigenous knowledge** – knowledge and practices used by the local, long-term, or native people in a particular area. For example, knowledge of local wild plants that are edible, or ways to build shelters or homes that are well adapted to local climate hazards.

**Infrastructure** – physical, man-made structures such as houses, buildings, bridges, dams, dikes, roads, power plants, power lines, etc.

**Institution**—the rules, laws, customs, social norms or conventions that guide or constrain human behavior and exchange in social and economic transactions. Institutions 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. The word “institution” also is sometimes used in everyday speech to refer to organizations structured to focus on a particular purpose (e.g., financial institutions, educational institutions).

**Land use**—the particular ways in which a given piece of land is being utilized. For example, a particular city land parcel could be designated for urban development, used as a park, farmed, left as a wild or semi-wild ecosystem, etc., or farmers may use their land in intensive or extensive agriculture.

**Maladaptation**—activities taken to reduce the risk from hazards that create new problems rather than the intended benefit. For example, the river dikes in Ho Chi Minh City in Vietnam prevent floodwaters in the rivers from entering the city but also prevent the water that accumulates in the city during heavy rain storms from draining out of the city. Another example is the sea dikes in Japan that were overtopped by the tsunami in 2011; because residents were so certain the sea dikes would protect them, they did not evacuate. Indeed, some residents went out to the sea dikes to watch the tsunami come in and were killed.

**Mitigation**—this concept is defined in two different ways.

- **Climate change mitigation** is any action taken to reduce climate change impacts by reducing current greenhouse gas emissions or by reducing greenhouse gas emissions that would occur under a “business as usual” scenario. For example, moving from coal-fired power plants to solar energy, reforestation efforts, or off-setting carbon emissions with carbon reduction efforts.
- **Hazard mitigation** in general is any measure undertaken to minimize the adverse impact of a potential hazard event. Measures can be physical, such as putting in a sea-wall to reduce the impact of coastal storms and reduce the damage by storm-waves, or non-physical such as land-use planning or public education.

**No regret approach**—selecting activities that can be taken to reduce climate risk or vulnerability that will work under most or all potential future conditions. For example, installing flood early warning systems is of benefit to communities and cities that experience flooding regardless of whether that flooding gets worse, improves, or stays the same.

**Regional Climate Model (RCM)**—RCMs are basically General Circulation Models (GCMs) run for a smaller, limited area of interest. However, because they deal with smaller scales, they use climate physics appropriate to those smaller scales, and so use different equations than GCMs.

RCMs are generally run for continental-scale areas, typically 5000km x 5000km, and produce results at a resolution of 25 or 50km. In contrast, a GCM produces results at a scale of 3.75° by 2.5°, i.e. entire small countries can fall within one grid cell. For the practical planning of water resources, flood defenses etc., countries require information on a much more local scale than GCMs are able to provide, which is why RCMs were developed.

To use an RCM, results from a GCM are used to determine the very large-scale effects of changing greenhouse gas concentrations, volcanic eruptions etc. on global climate. The climate (temperature, wind etc.)

calculated by the GCM is used as input at the edges of the RCM. Consequently, RCM outputs are subject to all the same uncertainty as GCM results.

**Resilience**—the capacity of communities in complex socio-ecological systems to learn, cope, adapt, and transform in the face of shocks and stresses. A resilient system can absorb disturbances, change or adjust, and then re-organize and still have the same basic structure and ways of functioning. Resilience in human communities (as opposed to natural systems) includes the ability to learn from the disturbance. A resilient system can experience external shocks, recover, and continue to function. If a system begins to lose resilience, the size of a shock from which it can recover gets smaller and smaller. For example, a reservoir may provide flood protection for a community when initially built, but if it is allowed to silt up rapidly, its storage capacity decreases until it can no longer hold enough floodwater and during large floods water must be released down the river.

**Risk**—the potential disaster losses, in lives, health status, livelihoods, assets and services, which could occur to a particular community or a society over some specified future time period. Thus, risk is a description and/or measurement of possible outcomes as a result of the vulnerability of a system. For example, a community may be vulnerable to flooding, but if improvements in drainage make it highly unlikely that a flood will occur, then the community's flood *risk* is very low. In a loose formula that is easy to remember, Risk = hazard x vulnerability/capacity.

**Risk Assessment**—a systematic assessment of the various risks to which a community is subject. Often also referred to as a vulnerability assessment.

**Scenario**—an educated guess about possible future conditions based on research. The greenhouse gas (GHG) emissions used in climate models are scenarios of potential future levels of GHGs, based on other scenarios of population growth, economic growth, technology and land use. The GHG scenarios are concerned with long-term trends, not short-term fluctuations.

**Sea Level Rise**—the gradual increase in average sea level due to increased melting of land-based ice (e.g. the Greenland and Antarctic ice caps) and the thermal expansion of seawater due to global warming.

**Sensitivity**—the degree to which a system is affected, either adversely or beneficially, by shocks or stresses.

**Slow-onset event**—an event that builds slowly over a relatively long period of time, long enough that changes on a daily, seasonal or even annual basis may be basically unnoticeable. For example, the change in average temperatures due to climate change is a slow-onset event. Over the course of the next 30 or 50 years average temperatures are projected to rise 2 degrees C or more. However, on an annual basis this may be unnoticeable, except as increased summer heat stress, small reductions in winter heating bills, small reductions in crop yield, increased heat wave mortality in aquaculture, etc. Because the impact of slow-onset events are hard to see because the changes from year to year are small, they can easily be overlooked in planning. However, overall impact can exceed that of short-term disasters.

**System**—any collection of parts that work together to deliver services or functions. For DRR and CCA, systems include both infrastructure (e.g. water supply and wastewater treatment systems, roads, power lines, food distribution, health, education, finance) and ecosystems (e.g. agricultural land, forests, water cycles, parks, wetlands, fishing grounds). Human systems are designed and managed through deliberate

human intervention, but their performance depends on a multitude of factors that are difficult to manage, including human behavior and institutional context, which often lead to unintended side effects (e.g. pollution, congestion).

**Systems approach**—working with a given problem from the perspective of the various systems engaged or incorporated into the problem and what is needed to assure or improve functionality of those systems. This means looking at systems holistically, including the other systems, organizations, or institutions on which the selected system is dependent if it is to function well. For example, for electricity generation, the electricity system is dependent on: transportation of fuel; water for cooling, steam generation, washing of solar panels, etc.; pricing, which may be dependent on national policies and laws; the city distribution network; the ability to manage the system; and customer demand, which is heavily influenced by culture, convention, and weather. A systems approach would consider all these elements when analyzing power systems.

**Threshold**—key levels beyond which a system will fail. Thresholds can be hard or soft. For example, the number of hospital beds in a city is a soft threshold; as hospital admittance increasingly exceeds the available number of beds it becomes increasingly difficult, but not impossible, to provide adequate medical care to those admitted. A hard threshold, however, results in immediate system failure. For example, when a dike is overtopped by floodwater, areas behind the dike are flooded, potentially quite rapidly and to significant depth.

**Variability**—how much a climate parameter, like daily rainfall or monthly high temperature, is greater than or less than the long-term average.

**Vulnerability**—this concept is defined in two different ways.

- In **Climate Change Adaptation**, the degree to which a system is susceptible to, and unable to cope with, adverse effects of a hazard, including climate variability and extremes. Climate vulnerability is a function of the character, magnitude, and rate of climate variation to which a system is **exposed**, its **sensitivity**, and its **adaptive capacity**.
- In **Disaster Risk Reduction**, the characteristics and context of a community or system that makes it susceptible or sensitive to hazards. Vulnerability is a function of the capacity of organizations and individuals, the fragility of the natural and infrastructure systems they depend on, or the legal and cultural norms that support or limit their options.

**Vulnerability and Capacity Assessment**—a systematic assessment of the exposure and sensitivity of people and their natural and physical infrastructure to existing hazards, taking into account the variability and potential future changes in those hazards, and the capacity to adapt.



## Appendix II – Resources

The following books, articles, and web sites provide more detailed information about the principles, tools and examples discussed above.

**Bene, C., R.G. Wood, A. Newsham, M. Davies, “Resilience: New Utopia or New Tyranny? Reflection about the Potentials and Limits of the Concept of Resilience in Relation to Vulnerability Programmes,” IDS Working Paper 405, Institute of Development Studies, Brighton, Sussex, 2012**

This paper is a review of current concepts of resilience dominating the world of development funders, especially in the United Kingdom. The article describes connections between resilience, vulnerability and poverty, and points out the benefits and disadvantages of using a resilience lens for Disaster Risk Reduction, Poverty Alleviation, and Social Protection.

**Dazé, Angie, Kaia Ambrose and Charles Ehrhart, “CARE Climate Vulnerability and Capacity Analysis Handbook,” CARE, May 2009, <http://www.careclimatechange.org>**

This is one of the original guides to taking climate into account in programming, developed by CARE in 2009. It lays out a step-by-step approach to moving communities through a process of doing a Vulnerability and Capacity Analysis with climate change considerations built in. Each step in the analysis looks at various levels – national, local government/community level, and household/individual level. The guide provides Guiding Questions to bring out the essential information. It suggests using tools that have become common ones in Vulnerability and Capacity Analyses that are derived from Participatory Rural Appraisal tools: hazard mapping, seasonal calendars, historical timeline, vulnerability matrix, Venn diagram of local institutions.

**Department for International Development (DFID), “Defining Disaster Resilience: A DFID Approach Paper,” November 2011**

This paper summarizes current best thinking at DFID about using resilience as its core approach to tackling disasters. It proposes a simple disaster resilience framework, gives examples of DFID funded programs that promote resilience, and outlines the agency’s plan to contribute to the disaster resilience agenda.

**Emergency Capacity Building Project – <http://www.ecbproject.org/>**

The Emergency Capacity Building (ECB) Project aimed to improve the speed, quality, and effectiveness of the humanitarian community to save lives, improve welfare, and protect the rights of people in emergency situations. It was active from 2005–2013 as a joint effort of CARE International, Catholic Relief Services, International Rescue Committee, Mercy Corps, Oxfam GB, Save the Children and World Vision International. It identified key capacity gaps constraining the ability to provide timely, effective and high quality preparedness and response to emergencies. The project then produced research findings and practical guides for three areas: Staff Capacity, Accountability and Impact Measurement, and Disaster Risk Reduction (DRR). Many of these resources are available on the web site.

**Frankenberger, T., T. Spangler, S. Nelson, M. Langworthy, “Enhancing Resilience to Food Security Shocks in Africa,” TANGO International Discussion Paper, 7 November 2012.**

This article, by the team at TANGO International, poses a conceptual framework for assessing resilience that grows out of the Sustainable Livelihood framework. While there is some discussion of multiple scales, the focus is on community level resilience. It provides several examples from Africa, points out where practitioners need to be measuring outcomes and impact, the disconnect between resilience building approaches and funding cycles, and in the appendix proposes a quantitative method for assessing resilience interventions.

**Frankenberger, T., T. Spangler, S. Nelson, M. Langworthy, “Enhancing Resilience to Food Security Shocks in Africa,” TANGO International Discussion Paper, 17 August 2012.**

This paper was prepared for the High-Level Expert Forum on Food Insecurity in Protracted Crises in September 2012. It covers some of the same ground as the paper cited above, though it specifically discusses building resilience in situations of conflict and poor governance.

**Friend, R., & Moench, M. (2013). What is the purpose of urban climate resilience? Implications for addressing poverty and vulnerability. *Urban Climate*, 6, 98-113.**

This peer reviewed paper by the team at ISET International brings the central concepts of human action and political contestation back into resilience discussions, which often focus on systems in a managerial or instrumentalist way. It points out that resilience is a value neutral concept, and therefore practitioners must build in pro-poor values into resilience building processes in cities.

**Global Network of Civil Society Organizations for Disaster Reduction ([www.globalnetwork-dr.org](http://www.globalnetwork-dr.org))**

The Global Network for Disaster Reduction is a major international network of non-governmental and not-for-profit organizations committed to working together to improve the lives of people affected by disasters world-wide. Since forming in 2007, the GNDR has sought to increase the effectiveness of civil society to contribute towards the building of resilient nations and communities – putting the concerns, needs and priorities of vulnerable people at the heart of Disaster Risk Reduction policy and practice. Focus has been on three core objectives: 1) Policy Formulation – ensuring risk reduction policies are appropriate to local context, needs and priorities; 2) Policy Implementation – supporting effective execution of risk reduction policies at the local level; and 3) Resource Mobilization – increasing access to resources at the local level. The site also has a number of resources useful for practitioners.

**International Federation of the Red Cross VCA toolbox – <http://www.ifrc.org/Global/Publications/disasters/vca/vca-toolbox-en.pdf>**

This is a step-by-step guide for doing a Vulnerability and Capacity Analysis written for Red Cross and Red Crescent staff and volunteers. It walks you through each step, providing all the materials necessary to conduct surveys, background research, and community workshops from first contact to final plan.

**Intergovernmental Panel on Climate Change, <http://ipcc.ch/>**

This is the web site of the Intergovernmental Panel on Climate Change (IPCC). The IPCC is a scientific body under the auspices of the United Nations (UN). It reviews and assesses the most recent scientific, technical and socio-economic information produced worldwide relevant to the understanding of climate change. This site is most useful for its complete collection of publications and resources that it has produced, especially the Assessment Reports. These reports are released every six years, and summarize the scientific consensus on climate change at the time. Most useful to general readers are the summary reports released each time.

**Levine, Eliot, “Resilience 101: Resilience at Mercy Corps,” Power Point presentation.**

This Power Point presentation introduces the basic concepts of resilience as developed at Mercy Corps. It runs through how to define resilience, four major questions for starting off resilience assessments, systems thinking, and examples of resilience building from Mercy Corps experience in Indonesia, Myanmar, and Somalia.



**Levine, Eliot (Mercy Corps), Giga Sarukhanishvili and Nino Kheladze, “Climate Change Adaptation Planning: Guidance for Municipal Decision Makers in the Southern Caucasus,” Caucasus Environmental NGO Network (CENN) and Mercy Corps.**

This document and an accompanying Power Point presentation provide clear guidance on how to bring climate change considerations into the planning process for adaptation programming. While written for guidance in Georgia, it provides general enough guidance that it can be adapted for other areas by using the basic process framework outlined in it.

**MacClune, K., Tyler, K. H., & Allan, C. (2014). “Introduction to a new approach to urban resilience: Final report to American Red Cross on urban resilience.” Boulder, CO: Institute for Social and Environmental Transition-International.**

This report reviews what makes building urban resilience different than rural areas, and lays out a framework and simple process for building resilience with communities from the local level to the city wide or even national level. It includes tools to help bring all relevant scales into the process, tips for effective networking to achieve results beyond what one organization can do alone, and several cases studies from around the world.

**Mercy Corps, “Building Resilience in the Sahel: Why Gender Matters”**

A brief review of why gender considerations are important for overall community resilience, and how to build a gender lens into resilience building programming. While the examples come from West Africa, the general approach can be adapted for elsewhere.

**Mercy Corps, VCA Case Study Series, “Case 1: Managing Risks Through Economic Development (M-RED) Vulnerability and Capacity Assessment (VCA),” and “Case #2: Myanmar Dry Zone.”**

These two case studies document Mercy Corps staff experience with Vulnerability and Capacity Assessments in Nepal, Timor Leste, and Myanmar. They review the steps taken to define the problems, scope the activities, plan and develop the tools, and carry out the assessments. Both studies provide lessons learned for future assessments.

**Mercy Corps, “Disaster Risk Reduction: Investing in DRR saves lives, empowers communities, and protects development,” no date.**

This short document lays out current thinking at Mercy Corps. It lays out principles for DRR programming, and provides a case study.

**Mercy Corps, “Resilience at Mercy Corps,” May 2013**

This document summarizes the consensus in Mercy Corps on resilience at the time of its production. It reviews why it is important for Mercy Corps' work, and four principles of resilience to build into every program.

**Mercy Corps, “Resilience Hubs: action and evidence,” no date.**

This short document reviews the programs in Africa and Asia that have built resilience. Specific examples come from Ethiopia, Niger, and Uganda. It also reports briefly on work in gender and resilience research from Mali, Niger, and Nigeria. For Asia the program examples are in Indonesia, Myanmar, Nepal, Timor Leste.

**Mercy Corps, “Strategy Summary: Mercy Corps’ Climate Change and Disaster Risk Reductions in South East Asia,” no date.**

This document outlines principles for doing Disaster Risk Reduction and Climate Change Adaptation at Mercy Corps. It also provides examples of typical work in India, Indonesia, Myanmar, Nepal, Sri Lanka, Timor Leste.

**Mercy Corps, “Strengthening Government and Community Linkages to Save and Improve Lives: Good Practices in Action: Water-Related Disaster Risk Reduction Initiative (DRRI-Water),” from the Water-Related Disaster Risk Reduction Initiative (DRRI-Water) partnership between Mercy Corps and Xylem Watermark, March 2013**

The Water-Related Disaster Risk Reduction Initiative (DRRI-Water) partnership between Mercy Corps and Xylem Watermark focused on activities to reduce communities’ exposure to hazards, lessen vulnerability of people and property and enhance emergency preparedness. Beginning in 2010, Mercy Corps oversaw Xylem-funded Disaster Risk Reduction (DRR) projects in six countries: Colombia, China, Ethiopia, Indonesia, Nepal and Tajikistan. From work in these six countries, the program developed guidance on four good practices in engaging communities, forging stronger community and government linkages and enhancing the sustainability of water-related DRR initiatives.

**PreventionWeb – <http://www.preventionweb.net/english/>**

PreventionWeb.net is a participatory web platform for the Disaster Risk Reduction community. Its primary purpose is to facilitate an understanding of the subject of Disaster Risk Reduction (DRR) and the work of professionals in this area by providing current news and views on the topic, and tools for exchange and collaboration.

**Turnbull, Marlise and Edward Turvill, Participatory Capacity And Vulnerability Analysis: A Practitioner’s Guide, Oxfam GB, June 2012.**

This is a step-by-step guide to do a multi-stakeholder risk analysis and planning process designed to help staff and partner organizations engage with communities in contexts where natural disasters are significant drivers of poverty and suffering. It is aimed at development practitioners working with communities that are vulnerable to natural hazards. In Part 1, the theory and concepts behind PCVA are outlined, as well as a brief description of how it has evolved. It also explains why climate change must be a significant factor in any risk reduction programming. Part 2 provides the step-by-step guide to the seven stages of the PCVA process. It covers the preparatory work you need to undertake, working directly with the community on participatory learning and action (PLA) exercises to answer key questions, and action planning.

**Turnbull, M., Sterrett, C.L., and Hilleboe, Amy, Toward Resilience, Practical Action Publishing, Warwickshire, 2013.**

This book is an introductory resource for staff of development and humanitarian organizations working with people whose lives and rights are threatened by disasters and climate change. It is aimed at program management, advisory and technical staff of development and humanitarian organizations, and seeks to strengthen staff understanding of the basic approaches and principles that can be applied to Disaster Risk Reduction and Climate Change Adaptation initiatives. It also provides practical guidance on how to integrate Disaster Risk Reduction and Climate Change Adaptation into the program cycle, different sectors and a range of contexts. This guide includes examples from practitioners' experiences that illustrate good practice and learning, and suggests tools and resources that practitioners find useful. The book was produced by staff from Catholic Relief Services, Mercy Corps, CARE, Oxfam, Save the Children, and World Vision.

**Twigg, John, Characteristics of a Disaster-Resilient Community: A Guidance Note, Interagency Group, Version 2 November 2009.**

This document is a guidance note for government and civil society organizations working on Disaster Risk Reduction (DRR) and Climate Change Adaptation (CCA) initiatives at community level in partnership with vulnerable communities. It was commissioned by a group of six agencies – ActionAid, Christian Aid, Plan UK, Practical Action and Tearfund, together with the British Red Cross/International Federation of Red Cross and Red Crescent Societies.

It shows what a 'disaster-resilient community' might consist of, by setting out the many different elements of resilience. It also provides some ideas about how to progress towards resilience. The *Characteristics* consists of a series of tables setting out the characteristics of a disaster-resilient community, supported by guidance on how to use them. They are organized under five thematic headings, representing the main areas of DRR intervention, based on the Hyogo Framework for Action 2005-2015.

**Tyler, S. and M. Moench, "A framework for urban climate resilience," *Climate and Development*, 4 (4) (2012), pp. 311–326**

This peer reviewed article lays out a clear conceptual framework for understanding resilience to urban climate change. Its analysis lays out a framework looking at ecosystems and physical infrastructure, agents, and institutions. It proposes that vulnerability is found where infrastructure is fragile, people and organizations have low capacity, and legal and cultural norms constrain freedom of action to adapt and learn.

**United Nations Development Programme (UNDP) Drylands Development Centre, "Community Based Resilience Assessment (CoBRA) Conceptual Framework and Methodology," 4 April 2013**

This document lays out the TANGO International Resilience Assessment conceptual framework, and then describes a process for developing baseline data, doing data analysis and reporting, and presenting the findings. It lays out clearly potential indicators for resilience organized along the five categories of assets from the Sustainable Livelihood Framework (physical, human, financial, natural, and social). It is focused nearly entirely on the community level, and does not analyze promoters or constraints to resilience on other scales. The annex briefly describes a number of other models or studies of resilience.

**United States Agency for International Development (USAID), “Climate-Resilient Development: A Framework for Understanding and Addressing Climate Change,” March 2014**

This document lays out USAID’s recommended process for incorporating climate change considerations in development programming. The document is very clear that climate-resilient development is about adding consideration of climate impacts and opportunities to development decision-making in order to improve development outcomes, rather than implementing development activities in a completely new way. The document lays out six steps to doing so. Only the first three – Scope, Assess, and Analyze – are new to this work. The document explains that the final three steps – Design, Implement and Manage, and Evaluate and Adjust – are the usual steps in the project cycle, and as a result the document provides less guidance for these steps.

**Wisner, Ben, Piers Blaikie, Terry Cannon and Ian Davis, At Risk: natural hazards, people’s vulnerability and disasters, second edition, Routledge, New York, 2003.**

This book introduced the idea of the Pressure and Release framework for understanding Disaster Risk Reduction. (Note that the same concept is often referred to by the name Crunch and Release.) It presents the concept from a largely theoretical point of view, and proposes the rough formula of risk = hazard × vulnerability. An online version of the first three chapters is available on the PreventionWeb web site at [http://www.preventionweb.net/files/670\\_72351.pdf](http://www.preventionweb.net/files/670_72351.pdf).

**Working Group on Climate Change and Disaster Risk Reduction of the Inter-Agency Task Force on Disaster Reduction (IATF/DR), On Better Terms: A Glance at Key Climate Change and Disaster Risk Reduction Concepts, United Nations, 2006.**

As the fields of Disaster Risk Reduction and Climate Change Adaptation have developed in recent years, terms and concepts have developed independently. The results have been the development of useful concepts and practices, but also confusion in terms and interpretation between the two fields. This booklet aims to lay down the foundation for greater collaboration by making sure practitioners from both disciplines understand each other. This booklet aims to clarify possible sources of confusion on just a few terms that both communities use and that are particularly important to the conceptual framework of each discipline, as a means of introduction. It also clarifies terms that are often used and sometimes differently used by the two communities to explain points of similar conceptual emphasis.

**World Wide Fund for Nature (WWF) and American Red Cross, “Green Recovery & Reconstruction: Training Toolkit for Humanitarian Aid,” 2010.**

The Green Recovery and Reconstruction Toolkit (GRRT) is a training program designed to increase awareness and knowledge of environmentally sustainable disaster response approaches. The GRRT is made of ten modules which are designed to be delivered in a one-day training workshop. Each GRRT module package includes a trainer’s guide; training materials for a workshop; PowerPoint slides; a technical content paper that provides background information for the training; and additional resources for further study. The ten training modules may be downloaded at <http://green-recovery.org>.



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## ABOUT MERCY CORPS

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