Working with A Changing Climate, not against It

PROJECT REPORT

Hydro-Meteorological Disaster Risk Reduction: A Survey of Lessons Learned for Resilient Adaptation to a Changing Climate

Is Resilience the key?

http://fcw.com/articles/2013/07/08/exectech-operational-resilience.aspx

DRAFT**
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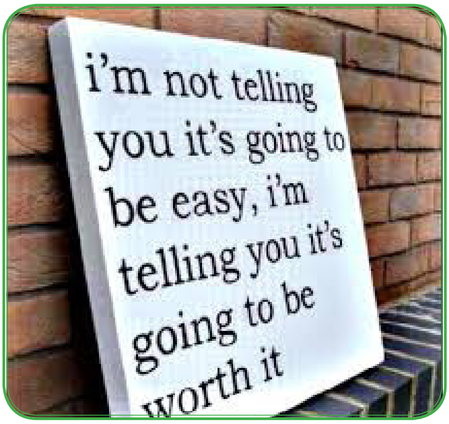
CONTENTS

ACRONYMS

AFN – Asia Flood Network
BMZ – Federal Ministry for Economic Cooperation and Development
CA – Central America
CAFFG – Flash Flood Guidance System for Central America
CCA – Climate Change Adaptation
CCR(B)D – Climate Change Risk (and Benefits) Disclosure
CCRD – Climate Change Risk Disclosure
CEPREDENAC - Centro de Coordinación para la Prevención de los Desastres Naturales en América Central (Coordination of Natural Disaster Prevention in Central America)
COFs – Climate Outlook Forums
Cordaid – Catholic Organisation of Relief and Development Aid
DHS – (US) Department of Homeland Security
DMUF – Decision Making Under Foreseeability
DMUU – Decision Making Under Uncertainty
DRM – Disaster Risk Management
DRR – Disaster Risk Reduction
E2E – End-to-End
E2E2E – End-to-End+Feedback (feedback is represented by a 3rd "E")
EIA – Environmental Impact Assessment
EWS – Early Warning System
FEMA – Federal Emergency Management Agency
FMMP – Flood Management and Mitigation Programme
GFDRR – Global Facility for Disaster Reduction and Recovery
GHA – Greater Horn of Africa
HFA – Hyogo Framework for Action
HKH – Hindu Kush Himalaya
ICIMOD – International Centre for Integrated Mountain Development
ICPAC – IGAD Climate Prediction and Applications Center
IGAD – Intergovernmental Authority on Development
IPCC – Intergovernmental Panel on Climate Change
LL – Lessons Learned
LMB – Lower Mekong Basin
MRC – Mekong River Commission
NATO – North Atlantic Treaty Organization
NHIA-EIA – Natural Hazard Impact Assessment – Environmental Impact Assessment
NHMSs – National Hydro-Meteorological Services
OFDA – Office of Foreign Disaster Assistance
RANET - Radio & Internet for the Communication of Hydro-meteorological & Climate-related Information
SD – Sustainable Development
SDC – Swiss Agency for Development and Cooperation
Sida – Swedish International Development Cooperation Agency
SRE – Satellite Rainfall Estimate
UNISDR – United Nations Office for Disaster Risk Reduction
UNEP – United Nations Environment Program
USAID – United States Agency for International Development
WMO – World Meteorological Organization
ZORs – Zero-Order Responders



PREFACE

How a society approaches a number of issues that involves interactions between the natural and socio-economic worlds is strongly influenced by a belief that science, especially technology, "will save us." Today, society expects to be saved by new technologies from the anomalous behavior of a variable and changing climate. This perspective is apparently reinforced by a distinction commonly made between the "physical" and the "social" sciences: the former is based on "hard" facts whereas the latter is based on debatable (so called "soft") findings. The general belief by policy makers that "technology is the answer," should evoke a challenging response "But what was the question?". The belief that physical science is the answer, however, overemphasizes the role of technology and runs the risk of drawing attention away from the equally important societal dimensions of disaster risk reduction (DRR). Whether on the local or the global scale, DRR is hard to achieve, despite positive programs and efforts to protect human life, livelihoods, ecosystems, and the built environment. Recognizing the prevalence of this distinction between the natural and the social sciences enables one to understand the lessons learned about hydro-meteorological DRR efforts in the face of a changing and uncertain climate-related future.

The explicit focus of this survey is DRR in terms of hydro-meteorological hazards and disasters. Societies and individuals have been "jousting" with variable, extreme and changing climates for millennia at local to regional levels, with varying degrees of success. Throughout that time, human interactions with climate processes were mainly based on trial and error as well as on societal expectation about natural processes such as seasonal variations and extremes. Through a cultural learning curve based on trial and error, different societies devised best practices for their specific locations that seem to work at given points in time to enable them to cope with local hydro-meteorological hazards and to recover from hazardous events that may have proven devastating.

In many ways, societies today are not much different than those in the past, except that we now have cutting-edge technologies and innovative approaches for coping with the impacts of rapidly changing climate processes. Recognizing and accepting the trial and error aspects of DRR efforts today is clearly a major positive step forward in identifying coping mechanisms. In addition, doing so keeps most societies aware that they face uncertain climate fluctuations, changes and extremes both today and in the future.

New technologies, which are designed to protect society from the vagaries of atmospheric and environmental processes, can be thought of as attempts toward climate-proofing. But there is as yet no cure-all technology or managerial tool that can assure a society that it has been climate-proofed. To be sure, while climate-proofing can take place at site-specific locations such as in a greenhouse, a controlled environment, no society to date can claim to be immune from climate-, water- or weather-related variability, hazards, and disasters. Still, climate-proofed immunity constitutes the "what ought to be," the societal goal that is often sought in theories and reports and campaign promises but that is, in the end, likely unattainable, although steps towards climate-proofing can be effective and must certainly be pursued. Herein lies the societal challenge for effective DRR.

Many agencies from industrialized countries provide assistance to developing countries that may not have the means—technological, financial or social—to cope with hydro-meteorological extremes such as droughts, floods and flash floods. USAID is one such agency, through the Office of Foreign Disaster Assistance (OFDA) and Food for Peace (FFP).

While completing this OFDA-supported survey of a set of projects, selected with OFDA, from Asia, sub-Saharan Africa, Central America and the Caribbean, it became clear that many intervening variables created gaps between expectations of what ought to have been the outcomes of these projects and what the actual outcomes turned out to be.

Identifying intervening variables, as both obstacles and constraints, provided insights into lessons that could or should have been drawn from previous DRR activities and that could be applied to the planning of future projects to make them more effective as well as more efficient in the use of limited resources for such activities. In addition to identifying lessons learned from this particular set of previously supported projects, in the following we have also sought to identify ways in which hydro-meteorological disaster risk reduction strategies, tactics and activities may be bridged with climate change adaptation (CCA) and longer-range planning activities in the face of an uncertain climate future.

This survey is entitled "Hydro-meteorological Disaster Risk Reduction: Lessons Learned for Resilient Adaptation to a Changing Climate." It was undertaken with the assumption that all humanitarian and emergency aid activities yield direct and indirect benefits to varying degrees to donor and aid recipients alike. In this survey, we tended to focus on both good and bad lessons with the intention of noting what worked well but more importantly of improving upon those aspects of the reviewed projects that could be improved. Disaster risk reduction is difficult to accomplish, even for the indistrialized countries. Perhaps this is an example of what Martin Luther King, Jr. referred to, in a Human Rights context, as "trying to finish the unfinishable." The funds available for prevention or preparedness for hazards and disasters are insufficient to help everyone everywhere in all at-risk locations. But funding alone could never be enough to reduce risk; it can only serve in a catalytic way to encourage governments to be pro-active in the face of an uncertain climate future. *Support for disaster risk reduction (DRR) and climate-change-adaptation (CCA) education and training are important investments towards educating civil society about the need and "best practices" for coping with such an uncertain future.*

www.globalgage.ibo.org

INTRODUCTION

Disaster Risk Reduction (DRR) has evolved from a "traditional approach to disaster situations of response and recovery" ("drr" in lower case letters) to include an increasingly greater emphasis on prevention and preparedness (henceforth, "DRR" in capital letters). Hydro-meteorological DRR has increasingly become an important consideration that has expanded the scope and benefits of traditional humanitarian and emergency disaster aid contexts over the past several years.

DRR is in this way now viewed as one reason for which the lessons of coping with past hazards and disasters should be identified and used for future disaster mitigation and, if possible, hazard impact avoidance as well as for longer-term (climate change-related) development planning. Such lessons, once verified, can serve as "teachable moments" that are transferable, after appropriate adjustments to account for variations in settings, to areas where similar hydro-meteorological hazards are likely to occur.

Such transfers are possible based on the idea of "foreseeability," which can be understood as a qualitative means by which insights into the future can be gained through analogical reasoning that draws on past experiences. It is a way to generalize and operationalize experimential knowledge. In terms of hazard planning and impact avoidance, this approach has also been referred to as "forecasting by analogy" (Glantz 1988). Effectively carrying out DRR programs can reduce the enormous social, cultural and individual burdens of disaster events, not only in terms of protecting lives and livelihoods but also in terms of reducing the economic costs of hazards and disasters and misery at household to regional transboundary levels.

A major concern in moving forward with DRR, however, continues to be the increasing imperative of identifying ways to bridge if not seamlessly "blend" the consequences of shorter-term disaster-related emergency and humanitarian preparedness and response with the needs of longer-term (i.e. climate change-related) development planning. Effective bridging (or blending) of DRR-related preparedness planning and response mechanisms with climate change adaptation (CCA) can help to mitigate, if not altogether avoid, many of the complications that tend to arise along development pathways when disasters impinge on community development programs or force alterations, which are usually setbacks, in development agendas.

An emerging problem today and at least for the near-to-midterm future is that the budgets available to humanitarian aid agencies working to address hydro-meteorological hazards and disasters are likely only to increase slowly (if at all) in the foreseeable future even as the occurrence of life-threatening hazard and disaster events is expected to rise with greater frequency in that same period. What this means is that global fiscal constraints have come at a difficult time in terms of changing climates, which are expected to result in adverse shifts in the frequencies, intensities, magnitudes, and even locations of hydro-meteorological hazards and disasters in the coming years and decades.

Climate-related surprises are also to be expected. What is foreseeable in this situation is that the disadvantageous consequences of changing climates will likely outpace the heightening of demands from affected countries for assistance, as well as modest increases in the budgets of donor agencies that have missions to assist countries and their at-risk populations to prepare for and respond to hydro-meteorological hazards and their potential to become disasters. In this circumstance, agencies will be forced by fiscal necessity to become more efficient and more selective, even as they simultaneously have to become more effective in fulfilling their short- and long-term mandates. For example, new criteria for evaluating grant proposals such as being able to demonstrate "value for money" have already emerged in some donor grant announcements and will likely be used increasingly more often to determine who receives what portion of donors' DRR or CCA humanitarian assistance budgets. As each year passes it becomes more obvious that many glimpses of a future altered by climate change are already occurring in many locations on the planet. Extreme hydro-meteorological events are appearing with heightened frequencies, intensities and magnitudes which is consistent with global warming projections. As such, USAID's Policy Guidance for Building Resilience to Recurrent Crisis report, released at the end of 2012, can

Source: emergency-room-nurse.blogspot.com

be viewed as representative of a proverbial game-changer for the climate change-related sustainable development community. This document reflects an emerging realization among international humanitarian assistance organizations of the need to shift to a focus on "resilience." In other words, the development community should carry out programs for disaster preparedness, response and recovery and for sustainable development as well as longer-term (climate change-related) activities. This call for bridging short and long term development assistance activities was succinctly captured in the following statement:

> Most notably, humanitarian relief and recovery are no longer conceived of as ends in themselves but as a foundation and platform upon which new and existing resilience and development investments must and will build (USAID 2012:14)

LESSONS LEARNED ABOUT "LESSONS LEARNED" ABOUT DRR

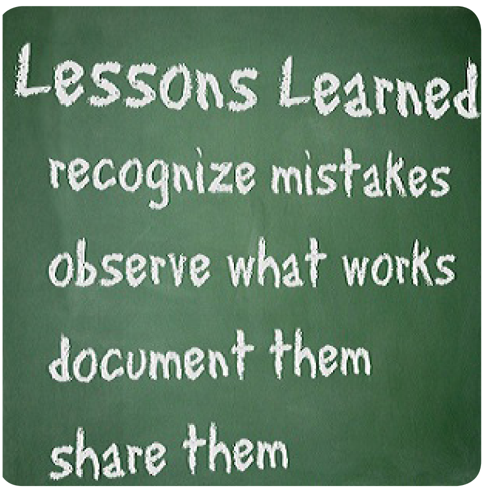
Lessons are more easily identified than learned, a truism that would be difficult for anyone to challenge. Of course, at the end of reports one can find lists of recommended actions to be taken to improve upon whatever activities have been assessed in those reports. Often actions and decisions are also noted briefly in the executive summary of such reports. When one reads such documents closely, many lessons or take home messages can be identified within the text that have not been highlighted in a formal way as lessons, even though they meet all the criteria for being considered as such.

In reviewing the basic documents from which lessons have been drawn, one finds many points that could be called lessons that are embedded throughout those documents and not just in sections labeled "lessons learned." In this way, a different person reading the same material, but having a different perspective about the issues being discussed would likely identify a different but sometimes overlapping set of lessons. Thus, there can be found many more lessons embedded in a document than are labeled as "lessons." A "ho-hum" comment on a topic to one lesson seeker may be seen for different reasons as an important comment to a different lesson seeker: lessons are always subjectively identified, depending in large measure on the perspective or academic training of the "identifier."

In identifying lessons from disaster risk reduction programs, the observation made by the narrator in the "Rime of the Ancient Mariner" comes to mind: "Water, water everywhere, nor any drop to drink." It seems this could be a similar sentiment about lessons development: "Lessons, lessons identified everywhere, but not many of them applied," the point being that over years and decades many lessons have been identified from projects and programs related to

DRR and CCA, yet most, for a host of reasons, seem to remain unused and unapplied, of benefit to no one except possibly those who wrote the reports in which those lessons were initially identified.

"The Suggestion Box is Full" ©Leo Posillico 2005



Source: www.uowblogs.com

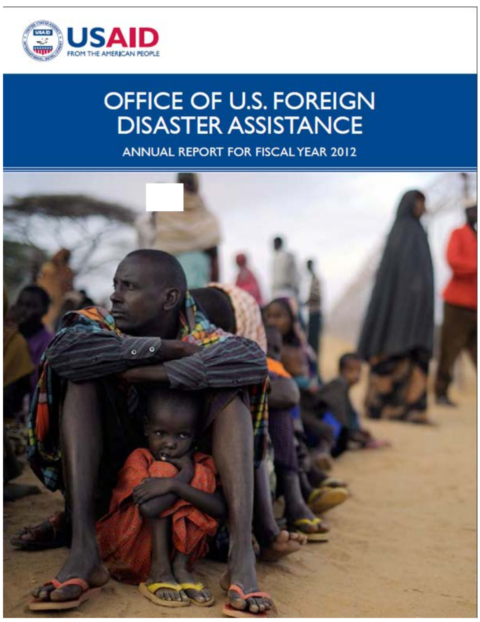
www.atoi2voir.com/atoi/visu_article.php?id_art=29

FROM PLANNING TO OUTCOMES: "WHAT OUGHT TO BE," "WHAT IS," "WHAT COULD BE"

Project planning documents usually reflect the expectations and desired outcomes of both donors and those responsible for carrying out projects. Such documents are filled with nicely worded mission statements, objectives and goals and interspersed with all the most current concepts and buzzwords, such as capacity building, risk reduction, data sharing, reducing adverse impacts, timely warnings, effective warning systems, and so forth. The sentiments surrounding such planning documents and their supporting PowerPoint presentations are most often, if not always, overtly positive, representing in hopeful language the development professionals' understanding of "what ought to be" achieved by project's end. Yet all projects have problems of one kind or another, and many of those problems are not controllable by the professionals who are responsible for carrying out those projects. Such problems often appear unexpectedly along the course of project completion, dampening the often hopefulness of that "what ought to be" that was originally presented as the desired (but not assured) future outcome of the project.

In "The Twenty Years' Crisis," British historian E.H. Carr (1939) reviewed international politics from the end of World War I to the onset of World War II in the twenty-year period between 1919 and 1939. In it, he highlighted the differences between what was desired from the international politics of the period, that is, the what ought to have been, and what the actual politics turned out to be. The "what is" vs. the "what ought to be" analytical model that resulted from his analysis can be usefully applied to hydro-meteorological concerns that deal with hazards and disasters. For example, an organization's published plans for programs for DRR and for its longer-term development (CCA) projects can be assumed to represent its highest expectations for success. In other words, such glossy publications represent an organization's understanding of "what ought to be" accomplished.

It is fair to assume that every humanitarian assistance project will produce at least some benefits to recipients and to donors, even if the project's overarching goals are not achieved, which is likely a legitimate assumption. To be sure, most often, if not always, circumstances arise that cause projects to fall short of their most desired outcomes. Unforeseen circumstances such as constraints, obstacles, intervening variables, etc. tend to arise and combine with the best intentions of the project stakeholders to produce the reality of the often limited outcomes in the actual world—the "what is."



USAID's 2012 policy guidance report serves as one example of an institution's vision of "what ought to be," providing a pathway for the agency to follow in developing its plans for its DRR activities while at the same time enhancing its longer-term, climate-change-related sustainable development prospects. The report provides several examples of what to do, at least in theory, for the foreseeable future to bring together these two seemingly autonomous sectors (DRR and CCA) into a more interactive, interdependent—bridged or blended—working relationship. While each of these sectors are aware of the other's activities (problems and prospects), a heightened synergistic relationship in a changing climate situation can be expected to yield greater benefits.

APPLYING WHAT IS, WHAT OUGHT TO BE AND WHAT COULD BE

What "ought to be" from a DRR perspective: Fewer people are affected by natural hazards each year because such hazards have fewer costs in terms of lives and livelihoods lost, cause less damage and result in significantly less socio-economic disruption.

What "is": Disaster impacts are increasing each year, collectively speaking, causing higher losses of life, disruptions to livelihoods, damage to property and derailment of economic development progress. Societies too are constantly changing, so the sustainable development goals identified today can be viewed as moving targets, that are likely to change in future decades.

What "ought to be" in regard to DRR programs: Each component of an early warning system (EWS) is given adequate attention and funding, not only to improve forecasting techniques and accuracy but also to foster resilience in the face of risk within societies and to foster an eventual feeling of ownership of projects and programs among key national institutions and at-risk communities in disaster-prone countries. Of course, how things "ought to be" is quite subjective, dependent as it is on which "lens" through which one chooses to view the world.

What "is" in regard to DRR programs: The focus in an end-to-end model, E2E, has with good reason mainly been on improving climate forecast capabilities of national hydro-meteorological services. As an outcome, people in key institutions involved in DRR projects tend to be grounded in physical science training if not background, based on the view to "improve forecast reliability." This, however, can inadvertently overshadow other important aspects of the hazard forecast chain of events from forecast to warning such as risk communication, awareness raising and enhancement of risk preparedness.

Organizations oriented primarily towards a science and technology perspective tend to favor the End-to-End (E2E) model of disaster planning, preparedness, response and recovery for DRR. This model is operational and effective to some degree for reducing natural disaster impacts on societies. From an E2E perspective, major investments in cutting-edge technology and technical expertise are considered essential and given a relatively high priority, for example, one must perfect forecast models and improve data collection networks. The cost to this approach is justified to generate valuable, usable scientific knowledge and quantitative data, if not immediately then at some point in the not-so-distant future.

To scientific and development specialists feedback from the second "E," the end user, to the forecaster is implicit. To encourage users of climate warnings to provide that feedback we suggest making an explicit reference to the feedback loop, as in a simple input-output-feedback model. This would encourage the end user --- **a virtual 3rd "E," E2E2E (or E2E+feedback)** --- to provide input to the specialists for the benefit of improved communication for the entire development community that includes civil society to the local community level.

Years of accumulated evidence suggests, however, that technological improvements alone do not necessarily directly benefit the local communities that are most at-risk from natural hazards. Technological advancements do not occur in a vacuum and cannot just be shuttled down the E2E chain to somehow automatically reduce risks and produce benefits for the recipients of such technical knowledge and equipment. To have the best chance of being usable, individuals at all levels of society must be able to understand the outputs in "popular (language)" (e.g. forecasts, early warnings, and the like) of scientific and technological jargon. Only then might all members of a society have a chance to benefit from new techniques and new cutting-edge technologies.

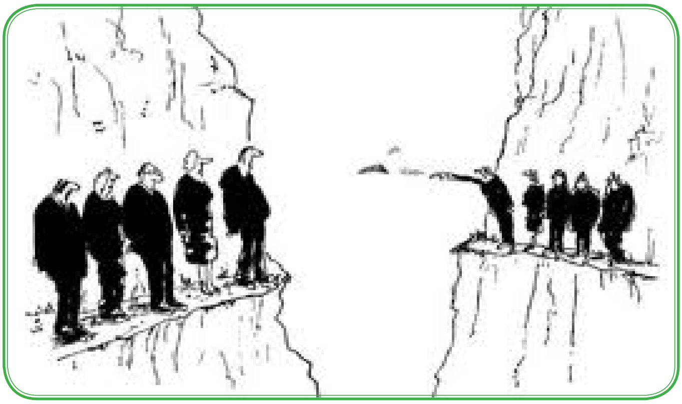
One concern is that the mention of emerging scientific and technological advances by the media often unwittingly heightens community expectations about the potential benefits of those technologies, expectations that are nearly always unrealized at least in the near term. In such situations, vulnerability to natural hazards is unlikely to decrease and may even inadvertently increase if people have been led to believe that modern technologies will protect them from the vagaries of climate, water and weather hazards. As another example, the notion of climate-proofing of society has been receiving attention in scientific as well as in popular media. While this is a "feel good" idea in theory—in the "what ought to be" realm—it will be difficult to achieve at the societal scale in the world that is.

Significantly, after decades of favoring technology transfer and scientific capacity building it has become obvious that attention and resources are urgently required for the "societal" side of the disaster risk reduction equation—risk education and raising awareness about hydro-meteorological risks. A more resolute focus on this societal component might help at-risk local communities to better understand why they need to take ownership of DRR efforts so that they can better cope with the likely consequences of a changing but still uncertain climate future. Important to remember is that ideas and not just technology can motivate people to take effective and appropriate action when coping with hazards and disasters. Such ideas that motivate individuals and communities can be viewed as "social inventions."

In the end, the point is that seeking ways to close the gap between "what ought to be" and "what is" for DRR under a global climate change scenario should encourage the individuals who constitute societies to think more about how the means and models by which and through which they live are at least partially the product of their own being in the world. In other words, it should encourage such individuals to think less about “what is” and “what ought to be” and more about the possibilities of “what could be.”

source: www.forbes.com

Actions based on one's perceptions of reality have real consequences.



"Couldn't we communicate better if we built a bridge?"
http://hahdang.blogspot.com

DRR & CCA: REASONS FOR BRIDGING AND BLENDING

Disaster Risk Reduction (DRR) has been an increasingly popular concept at least since the World Conference for Disaster Reduction, held in Kobe, Hyogo, Japan in mid-January 2005. The conference, organized by the UNISDR, produced the Hyogo Framework for Action (HFA), a guideline document for undertaking disaster risk reduction activities. UNISDR defines DRR as: "The concept and practice of reducing disaster risks through systematic efforts to analyse 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" (UNISDR 2013a).

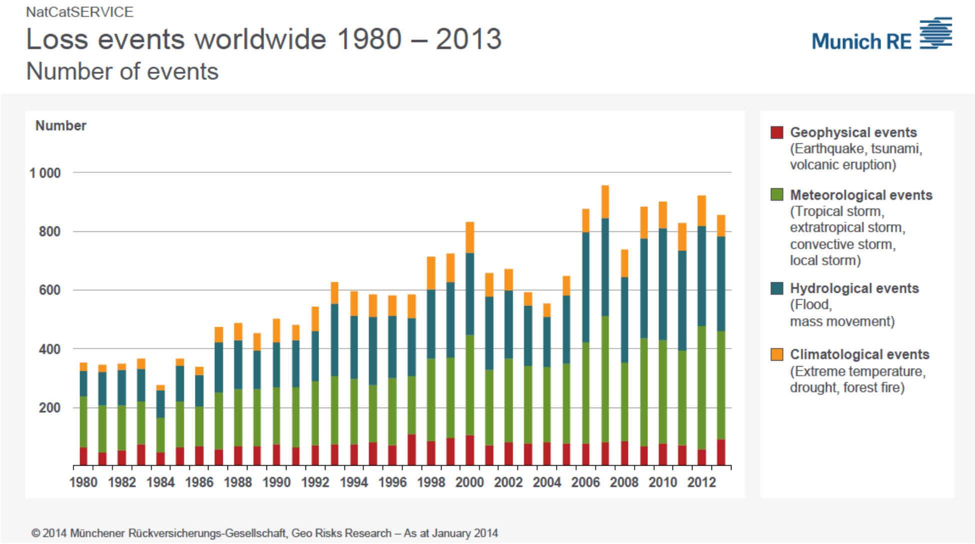
According to UNISDR, the HFA was developed by the numerous types of partners needed to reduce disaster risk—governments, international agencies, disaster experts, etc.—and brought them all into a common system of coordination. The goal of the HFA continues to be to substantially reduce disaster losses by 2015 by building the resilience of nations and communities to disasters, which means reducing losses of lives as well as of social, economic, and environmental assets when disaster events occur (UNISDR 2013b).
Closely following the Hyogo Framework for Action, OFDA has

strongly emphasized DRR through disaster preparedness activities in addition to its more usual humanitarian emergency responses to hydro-meteorological disasters. Still, however, according to one UN official, “Only 4% of the estimated $10 billion US [in 2006] in annual humanitarian assistance is devoted to prevention” (Schwartz 2006).

Until recently, adapting to and coping with the consequences of climate change impacts on societies and ecosystems have been a high priority for development agencies. In the coming few decades and throughout the rest of the 21st century, however, high-impact hydro-meteorological extremes are expected to become not only more plentiful and powerful (intense) but also more damaging. Given this new expectation, various climate impacts researchers and communities alike have focused over the past couple of decades on how to adapt to the impacts and consequences of extreme climate variability and change. Such adaptation schemes, however, may prove insufficient, given remaining scientific uncertainties about climate changes decades from today. It appears prevention of the contributory causes of climate change (aside from mitigation) has not been CCA communities' concern. Yet, prevention in terms of DRR has been a key strategic planning option in natural hazards research. Prevention as in DRR is an important option to pursue in future CCA planning.

WHY CARE ABOUT “BLENDING” CCA, DRR, AND OTHER KINDS OF DEVELOPMENT?

As noted earlier, a major concern and research focus of climate scientists today is about projected increases in the frequency, intensity and magnitude as well as about changes in geographic locations of climate change-related, high-impact, possibly record-setting events. A large share of disasters worldwide seem to be caused by hydro-meteorological extremes, which are increasingly being labeled as “Superstorms.” The reality of the increased occurrence of such events (see Figure on page 21) has prompted longer-term development specialists to turn their attention to humanitarian agencies and how such agencies are responding to disaster situations. These specialists are concerned about how tactical emergency and humanitarian responses can significantly affect their ability to achieve or protect hard-fought gains in broader development objectives.



One of the primary challenges facing humanitarian and development organizations has to do with redefining the existing relationship between Disaster Risk Reduction and Climate Change Adaptation. More generally, calls for the "mainstreaming" of DRR and CCA within development policy are repeatedly being made by development researchers. They argue that integration would open "spaces of opportunity" for each field to learn from the strengths and weaknesses of the other, thereby contributing to a more efficient use of development community resources (Shaw et al. 2010; Tearfund 2008).

Neither the "mainstreaming" of DRR into CCA nor the "mainstreaming" of CCA into DRR is straightforward. Debates have drawn on over which should be the mainstream for disaster-related hydro-meteorological risk management and which should be integrated into that mainstream. Importantly, however, "mainstreaming" within the context of these two fields must be understood as suggesting a higher degree of interaction than is entailed by simply blending, complementing or even bridging the two fields.

USAID (2012) identified changes in both external approaches to development planning as well as internal institutional processes. Its Building Resilience to Recurrent Crisis policy report, for example, reveals a serious concern within USAID about how best to bring together in-house experts who are focused on emergency preparedness, response and recovery and in-house experts who are focused on long-term sustainable economic development. Thus, bridging short-term humanitarian and longer-term development planning and activities has been identified by the agency as central to the success of its new policy guidance to build resilience. To this end, changes are being pursued through synergy to improve agency effectiveness in short-term humanitarian emergency activities (DRR) and in longer term climate change-related (CCA) sustainable development planning. By requiring closer cooperation, interaction and the awareness of need to coordinate effectively between these two differentiated mandates, USAID has identified an important lesson to help improve humanitarian and development agency efficiency and effectiveness.

KEY COMMONALITIES AND DIFFERENCES BETWEEN CCA AND DRR

Commonalities between the DRR and CCA fields include their shared concern with improving hazard and disaster preparation and response, with reducing the vulnerability of at-risk populations and with increasing societal resilience.

Considerable attention is now also focused on figuring out how institutions might bridge DRR efforts and CCA efforts between different organizations and even within them. To be sure, there is an ongoing conflict between some aspects of here-and-now emergency humanitarian preparedness and responses to hydro-meteorological hazards and disasters and some aspects of sustainable development planning for the future.

The following few pages present an overview of the possibilities for and the problems encountered in efforts to bridge, blend or integrate DRR and CCA. They also identify prospects for success. These two communities obviously must blend their efforts on at least some of their common concerns and activities. As such, a stronger relationship must be developed between DRR and CCA where their concerns clearly and directly overlap. Perhaps highlighting the following will generate better ways to effectively bring these communities together, for example, by establishing a pool of funds that is solely used to support activities in which the DRR and CCA communities truly collaborate.

DRR and CCA both . . .

- Focus on hydro-meteorological hazards;
- Fall under Disaster Risk Management (DRM);
- Seek to reduce if not avoid hazard risks;
- Seek to foster adaptive capacity;
- Seek to foster societal resilience;
- Face an uncertain climate future;
- Have (or share) overlapping time frames (short to midterm; midterm to longer term);
- Would benefit from knowledge sharing;
- Reduce vulnerability of at-risk populations;
- DRR activities generally have a CCA component and CCA activities generally have a DRR component; and
- Are concerned about rural development.

The fact is that both the DRR and the CCA communities have increasingly focused in on climate-, water- and weather-related disasters: the DRR community has because doing so aligns with its core mandate, and the CCA community has because planning for future disasters is becoming a primary concern for policymakers, even though, according to climate scientists, no single hydro-meteorological event has as yet been directly scientifically linked to climate change. Although the 2000-2009 decade witnessed an increase in the number of CCA projects, some of which even dealt with current hazards in the name of climate change and thereby overlapped with actions traditionally undertaken by DRR projects, the reality is that definite institutional boundaries persist between CCA and DRR. To bridge this gap, the DRR community must (and has begun to) put a greater emphasis on and a greater share of its resources towards anticipating, preparing for and educating civil society about how communities can better cope with the hydro-meteorological hazards they currently face. The thinking must be that if members of society cannot deal well with known hydro-meteorological extremes today, they will most likely have trouble coping with the more frequent and more intense extremes expected into the future.

There are, however, significant differences that must be addressed in terms of the tools and approaches that DRR and CCA use in addressing hazards. DRR, for example, has a history of interventions and specific tools that have yet to be well developed in CCA (Mitchell & van Aalst 2008; O'Brien et al. 2008). It also has a tradition of including local actors and local knowledge, whereas CCA has largely been dictated by global policy processes and privileged scientific expertise (Shaw et al. 2010). Furthermore, DRR is generally more inclusive of societal factors that contribute to risk, whereas CCA has generally been focused mainly on climate drivers (Tearfund 2008).

For its part, CCA has been concerned primarily with identifying ways for societies to adapt sustainably to increasingly warmer climates but over decadal timescales out to 2025 or 2050, and beyond. Coping with disasters, however, has been only one of many broader concerns of the climate change community, which also must focus on reducing carbon emissions (climate scientists refer to this as mitigation), on adapting to the impacts of human-induced or natually occurring changes in environmental conditions, developing new and non-polluting renewable energy sources through the fostering of green economic activities and livelihoods, protecting tropical forests, modeling and monitoring atmospheric changes to generate climate change scenarios on decadal time frames to assess risks, and so forth. Its direct involvement in disaster preparedness is an example of what might be viewed as the CCA community's concern about what it might (or could) learn about longer-term development planning in the name of resilience from attempts today by humanitarian agencies to cope with hydro-meteorological hazards and disasters.

Some of the principle challenges to integration of DRR and CCA include but are not limited to fragmentation of funding and implementation of resources, entrenched interests at different spatial and temporal scales, differing systems of norms, and different kinds and sources of knowledge as well as of funding (Birkmann & Teichman 2010). In particular, reconciling the top-down CCA agenda, which is driven mainly by multilateral organizations, with DRR's bottom-up local or regional approach may be especially difficult, though not at all impossible. Within USAID, for example, bridging DRR and CCA will require meaningful changes in the way these expert groups interact, which means that they can no longer remain quasi-independent fields of operation within the same agency. As such, successfully achieving this bridging is USAID's major challenge, one driven primarily by the following factors: the two communities have different mandates, they are focused on different aspects of development, they have differing missions, they have different timeframes of concern, they employ different approaches to fulfilling their missions, they require different resource streams and amounts, they have different ways to access funds, and they have different timeframes for evaluating successes and failures. As this list suggests, despite their common interest in addressing disasters, effectively bridging these two communities will be much easier said than done.

WHAT CAN BE GAINED FROM BRIDGING, BLENDING OR INTEGRATING DRR AND CCA?

Clearly, both communities must stay focused on their core concerns even as they seek to identify ways to blend, bridge or even to some extent integrate their activities, a task which could perhaps begin with disaster preparedness. In this way, both DRR and CCA would address components of Disaster Risk Management (DRM) with DRR looking at hydro-meteorological hazards to help the affected society to "bounce back better" if disaster were to occur in the near term, and the CCA community to address sustainability in the longer-term by picking up disaster responses in the recovery and reconstruction phase.

CCA could benefit from using tools already established by DRR, including methods for engaging local communities and the need for improved capacity, while keeping its focus on longer-term vulnerability reduction. DRR could benefit from CCA's proactive approach, which might better ensure that risk reduction projects incorporate changing climate scenarios into their programs and actions. By such means, a longer-term perspective for DRR could increase the longer-term resilience of projects that will eventually be affected by climate change.

Bridges are best built from both sides of the river

source: http://glennpasch.com/manangement-coaching-and-communication/

WHAT MIGHT BE LOST IN A MERGER OF CCA AND DRR?

Disasters are usually conceptualized in terms of human losses and not necessarily in terms of environmental losses (i.e. biodiversity loss, coral reef or mangrove destruction, etc.). Climate change adaptation emphasizes loss of resilience in biological systems more than does DRR, which for the most part tends to be highly anthropocentric in its focus. Merging these two strategies, however, runs a risk that global climate change will become the primary focus of all assistance planning to the detriment of other hydro-meteorological sources of vulnerability that will continue to exist in immediate local and regional contexts. Likewise, the uncertainty of precisely how climate change will affect specific locations might lead to greater paralysis of action. Another risk is that political support for the funding of DRR might be undermined in areas where climate change remains a controversial issue.

One might argue, for example, that CCA, being situated within environmental ministries and largely being framed as an environmental issue, draws strength from "eco-centric" values and has its strongest involvement if not support from the environmental community. In contrast, with its roots in humanitarian relief, DRR is more oriented towards prevention and the relief of human suffering. As such, exploring how political support for each cause is mobilized in order to see if integration might inadvertently undermine existing support would prove an interesting exercise.

In any event, the values underlying each separate approach are certainly worth making explicit before any bridging, blending or integrating can take place. In the end, building greater resilience among communities and institutions must be the overarching goal. This point will likely be especially true given the glimpses we already have of the uncertainty we will continue to face in our hydro-meteorological futures based on what we already know as well as on the "lessons" that societies have already identified for enhancing their well-being in times of such change.

The charts bellow identify the strenghts, weaknesses, opportunities and constraints as well as threats (SWOCT) related to DRR and CCA if they were to act alone.

DRR (disaster risk reduction)

November 15, 2013

SWOCT by M.H. Glantz, M-A. Baudoin & A. Tozier de la Poterie

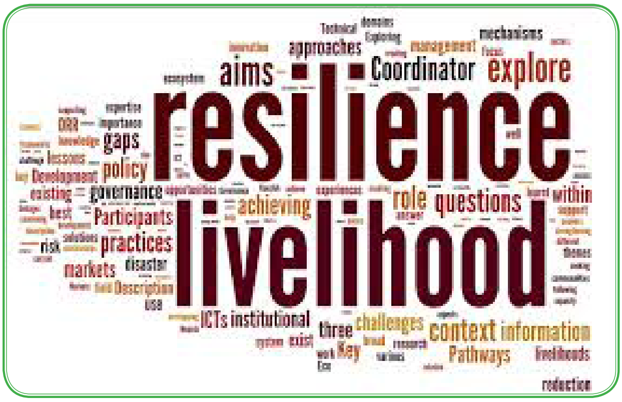
S	W	O	C	T
Improve effective and efficient use of funds "Training of Trainers" (capacity building) Creates societal awareness Donor acts as catalyst for new knowledge and new approaches Communities prepare for future but uncertain hydro-met events Creates awareness of RISKS and ways to see results of efforts early Gets life back to some degree of normalcy Can organize government agencies and local communities around the DRR theme Can concentrate on a known hazard or hazards Targets hazards Targets at-risk people Can do pilot projects to test what works Focused on short term "DRR" has become symbolic to the hazards and development world since Hyogo Framework [e.g. it's become a "social invention"] Focus on resilience of communities *Bottom-up processes and a tradition of including local actors. Incorporation of local knowledge* *Established tools and methods* *Holistic perspective that integrates both physical and social components of vulnerability* Highly visible impacts and responses; can show effectiveness and efficiency in response Can identify 1^{st} and 2^{nd} order at-risk people to educate and train (E & T) and foster TOT Visibly assisting people in need	Focus is on the short term Focus on getting things back to normal or close to it DRR community has its own vocabulary Many do not see DRR in the same way: there are broad definitions Does not consider long term sustainability in its projects Often acts through top-down, End-to-End model with implied feedback Reports may not be usable at the village level Trained trainees do not stay in the job they were trained for Support is limited due to demands for help elsewhere Different views on what is an EWS (each component) Capacity Building is a process requiring more time and funding than a traditional DRR program might provide no well defined DRR boundary with CCA and as a result mission creep can occur by CCA Focus is on the short-term Outcomes (results) are expected to occur soon after a program is implemented *What is meant by inclusion of local actors varies widely across contexts* At-risk populations, regions – all are affected in the region or country *Tension between immediate disaster response and the need for longer-term planning (bureaucracies)* *Possibility that reconstruction post-disaster will lead to later vulnerability* *Tendency to assess risk based on historical patterns (rather than considering longer-term change)* *Tendency to shift risk into the future with large infrastructure projects* *(Arguably) A focus only on shorter-term vulnerability reduction (not incorporating climate change)*	**GENERATE** Generate awareness; society to take effective ownership of disaster preparedness and response **INFORM** Identify longer-term community needs that can be passed on to CCA people or to Sustainable Development people **FINE TUNE** To better define its administrative jurisdiction to avoid "mission creep" **ANALOGICAL THINKING** Can use analogous situations from other locations as a starting point to develop a DRR program, using analogies with caution **DEVELOP** To develop a seamless bridge with longer term development needs **ENHANCE** Enhance both CCA and DRR by bridging or blending them DRR can use "**teachable moments**" for improving its response to recurring hazards in a given area (e.g. drought) [NB: for CCA, one cannot see results for efforts for a long time] Consider "**satisficing**" for DRR (NOT "shoot for the PERFECT") **Resilient adaptation** can help to merge DRR and CCA thinking DRR considers **prevention**; could get CCA to do the same, not just adapt and mitigate *DRR is under pressure to become more forward looking*	Never enough resources to do "perfect job" ("What ought to be") Donor budget cycles Hazards are constantly occurring somewhere else on the globe requiring a response Issue-attention cycle of government, agencies, media, and researchers Cultural and political differences make sharing experiences difficult In regional DRR (trans-boundary river basins) language becomes a problem Administrative budgets are limited and targeted to specific areas: CCA or DRR or Sustainable Development Limits of predictability of hazards magnitude, intensity, location, frequency Projects speak in terms of what ought to be instead of what could be (recognizing limits) Poor recipient infrastructure Donor's "chicken-egg problem": focus on economic development and then DRR or DRR while considering development? Bureaucratic rivalries in both donor and recipient countries *Low visibility. Attention focused on disasters after a major event, but support then wanes*	Hydro-met hazards exist and recur Low resolution models for limited areas Lack of infrastructure Lack of absorptive capacity Capacity building of locals Hazards do not respect borders A wrong forecast New type of hazard to a location Occurrence of a rare "super hazard" Changes in the characteristics of a region's known hazards Unplanned changes in societal characteristics Scientific uncertainty Areas are data-sparse

CCA (Climate Change Adaptation) **-Sustainability -Development -Resilience -Adaptation**

November 15, 2013

SWOCT by M.H.Glantz, M-A. Baudoin & A. Tozier de la Poterie

S	W	O	C	T
CCA is becoming relevant in political and development circles as well as in academia [name recognition of a problem/process] Focus is on mid- and long-term sustainability Can mobilize resources more easily with CCA as a reason rather than DRR education Many scenarios are being developed for CCA in future decades *Addresses both long-term risks to humans and to ecosystems* *Reliance on expert knowledge (academics and others) and expertise, and hence the ability to draw funds* *Top-down global agenda with high visibility* IPCC –National governments to ministries and then local governments *Emphasis on reducing vulnerability of at risk populations and societies in the long-term* Symbolic of the need to consider the climate change issue in forthcoming policies Focused on mid- to long-term future Focus on sustainable development	Focus is on long-term development Not integrated with DRR Has to take a back seat to disaster response and early recovery Susceptible to mission creep because everything can be linked to the atmosphere Mission creep diffuses the money available for any specific project Adaptation has many meanings Climate projections still uncertain; not clear how to respond to them as there are different ones Hard to link specific extreme event impacts to climate change Time frame for expected major changes due to climate change expressed as decades. Too far out for people to act now Conflicting time frames of DRR and CCA In financial or other situations climate change concern has a lower priority Scenarios are heuristic devices with a short shelf life; outmoded by new societal and scientific information *Lack of focus. Almost anything can be classified as CCA* *A relatively new discipline with few "official" established methods* *Top-down global agenda could also be viewed as a weakness, as the carrying out of adaptation plans is likely to take place at a local level* *Over-focus on climate drivers as opposed to other, societally-driven sources of vulnerability.* *Reliance on expert knowledge and expertise,* discussed often using scientific jargon *Long-term projections are not terribly reliable—particularly at local levels* due to coarse model resolution though at larger scales there may be better reliability	People are concerned about CCA, so many initiatives for education and trainings exist Climate change affects everything so CCA can go into many socio-economic sectors CCA activities can be useful for coping with climate extremes and variability CCA and DRR are increasingly being seen as in need of being meaningfully linked Use of resilient adaptation can help cope best with an uncertain future for which new information supersedes or reinforces existing information. Many concepts can be used to get at CCA: sustainability, resilience, adaptation, acclimatization, compensation, mitigation MANY ROADS TO ROME Climate is always changing and people have to adjust to changed conditions Adaptation to an expected change is sustainable over time CCA is the new driver in regard to environmental change—natural or human induced; governments are developing plans to create awareness Can use CCA to address chronic societal ills and adverse environmental trends To take climate change importance down the societal food chain to local communities	CCA is too broad a concept (acronym) Those who challenge climate change science can slow down meaningful support and activities Separate institutional units deal with CCA and DRR Seemingly ordinary words are redefined for CCA's purpose Global warming consequences for local level still have scientific uncertainties Difficult for public and policy people to focus on distant future while trying to survive the present Primary countries responsible for climate change do not take responsibility for it CCA does not speak of prevention as an option Harder to see measures of true success to CCA outcomes Decades may pass before benefits of CCA are seen Human nature: humans don't like change (Eric Hoffer, Ordeal of Change) Tendency to rely on Formal Expertise; neglect of indigenous and ordinary knowledge The symbol won't mean anything to the public; it is caught on in a world where acronyms are popular but won't work with the public	Global warming Local impacts are still uncertain Awareness at the local level is still missing [Cambodia] EMEs are expected to increase in frequency, intensity, magnitude, and to occur in new areas CCA-related surprises are to be expected Too general of a concept for guidance Adaptation has too many interpretations CCA is in a way a short-hand (slogan), a social invention for climate change-related people



Source: www.nalakagunowardene.com

RESILIENCE

In academia as in practice the term resilience has been used to mean a variety of different things (Ahmed 2006; Alexander 2013). In the field of ecology, for instance, it was used in the early 1970s to describe the ability of an ecosystem to persist in the face of shocks (Holling 1973). Since that time, resilient systems have often been described in terms of their ability to absorb shocks as well as to anticipate and avoid harm in order to bounce back or reconfigure after a disturbance. These qualities remain fundamental to the meaning of resilience within the social contexts of international development, which has led, unfortunately, to persistent mis-understandings of and, mis-communication surrounding the meaning of resilience in development studies.

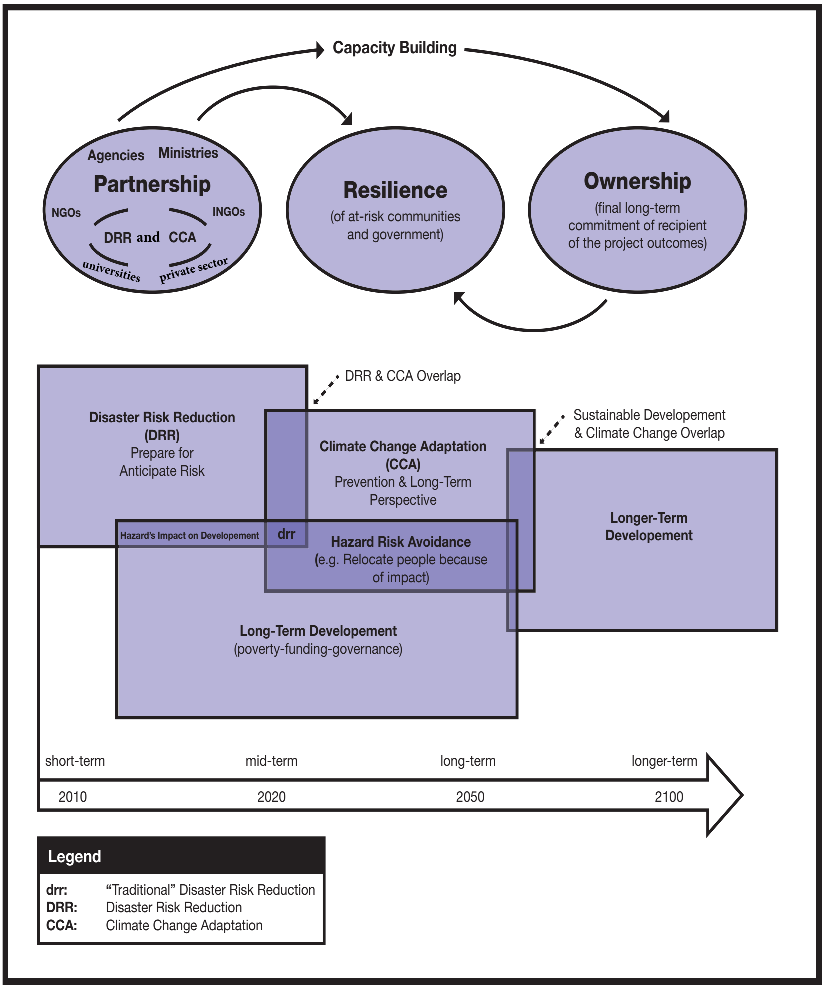
Various interpretations of resilience are explained by Gaillard (2010), who argues that when concepts such as “vulnerability” or “resilience” are used in terms of development aid (in supporting either DRR or CCA), they are typically taken out of their more theoretical contexts in order to serve different and specific purposes in the non-theoretical world. The result tends to be a lack of clarity or agreement in regard to their definitions and a lack of a uniformity in their operationalization. In this way, as Klein et al. (2003) notes, resilience has become little more than an amorphous umbrella concept for a range of attributes deemed desirable for a system to have even as the concept continues to elude clear translation into either policy or management activities.

With increasing frequency, as if blown in by a fresh new breeze across the economic, ecological and environmental landscape of what has been collectively referred to as "eco-development," development organization publications focused specifically on resilience have begun to appear. This recent conceptual shift has seen "resilience" begin to overshadow "adaptation" as this decade's dominant concept on which eco-development is to be focused. In retrospect, this shift can be seen as being similar to how "adaptation" in the early 21st century came to overshadow "vulnerability" and even "sustainable development," which were the dominant concepts of the late 20th century. Though each of these concepts remains in play and each continues to have its share of supporters, resilience appears to be the dominant concept for at least the rest of the current decade.

The shift toward resilience is a marked departure from previous trends in development that emphasized the concepts of vulnerability, adaptation, and sustainable development. The relationship between vulnerability and resilience is of particular interest and importance because of the widespread use of the former in the development industry. Importantly, although resilience is often considered little more than the "flip-side" of vulnerability, this is too limited a characterization. Resilient communities are likely to remain vulnerable to some hazards, especially in the face of climate change which is predicted to increase the vulnerability of many communities to hydro-meteorological hazards. Furthermore, hazards will likely appear in areas in which they had not been experienced before, also increasing the vulnerability of otherwise resilient communities. In these ways, communities that have significant absorptive, adaptive and transformative capacities but that also have high levels of exposure or sensitivity to or inexperience with certain types of shocks may still be vulnerable (Miller et al. 2010).

As noted above, USAID (2012) recently outlined a major shift from its previous focus on the concepts of DRR and sustainable development in a time of rapidly changing climates to an institutional focus on building resilient communities. In this document, USAID defined resilience as "the ability of people, households, communities, countries, and systems to mitigate, adapt to, and recover from shocks and stresses in a manner that reduces chronic vulnerability and facilitates inclusive growth" (9).

Complementing this need for increased focus on resilience is the associated emphasis on the need to bridge, blend, or integrate present and future climate, water, and weather concerns. The following graphic is an attempt to put some order to the DRR-CCA "playing field."



DRR-CCA graph by M. H. Glantz and M-A. Baudoin, 2013

The bottom line is that even though people are now seeing changes and are aware that they may be climate-related, these people continue to cope with those changes as they have done with variability and extremes in the past. For most people, this is all they can really do given their lack of resources, both within their countries and from international donors. In this way, by focusing on extremes the concepts of variability and change are seemingly being used interchangeably, reinforcing the need for flexibility in approaches to adjusting (or acclimatizing) to the environmental consequences of changing climates.

USAID recognizes the need to improve responses to recurrent crises in the developing world as well as to enhance the effectiveness of funding humanitarian assistance programs. According to this dual need, resilience can be seen as a "fresh," positive approach to development issues, as it draws attention to short- and long-term responses. As such, resilience has the potential to bridge different units, such as the CCA and DRR communities, that work on issues within aid agencies. However, there are overlaps because for example climate change units may support to some extent DRR activities. Problems arise to such cooperation because DRR and CCA activities are placed in different bureaus and have different sources of funding.

WHAT IS NEEDED FOR EFFECTIVE RESILIENT ADAPTATION?

"Experts tend to come from out of town," an old saying goes. In academic research across a wide range of disciplines, a similar saying could be, "Ideas tend to come from other disciplines." Joseph Martino (1972) wrote for engineers about "forecasting by analogy" with regard to technological innovation. Glantz (1988) picked up on this concept and applied it to climate change, drought-related climate impact assessments and, later, to other hydro-meteorological processes, events and societal responses to atmospheric and oceanographic processes. Such "refunctioning" of analogous ideas continues and has recently been done with the concept of "resilient adaptation." This concept is borrowed from the field of social psychology (Lothar 2003) and is intended to generate ideas about how societies might flexibly adjust to uncertain, longer-term, incrementally changing climate futures. It has been proposed, in other words, to better understand available societal options in trying to cope with or adjust to change, especially given ongoing atmospheric warming.

Resilient adaptation may prove useful to DRR and CCA professionals in operationalizing its vision of creating resilient communities, providing a framework through which the separate concepts of resilience and adaptation can be merged. Resilient adaptation can be defined here as "a process that is a flexible, incremental approach to adjusting to and coping with the foreseeable adverse (or beneficial) impacts of an uncertain changing climate" (Glantz 2008).

As noted previously, the term resilience has been used to refer to the ability to bounce back. The term adaptation, on the other hand, while also having many definitions, refers generally to changes in human or natural systems in response to anticipated or experienced shocks. In the context of climate variability and change, it refers to any adjustments in economic or social behavior that reduce societal vulnerability to climatic change. Given these definitions, the merger of resilience and adaptation directly correlates to USAID's goal of "layering, integrating, and sequencing" humanitarian recovery efforts and longer-term development. It entails incrementally coping with both short- and long-term consequences of climate variability and change in ways that are mutually reinforcing. In this way, resilient adaptation provides a framework through which short-term challenges can be foreseen and responded to without losing sight of the downstream implications for longer-term resilience. It acknowledges that although there is considerable uncertainty associated with planning for the future, there are "knowable surprises" for which taking anticipatory action, if not to prevent than at least to mitigate the effects of such surprises, is possible.

The acronym PASWIRO represents the suggested steps needed for assessing the impacts of proposed adaptations to climate change using the resilient adaptation framework. The following Table summarizes the meaning of each letter in the acronym.

	PASWIRO Action	Reasoning for action
P	*Problem* identification (underlying and proximate causes of the problem)	This includes identifying biophysical and social impacts as well as residual risks of climate change in order to identify appropriate adaptation measures.
A	*Adaptations* proposed in responding to a changing climate	Evaluate potential adaptation activities in relation to goals. The evaluation process must consider both strengths and weaknesses at various levels (i.e. national, regional, local, household), particularly in the long-term.
S	*Strengths* (or value) of that adaptation	Strengths include economic, ecological and social benefits and how these are likely to hold up over time.
W	*Weaknesses* of the adaptation	Weaknesses refer to continued or exacerbated risks as well as to new risks that may arise from proposed adaptations over time.
I	*Impacts* of the adaptation (social, ecological, etc.)	What are the expected impacts of the adaptation? What are impacts that were not expected?
R	*Resiliency* level for the short-, mid- and long-term	Resilient adaptation requires continuous reassessment of the effectiveness of the adaptation at various timescales as well as changes in responses to emerging information.
O	*Opportunities* expected to be generated by the adaptation	What are the intended and unintended positive consequences of the adaptation process?

M. H. Glantz 2013

http://cobaltpm.com/lessons-learned-on-projects/

LESSONS LEARNED

A key objective of this survey was to identify "lessons learned" from selected OFDA hydro-meteorological projects and activities. The Free Dictionary (www.thefreedictionary.com) defines a lesson as:

> **a.** An experience, example or observation that imparts beneficial new knowledge or wisdom.
> **b.** The knowledge or wisdom so acquired.

Just about every hazard or disaster-related assessment, retrospective or hindcasting exercise ends with a section in its final report devoted to lessons learned. These lessons often take the form of recommendations about what to do differently in the future if faced with a similar situation as in the past. Such an exercise is a way for humanitarian assistance organizations to "ask those coming back in order to glimpse the road ahead." Although doing so makes perfect sense, identifying meaningful project lessons is, however, not always so straightforward.

A substantial and growing literature on "lessons learned" has emerged that details how to identify, store, access and reuse the lessons of past events (e.g. Weber et al. 2001). An important point often overlooked in this literature is that most lessons that are "identified" focus on what has been "learned" about those activities that were undertaken but that did not work out well or that did not work out as expected. As a result, lessons identified often tend to be negative, relating to activities that could be improved; those activities that actually worked well, on the other hand, are usually seen as being needless of comment. This tendency has to be better identified and contested as it detrimentally influences future planning and operation of programs.

In an organizational review-of-program context positive 'lessons' drawn from those activities that did work can also be made explicit. If something did work, the need still exists to state explicitly what it was and why it worked so well. To this end, the "tone" of a set of lessons identified—and rightly or wrongly considered learned—should be balanced by highlighting beneficial actions as well as actions in need of improvement. The metaphor for "what we know vs. what we don't know" is that of a glass being three-quarters full and one-quarter empty. The tendency in science-related issues is not to dwell on what we know or what worked effectively (e.g. the three-quarters full glass) but to dwell on the one-quarter of the glass that is empty, that smaller part that represents the uncertainties that remain in any situation.
In this "Lessons Learned" survey, we have sought to address this tendency by not only focusing on what issues need to be addressed but by also highlighting some lessons (i.e. learning experiences) drawn from those actions that proved successful and that should be maintained, if not strengthened, in the future.

While organizations cannot very readily modify the definition of "a lesson," they are at liberty to define "lessons learned" in their own way and to meet their own needs. Here are just a few illustrative examples of how "lessons learned" are defined and identified by some top international organizations.

According to the NATO (2011) Lessons Learned Handbook:

> Lessons can be derived from any activity. They are a product of operations, exercises, training, experiments, and day-to-day staff work. During the course of our activities most of us will recognize ways of doing things more easily or efficiently that

> can be passed on to our colleagues and successors to help them avoid problems and do even better than we did before. The challenge facing any organization is to build a culture within which we all feel comfortable and motivated to share our knowledge in a productive way (p. 2).

As part of the U.S. Department of Homeland Security (DHS), the Federal Emergency Management Agency (FEMA 2013) maintains a comprehensive electronic library, the Lessons Learned Information Sharing (LLIS). It typically has a broader view about what can be a source of lessons learned, including Lessons Learned (defined as knowledge and experience, positive or negative, derived from actual incidents, such as the 9/11 attacks or Hurricane Katrina as well as those derived from observations and historical studies of operations, trainings, and exercises), Best Practices, Good Stories, Notes from the Field, Trend Analyses, and Practice Notes (defined as brief descriptions of innovative practices, procedures, methods, programs, or tactics that an organization uses to adapt to changing conditions or to overcome an obstacle or challenge). [**NB: It is important to note that the LLIS is <u>not</u> for open sharing. the www.LLIS.dhs.gov website does not alert a reader to the fact that the sharing is only for so-called "first responders. Our access was twice denied.]**

Similarly, UNEP notes that "there is considerable published academic and informal (grey) literature on 'lessons learned' and most of these aim to convey knowledge gained through experience, in some specified field of performance" (Spilsbury et al. 2007)

Writing for DHS, Donahue and Tuohy (2006) observe that:

> Despite these widespread activities, however, the term 'lessons learned' is often a misnomer. Our experience suggests that purported lessons learned are not really learned; many problems and mistakes are repeated in subsequent events. It appears that while a review of incidents and the identification of lessons are more readily accomplished, true learning is much more difficult. Reports and lessons are often ignored, and even when they are not, lessons are too often isolated and perishable, rather than generalized and institutionalized.

The distinction between a "lesson learned" and a "lesson identified" is critical for development prospects. As one extreme hydro-meteorological event can set back economic development gains for many years, it pays for humanitarian aid agencies to be aware of this important distinction—that **identified ≠ learned!**

At the heart of the matter concerning lessons learned is whether lessons are, more broadly, framed as "teachable moments" that are useful for planning for future resilient and sustainable communities. This issue is a concern to emergency and humanitarian assistance agencies because, while many lessons are gleaned every year from each new hydro-meteorological hazard or disaster, the growing expectation is that the lessons identified will translate directly or without question into benefits when used in future decision-making processes.

The question is whether such so-called "lessons learned" are ever actually re-viewed (i.e. looked at again) for possible application in future decision making processes. For a variety of reasons, unfortunately, many lessons seem to have little "re-use value," even to the same decision makers, to the same organizations or for a similar project for which the lessons had originally been identified.

Donahue and Tuohy (2006) addressed some reasons that responder organizations to emergencies—disasters, really—tend not to use lessons from others or from the past, even if it is a past with which they are familiar. Their article has many take-home messages for those truly interested in learning from the hazards and disaster of the past. Some of these messages are provided in the following bullets:

- Concern about attribution and retribution from having identified lessons;

- Different meanings of terminology create misinterpretations (and generate a false sense of understanding);

- Focus of reporting is imbalanced and tends to negatively focus on what to do and not on what not to do;

- Smaller but valuable lessons are usually omitted;

- Reports are not distributed effectively;

- Focus is too often on conferences, even though these are not the most pressing places at which lessons need to be presented;

- A problem of "trust," even among units within the same organization;

- Fears of mentioning a lesson learned being seen by others as self-criticism;

- Lessons learned exercises must be done without blame;

- Identify positive as well as negative lessons;

- Use a facilitator to tease out the lessons with a degree of objectivity;

- A lessons learned process is important for continuous similar activities, as lessons can be passed on seamlessly;

- Lessons-learned templates need to be customized;

- Not everyone in a lessons learned session will agree on all the lessons selected; and

- Find ways to make the implementation of recommended solutions visible.

Providing a corporate perspective, Milton (2009) suggests that "a lesson identified for reasons other than for sharing or re-use in future decision making is of interest to historians but not necessarily to knowledge building for future use or value, regardless of whether the lesson is about positive or negative outcomes." He usefully proposed the "5 steps a lesson has to go through before it can be considered learned: Reflect on experience, Identify learning points, Analyze, Generalize (at this stage we have a lesson identified), and Take Action (a lesson needs to be accompanied by an action if it is to be considered truly learned).”

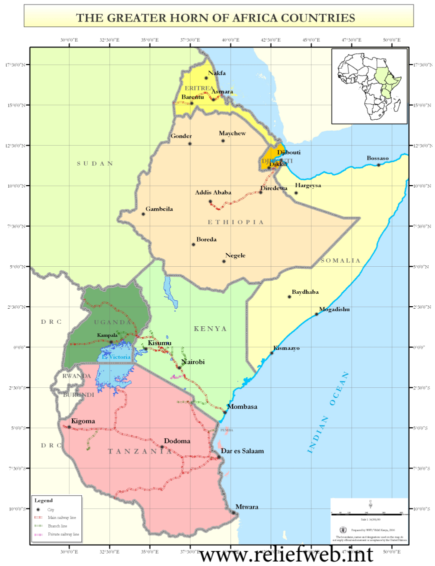
The reality is that disagreements are foreseeable about every aspect of “lessons learned,” including how to identify them, validate them, store them, retrieve them, use them, and share them. While objective criteria can be used to identify and categorize specific lessons or generalizable ones, an element of subjectivity will always exist in such processes. In light of this reality, we suggest that each recommendation made or lesson identified should be accompanied by a “ramification statement” that makes explicit the possible consequences of not acting on those recommendations presented or lessons identified (Glantz et al. 2009: 89-90).

An interesting idea to conclude this section comes from a UNEP report (Spilbury et al. 2007), which suggests that the actual lessons identified or learned are not the most important outcomes of a lessons learned activity. Instead, the report claims that what is important is the discussion and debate that surrounds the first-time proposal of lessons or the framing of lessons from other socio-economic, institutional or historical contexts for re-use in new and current contexts.

STUDY METHODOLOGY

The case studies that follow have been conducted by various authors using different research approaches and methods. Each case study relies on a mix of document review and interviews with key informants. The document review targeted key reports provided by OFDA and other informants to understand OFDA's initial goals and planned activities, the program's implementation and, in some cases, their final outcomes. Other documents analyzed include regional documents and NGO reports.They also provided data to assess specific characteristics and performance, as well as weaknesses and room for improvements of selected OFDA's DRR programs in each of the cases. In addition, interviews were conducted with key actors involved in OFDA's projects, such as stakeholders and NGOs staff.

Thirtieth Greater Horn of Africa Climate Outlook Forum March-May 2012, Kigali-Rwanda



www.reliefweb.int

CASE SURVEY: GREATER HORN OF AFRICA (GHA)

THE PROJECT

The case study in sub-Saharan Africa offers a review of a specific OFDA DRR program that was developed in the GHA between 2002 and 2005. This program, called "Regional Climate Prediction and Risk Reduction in the Greater Horn of Africa," aimed at improving preparedness for hydro-meteorological risks. It was undertaken in partnership with ICPAC (IGAD Climate Prediction and Applications Center) and the International Research Institute (IRI); the WMO provided technical support.

Because of the high exposure of the GHA to hydro-meteorological risks, especially droughts and floods, OFDA's program targeted risk preparedness at the regional, national and local levels (through pilot activities). At the regional level, the program sought to enhance climate monitoring through the strengthening of ICPAC as a platform to provide training of staff from the NHMSs in the GHA, technological support to better monitor national forecasts using advanced technologies, and a place for interaction and dialog, to share data and knowledge at the regional level. Moreover, OFDA provided extra support to the COF meetings, which were used as vehicles to enhance regional collaboration and to promote a better understanding of seasonal climate outlook and climate information for a range of relevant categories of users. The NHMSs were then relied on to disseminate climate information more broadly at the national level.

At the local level, several demonstration projects were piloted in order to show the utility of appropriate and accurate forecasts in decision-making for various stakeholders and in different climate-sensitive sectors. These projects were also aimed at reducing vulnerability to climate risks within local communities. They were mainly conducted in Kenya, with the objective to upscale project results in other regions of the GHA after having been successfully tested.

CONTEXT AND PROBLEMS

Sub-Saharan Africa (SSA) is highly susceptible to climate-related disasters. Catastrophic events, such as the consequence of the El Niño of 1997-98, the heavy floods in Mozambique in 2000 and the most recent drought in the Great Horn of Africa in 2010- 2011, have illustrated the heavy "costs" of hydro-meteorological hazards in the region in terms of loss of life and property, loss of livelihoods, displacement of settlements, and economic disruptions. The GHA, which extends from Eritrea to the Great Lakes region, is especially prone to hydro-meteorological risks. For instance, among the 166 million people globally affected by floods and droughts in 2011, most were located in the GHA (Clark 2012).

This situation is likely to worsen in the future due mainly to the expected impacts of climate change as well as to the particulars of the region's current development path. On the one hand, SSA has been identified by the IPCC 2007 report on climate change as very vulnerable to climate change, with the following negative impacts (among others) expected in the coming years and decades: increased hydrological stresses (expected by 2020); increased and increasingly rising temperatures; more or less predictable extreme events (e.g. storms, dry spells, etc.); and gradual (creeping) changes in precipitation patterns that include increased rainfall variability. On the other hand, the resulting impacts on livelihoods will continue to be exacerbated by development patterns and overall social characteristics of African societies, which currently include high population growth, increasing urbanization, dangerous locations available for resettlement of displaced poor communities, in addition to climate-sensitive livelihood, especially in rural areas where rain-fed agriculture is dominant (Hansen et al. 2011). Climate shocks might also disrupt the current rapid economic development in the region.

SSA's high vulnerability to hydro-meteorological hazards is not only a result of its exposure to such events. Another factor of vulnerability is the many many gaps that remain in the overall practice of DRR on the continent. For example, such gaps were identified and used to highlight lessons learned for DRR in the aftermath of disasters associated with the 1997/98 El Nino in Kenya and floods in Mozambique in 2000. The ability to use past experiences to plan for better responses to similar future events is an important capacity for governments to develop in disaster-prone countries as well as for international aid agencies working to improve living conditions in the GHA. Such lessons from the past are, therefore, significant for DRR and the CCA communities alike, both of which are trying to save lives under a changing climate. Moreover, with increasing hydro-meteorological risks expected to be the norm in the not-too-distant future and a likely leveling-off of funding for aid agencies, gaps and weaknesses in disaster management that have been pointed out for decades have to be addressed now with greater focus and efficiency.

Importantly, improvements in DRR planning and operations have been acknowledged over the past years. Until recently, however, focus in terms of funds invested and projects supported was heavy on risk response and recovery (i.e. "traditional disaster risk reduction" (drr in lower case). Although these provisions were necessary, the lessons of such events, even when they were acknowledged and identified, were not always learned and applied to similar future situations.

Fortunately, an ongoing shift of attention over the past several years towards risk preparedness and prevention has been gradually endorsed by aid agencies. Among these agencies that have made this shift is OFDA, which seeks to increase its efficiency in addressing DRR, and is increasingly willing to invest its resources into better risk preparedness in efforts to enhance the resilience of societies to natural hazards (USAID 2012; UNISDR 2013c). This shift, highlighted in several recent aid publications, also importantly responds to the contemporary pressures to control spending and streamline resource allocations for costly recurring recovery measures in the same locations. It also aims to filling in gaps in most African country's capacity to manage disaster risks.

In SSA, financial, technological and operational resources are all often limited, especially in regards to what is needed to collect climate data and monitor forecasts. Also often lacking are skilled staff and communication tools to issue timely warnings to relevant, at-risk settlements. Nonetheless, regional institutions have been established across the sub-continent within the past two decades to provide weather and climate advisories with predictions and early warnings (IRI 2001). In the GHA, ICPAC (IGAD Climate Prediction and Applications Center), created in 1987 (called the Drought Monitoring Center or DMC at that time), is a significant regional climate center. The main aim of ICPAC is to provide timely climate information in the GHA to enable member states to better cope with climate-related (including water and weather) risks and to minimize the impacts of climate and climate-related extreme events. Among ICPAC's main activities and significant contributor to DRR in the region is the organization of Climate Outlook Forums (COFs), which occur three times a year (since 2011). Preceded by a one-week training session that has over the years proven important to national NHMS staff in the GHA, the main objective of the COFs is to provide pre-seasonal forecasts for the region and warn users in climate-sensitive sectors about potential climate impacts on their activities. Moreover, COFs are important cooperation opportunities for countries in the GHA to produce climate information.

Because of limited financial and technological capacities in the GHA, international support for regional climate centers such as ICPAC is important in order to address and improve the management of hydro-meteorological risks. Not only does such support promote use of advanced technologies for climate predictions in order to enhance risk prevention, but it also aims at improving communication on risk and risk awareness within vulnerable societies. Preparedness is, indeed, crucial. No matter how much the climate science improves (and continues to do so), forecasting alone will never make a warning system fully operational. Also necessary is the need for better risk communication, education and preparedness, factors highlighted in previous lessons learned in SSA.


Communication between an African rural community & climate experts

DRR AND THE GHA

OFDA's main DRR program in the GHA clearly provided long-term outcomes. A significant impact of this program was its contribution to the establishment of ICPAC as a relevant climate center at the regional level. Clearly, OFDA acted as a catalyst in developing this institution, which continues to promote data exchange among meteorologists in the GHA, to train staff from the NHMSs and to provide technological facilities for climate monitoring across the GHA. In addition to being a catalyst, OFDA also served as a bridge to funding from other donor organizations that supported follow-up stages of DRR in the region. These are two major long-term outcomes that resulted from this particular DRR program that was funded by OFDA.

Moreover, in prioritizing technology transfers and the use of advanced techniques to improve climate predictions in the region, another positive outcome of OFDA's funding was the enhancement of early warnings as well as a greater dissemination and understanding of forecasts among some categories of users, especially inKenya. Forecast quality and seasonal predictions have also improved over the last decade, an outcome that also first emerged with OFDA's funding of technological advancements and skill improvements among meteorologists at ICPAC.

Despite these important successes, some shortcomings regarding forecast quality and "real-world" utility have been identified in this review of the current state of DRR in the GHA. For instance, climate predictions remain spatially too coarse and regional in nature to be operational as a utility, especially at the local level. This limited forecast accuracy at finer spatial levels is partly linked to data limitations that are the result of difficulties some ICPAC member states have collecting, monitoring and downscaling relevant climate data (e.g. there is a lack of infrastructure to collect local climate data in most of ICPAC's member states). In this regard, it should be noted that not all countries in the GHA are equal in terms of infrastructures, technologies or the forecasting skills necessary to be able to produce reliable seasonal predictions.

Moreover, forecasts in the GHA are typically not produced according to user needs; in many cases, such needs are not assessed by hydro-meteorologists or ICPAC's scientists who work on the production of seasonal forecasts. Actually, the production of seasonal forecasts remains essentially in the hands of climate scientists from ICPAC, the IRI and the regional NHMSs who appear to have limited interactions with users, especially those representing local communities. In other words, the feedback loop implied in the so-called "End-to-End system" (E2E) is not yet made explicit in real-world application. Encouragingly, attempts to develop and increase outreach to different categories of users have been observed, a trend that appears to continue even today, especially during COFs.

COFs are still regularly organized before each important rainy season in the GHA, and these forums continue to serve as a basis for the release of seasonal climate predictions to each ICPAC member state. Until 2011, seasonal predictions were only monitored for two rainfall seasons (Fall and Spring) over the Great Lakes
and Eastern part of the GHA (i.e. over Kenya, Tanzania, Uganda, Somalia, etc.). In order to better serve all countries across the GHA, a third annual national forecast was released for the “summer rainfall countries” such as Ethiopia, Sudan, and Eritrea. It should, nonetheless, be noted that before 2011, ICPAC was already supporting national meteorologists in these summer rainfall countries, providing, for instance, support for their specific seasonal forecast.

Participation in the COFs of users not directly concerned with the technological aspects of climate remains very limited despite recent improvements, especially regarding potential users at the local level. Even if the participation of climate-sensitive Ministries, international non-governmental organizations (INGOs) and journalists (through the Network of Climate Journalists of the Greater Horn of Africa (NECJOGHA) has been maintained and potentially even increased since the end of OFDA’s program, there remain a lack of engagement with smaller institutions like NGOs and farmers' associations that interact more directly with local communities (according to interviews and field work). Such local actor participation is key to the success of the E2E system because they are the end-users of the seasonal forecasts. Thus, their inclusion in the process is necessary if early warning systems in the region are to reach their full potential usability.

The limited inclusion of "ordinary knowledge" (experiences) that exists at local levels is unfortunately systemic in programming in the region. For example, outreach towards stakeholders and civil society remains one of the weakest links in the EWS in the GHA. In narrowly focusing on technological improvements and the capacity building of climate scientists at ICPAC, other important components of the EWS receive limited attention, namely those having to do with communication, education and risk awareness. ("ordinary knowledge" is discussed briefly in the Concepts section at the end of this report).

Emphasis on the technological aspects of the EWS as well as a lack of cooperation among relevant partner institutions (see full report for more details), are also likely responsible for the abrupt cessation of most pilot projects that were meant to demonstrate the use of forecasts in decision-making in various sectors at the local level once OFDA funding ended. Such activities, which constituted a link between the climate science and society, and which encountered more or less success during the project's lifetime, were not carried on because follow-up funding was not forthcoming once the project's short-term grants ended. Ultimatly, this circumstance may have resulted from both a lack of interest among ICPAC's physical and climate scientists as well as a lack of ownership by the institution itself, an observation that highlights the need for aid agencies to consider longer-term commitments that ensure ownership by host institutions once a project has ended.

While advancements in forecasting and in forecast technology are important, this study shows that early warnings alone are not enough for society to successfully avoid disasters. For timely action in hazard situations, in addition to warnings, social aspects of EWS must be addressed. Forecast dissemination at the local level remains inadequate, in geneal, especially for communities in hard-to-reach areas, which suggests that early warning information is distributed unevenly. Further work is needed to develop communication networks to address these disparities. More broadly, it implies that successful programs require scalling-up (see the RANET section in this review). Furthermore, forecasts in the region are not user-friendly. That is, they are often expressed in complex and probabilistic terminology, which limits most local users' ability to understand them. After years of programming in the GHA, social aspects of EWS warrant more attention and investment. In particular, the scientific community must be encouraged to increase its efforts at providing user-friendly climate forecasts and other products so that it may fulfill its mission to benefit societies in the region. At the same time, investment in the education of farmers, who often neither understand nor trust forecasts, must be given a higher priority to realize the full potential of a transition to a more user-friendly DRR.

In addition, to enhance the usability of forecasts for DRR, it is necessary to overcome persistent problems that hinder the capacity to utilize them in timely decisions. These problems include limited institutional capacity and poverty. For example, governments in the SSA often lack preparedness plans to respond quickly to risk alerts. Furthermore, they are limited by inadequate funding to operationalize responses. Moreover, at the local level, poverty consistently hinders the ability of farmers to invest in new strategies to respond to foreseeable climate stresses. Despite these challenges, there is hope if one considers the abundance of opportunities in development communities. For example, risk insurance and microcredit programs could potentially alleviate these aforesaid problems by enabling farmers to pursue and implement new agricultural strategies, which in turn, builds greater resilience to hydro-meteorological events. In the future, what is needed is a strengthening of long-term development mechanisms that foster partnerships between DRR and development communities, which are often perceived as separate entities.

In many respects, however, it seems that communication is the key problem. Communication not only entails interacting with forecast users; it also includes educating and training those users (especially end-users). Addressing the communication challenge could provide a significant opportunity to enhance forecast usability, which in turn, may improve agricultural and policy decision-making, as indicated by numerous studies (see Archer 2003; Hansen et al. 2011), including one in the GHA region (Ngugi et al. 2011). There, the successful use of seasonal forecasts was promoted to select farm communities in the Machacos district of Kenya, which suggests that benefits of such an initiative are encouraging.

Addressing the issues of hydro-meteorological risk that are faced by people in the GHA is possible, and doing so opens up many opportunities for increased interactions between climate scientists and stakeholders at every level, from key Ministries to local communities,

Farmers' community in a rural African village

and especially at the level of the first victims of hydro-meteorological events, the "zero-order responders" in local communities. To be sure, proactive steps can be taken into the future by DRR institutions such as OFDA, which played a key role as catalyst for ICPAC, that are committed to saving lives and livelihoods. But such work must not only include DRR institutions. Longer-term commitments and increased collaborations with other partners such as those working on CCA and development issues are also necessary if eventual ownership of projects and enhanced resilience of African societies in the face of known future climate and development challenges are to be secured.

"LESSONS LEARNED" ABOUT DRR IN THE GREATER HORN OF AFRICA (GHA)

Many past reports have highlighted lessons drawn from SSA hazard and disaster literature; one such comment from a researcher might suggest that we need to pay more attention to lessons (and recommendations) related to previous hydro-meteorological events. Rob Bailey (2013), for example, asks, "why [are] early warning systems—which have dramatically improved over the last 20–30 years— . . . good at predicting crises but bad at triggering preventive action?". On the bright side, visible and significant improvements in climate science and in forecast accuracy have also been observed. The present review acknowledges the key role OFDA played in this field. Not only did it contribute by helping to introduce the use of advanced technologies for forecast improvement but it also catalyzed support for ICPAC, which has been recognized for its regional contributions by the WMO.

There is, however, still much room for improvement in terms of hydro-meteorological risk reduction in the GHA. For example, the continued prevalence of technologically-generated forecasts to the exclusion of other societal factors remains a concern, as exemplified during recent droughts in the GHA (2010-11). Although warnings were generated early enough for plans and preparations to be made to avert calamity, a food crisis that adversely affected thousands of people in the region nevertheless emerged (UNISDR 2012). In this situation, responses from neither national nor international authorities were forthcoming. This illustrates just how risk preparedness is, with communication problems, among the weakest link in the development of a truly holistic early warning system in the GHA.

But early warning is not an easy task as so much rides on whether a warning is specific enough to be useful or trusted enough to be used. In working to meet these criteria, aid agencies have in recent years made useful shifts in DRR planning to focus less on disaster response and recovery and more on risk preparedness and prevention. A further step in this shift would be to begin to perceive risk preparedness not just as a climate-centered problem (one that essentially relies on scientific and technological improvements) but as a societal problem with an important scientific component. Doing so might go a long way in acknowledging that contending with social issues requires as much education, awareness-raising and capacity building as do the physical aspects of climate science.

Improvements in climate science notwithstanding, warnings and forecasts will remain shrouded by uncertainties. This is why, as mentioned earlier, stakeholder preparedness, awareness and understanding of products such as forecasts and early warnings should be improved if trust in and use of EWS is to be increasingly mainstreamed into decision-making processes. Moreover, communication related to forecasts and early warnings remains a significant problem in disaster risk management (for both DRR and

CCA) in the GHA, a problem that urgently needs to be addressed. To further attend to reduce risk and vulnerability, communication gaps must be filled if social responses to recurrent natural hydro-meteorological hazards in vulnerable regions like the GHA, which will only be amplified in the context of climate change, are to be improved upon.

ILLUSTRATIVE LESSONS

Some of the key lessons identified in this report, through evaluation of the OFDA/DRR program for the GHA, are summarized in the list that follows. These lessons in general demonstrate OFDA's contributions to DRR in the GHA. They also highlight the significance of disaster reduction activities and suggest potential ways to improve them in practice in the context of changing hydro-meteorological risks that are expected to come as climates change.

1. Humanitarian assistance and emergency responses for DRR are inseparable from longer-term development issues. Over recent years, societies' vulnerability to adverse climate events has increased as a result of socioeconomic and political causes and not only because of changing climate-related conditions. Similarly, as this report demonstrates, common development patterns in GHA countries, such as institutional corruption at the level of government or chronic poverty at the margins, go a long way to undermine the capacity of individuals at many levels of society to effectively use early warnings and forecasts for DRR-related decision-making. Therefore, bridging activities to foster and strengthen partnerships that link research and associated DDR activities with development planning are necessary.

> **Ramifications:** If c oncerted efforts to bridge, integrate or blend DRR and CCA activities are not taken seriously, hydro-meteorological extremes and their impacts will likely further burden the most vulnerable as well as, increasingly, other communities as they become more susceptible to hydro-meteorological risk. In such a case, governments and humanitarian organizations will have even more difficulties responding effectivly, regardless of how good forecasts and warnings on risks eventually become.

2. Climatological and hydrological approaches for addressing regional needs must be continually advanced through cutting-edge science, technology and methods in SSA. The GHA case study demonstrates that improved downscaling techniques, for example, would be extremely useful for risk mitigation. Similarly, greater accuracy in and reliability of forecasts for use at the local level would also be helpful. Overall, improvements in these sciences as well as in their general usability would increase trust in a number of climate products.

3. Long-term commitments to DRR as well as to bridging, integrating or blending DRR methods into development strategies is necessary if resilient outcomes and post-project ownership of such activities is to be ensured. A donor agency should consider in advance post-project strategies that seeks to ensure that the activities it initiates will be completed and that the results will be adequately evaluated once the original funding ends. To foster post-project ownership by recipient states, local-level stakeholders must be included from the outset of project planning and be provided with training and capacity building.

> **Ramifications:** If investment in DRR for stand-alone, short-term projects continues in a business-as-usual fashion, then the need for aid agency spending in this field will likely increase, sustainable longer-term results will likely not be achieved and many climate-related development issues will not be adequately addressed. These risks are illustrated in short-term demonstration activities commissioned by OFDA in Kenya over the course of its 2002-2005 project. These activities were managed by ICPAC but had to do so with insufficient staff involvement and no early consultation of all relevant institutions. As a result, several of them were not completed and their findings were not applied.

4. Findings from pilot activities should be shared with other NHMSs and follow-ups on the use of climate products after COFs should be conducted. Doing so would foster the role of ICPAC as a regional institution.

> **Ramifications:** If the sharing of relevant findings is not

promoted, ICPAC will likely continue to be perceived as Kenya-centric and, as a result, the application of project findings to other areas will be less likely. If follow-up activities are not conducted on how to improve the use of climate products, the usefulness of such products at the local level might remain marginal.

5. Multidisciplinary impact and vulnerability assessments should be conducted for all DRR activities. Such social assessments are as much a part of early warning systems as is the climate science.

Ramifications: Generating demand-driven, tailor-made climate products that address the needs of specific users is not possible without first assessing those users' needs and vulnerabilities; otherwise, these climate products will be neither used nor understood by their intended users, and fundamental problems related to forecast dissemination and interpretation will persist, especially at the local level. This situation was highlighted through the Kenya case study.

6. All projects should include activities to monitor progress, evaluate results and discuss next steps; furthermore, reports should be made available in understandable language to the public.

Ramifications: If evaluation activities are not conducted, performing necessary mid-term adjustments to identify next steps and draw lessons to apply to other projects is usually not possible. In the same way, aid agencies should look for lessons in past activities before preparing new projects so as not to repeat past mistakes.

7. The education and training of users of climate products is a significant component of an EWS that is often overshadowed by other, seemingly more important components. Educating and training people about hydro-meteorological risks and about how best to disseminate and use forecasts is important if warnings are to be effectively received, understood and used. Early warnings by themselves, however, are not a guarantee of reducing risks, as demonstrated in the GHA case study.

Ramifications: If education is not emphasized, different categories of users, including members of local communities, are not able to use warnings effectively, especially if they do not understand them or make inappropriate decisions from a superficial understanding of them. In such situations, despite cutting-edge technologies being in place, vulnerability to and loss in disasters may not be reduced. In this OFDA project in the GHA specifically, even though forecast skills were improved, broad user training was lacking. As a consequence, even if some categories of users did participate in the COF training workshops, they were unable to share what they learned with their home institutions, which means that they more or less failed to benefit maximally from available climate information for decision-making.

8. Significant differences exist among GHA countries regarding capacities for climate data collection, climate monitoring and information dissemination. Such disparities must be identified and addressed to avoid unequal benefits in regional projects. The fact that GHA countries have different "levels" of capacity must be recognized and addressed through country-focused projects (that reinforce or complement regional projects) to level the proverbial playing field by bringing each country in a region closer to a similar level of capacity.

Ramifications: If specific needs at the national level of GHA countries are not assessed before a regional project is conducted, disparities will persist and even likely hinder attempts to develop regional cooperation to conduct forecasting and DRR activities. Such persistent disparities were observed in the GHA with, for example, the significant differences between Kenya and South Sudan in terms of, among things, infrastructure and staffing. Earnest attempts to close such capability gaps might make countries and organizations more willing to cooperate on forecasting and coping with hydro-meteorological hazards.

9. Significant gaps in the communication of climate information

must be identified, addressed and removed as they are a hindrance to improving DRR. RANET and other projects have sought to meet communication needs using satellite radio and low-tech communication devices, though such activities are very limited in many countries and requires additional support.

Source: www.radionilo.com

Ramifications: Climate information released to the NHMSs as well as to civil societies through such systems is often too complex and probabilistic in nature for the general public's understanding and use. This information is also limited to the national level, as station level forecasts are typically not provided. Ideally, farm-level information would become available and include understandable and actionable options for farmers. Otherwise, climate information might not be useful as a decision-support tool.

10. Local knowledge must be taken into account when producing forecasts. People at the local level are witnesses of their own local climates at levels of resolution from which scientists typically lack data. Such people tend to have significant awareness about seasonal

trends over a few decades at the least. A lot can be learned from these people, even if some of that information at first appears to be anecdotal. The point is that local knowledge must not be neglected by climate science; indeed, scientists must learn to interact with local communities.

> **Ramifications:** Without such interactions, trust issues might remain fundamental to the local level experience of science, which would only continue to hinder the use of forecasts by such communities.

11. Identifying, consulting with and involving all relevant institutions at the beginning of a project is important for conducting analyses and applying findings. In the case study in Kenya for instance, KenGen should have been consulted at the very beginning of the Tana River Basin management demonstration activity instead of becoming an adjunct to ICPAC (see full report). As a result, at the end of the OFDA grant this pilot activity ended without providing any of the benefits of its original promise.

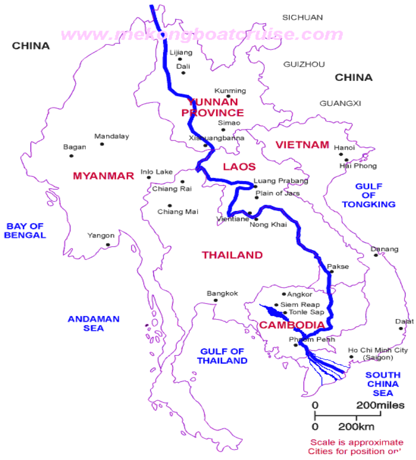
> **Ramifications:** This example is an indicator of larger problems in the interactions between ICPAC and the users of climate information. They must be addressed and resolved to ensure successful efforts in DRR in the GHA in the future.

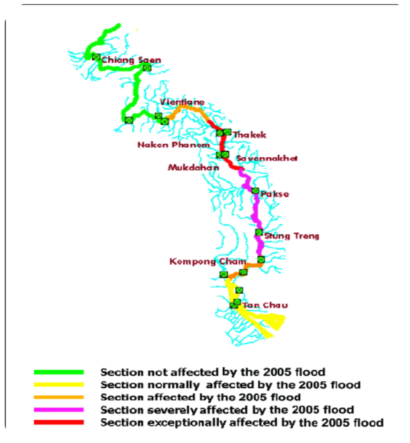
12. Gaps in the use of climate information at national and local levels have to be identified and closed. Gaps in the capacities of users to convert climate information into actionable products, a conversion that is especially important at the local level, must be identified. In this way, climate products can be made relevant to all categories of potential users of hydro-meteorological information. Products should also be delivered in a timely way using communication devices appropriate to targeted audiences and must be in user-friendly, usable terms. Gaps in the use of climate products need to be identified by conducting follow-ups of the COFs to assess how seasonal forecasts

are used to pinpoint potential product improvements.

A new department for "user affairs" could be created within ICPAC or independently to deal with these issues. Additionally, climate products should be issued and made available to all potential users, especially small NGOs as they work at the grassroots level in local communities.

http://www.ilri.org/ilrinews/index.php/archives/tag/usaid





CASE SURVEY: THE LOWER MEKONG BASIN (LMB)

THE PROJECT

OFDA with other US agencies has sought to improve hydro-meteorological forecast and early warning system capabilities for the Lower Mekong River Basin. OFDA support has been instrumental over the past decade or so in strengthening the Mekong River Commission (MRC) as a regional focal point for national meteorological and hydrological services with regard to flood forecasting and monitoring as the Mekong flows across several international borders.

The search for lessons in this region has been illuminatiing, because the MRC tends to include the identification of lessons in most of its donor-supported activities at the end of their projects. The Mekong River Basin is of interest and concern for organizations interested in hydro-meteorological disaster risk reduction and for those interested in fostering economic and political development in the LMB. Reviews by other donors also identify lessons about the MRC-related activities that they have supported.

CONTEXT AND PROBLEMS

The Mekong is the tenth largest river in the world by volume and the twelfth longest (UNU 1996), with at least one author referring to it as the Nile of Southeast Asia. A major difference with the Nile is that many consider the Mekong to be underutilized, especially when compared to other major river systems in the world. As Than (2006:141) writes, "The Mekong region . . . is the poorest in Southeast Asia. Sandwiched between the booming part of Southeast Asia and rapidly emerging China, the region has immense potential. Yet, like the river that runsthrough it, the economic potential of the Mekong region is so far just that—potential." This outlook will likely soon change, however, as governments in the region are deep into the process of planning activities to promote economic growth and development initiatives that will center on tapping into the river as a regional resource for what they anticipate as being future decades of national if not general prosperity in the LMB.

Mekong Delta, Vietnam. Source: www.getittravel.com

The population of the Lower Mekong Basin is well over 60 million. China and Myanmar comprise its upper basin states, while Thailand, Laos, Cambodia and Vietnam make up the lower basin states. Along its course, Mekong waters flow through large areas that are dominated by agricultural production, a region that is collectively responsible for major rice production, especially in the Mekong Delta known as Asia's "rice bowl". The Mekong Delta is a central feature of this highly productive agricultural area. In addition, the region's inland fisheries are also known to be among the most productive in the world. The occurrence of disaster events aside, the well-being of communities, livelihoods, ecosystems and biodiversity depends in large measure on the "expected" seasonality of the river's flow.

Extremes of floods and droughts and the impacts of a changing climate are key regional hydro-meteorological concerns facing decision makers in the LMB. Although varying degrees of flooding are anticipated annually in the LMB, in some years flooding reaches disastrous levels in terms of loss of life and property, damage to agricultural lands and to rural and urban infrastructure, and a general disruption of social and economic activities, especially development prospects.

Siem Reap, Cambodia Flood Victims, 2011.
Source: archive.constantcompact.com

The natural cause of annual flooding in the basin is related to the behavior of the southwest monsoon and every few years by the onset of El Niño and La Niña events and especially by the extreme behavior of the southwest monsoon.Year to year climate variability, quasi-periodically exacerbated by the onset of El Niño and La Niña events and especially by extreme behavior of the southwest monsoon. The longer-term consequences of a changing global climate and its regional implications, such as changes in the expected seasonal flow of glacier melt (in China) and in seasonal streamflow generally that can lead to flash flooding, are also major concerns for the LMB. This means is that into the future the Mekong is expected to continue to change in response to such influences. The mighty Mekong will be a different river in the future, than it is today for reasons related both to short and long term global processes as well as to ever-changing socioeconomic and demographic conditions.

The Mekong River Commission is mainly responsible for river management and regional flood forecasting. Because most countries in the Lower Mekong Basin require constant financial support to meet their socio-economic development needs, to fulfill its mission the MRC must also rely on contributions of cutting-edge technologies and core funding from the humanitarian and development aid programs of industrialized countries. To compensate for its chronic short-handedness in terms of the technical expertise of its core staff, however, the MRC in a push for some measure of regional self-sufficiency has as a fall-back measure utilized the "secondment procedure" through which it borrows needed expertise for relatively short periods (1 to 2 years) from member states to fulfill its key program tasks. The MRC has used secondment strategically as well as tactically to overcome chron-ic gaps in the expertise of its permanent staff and to adequately carry out its mission.

DRR AND THE LMB

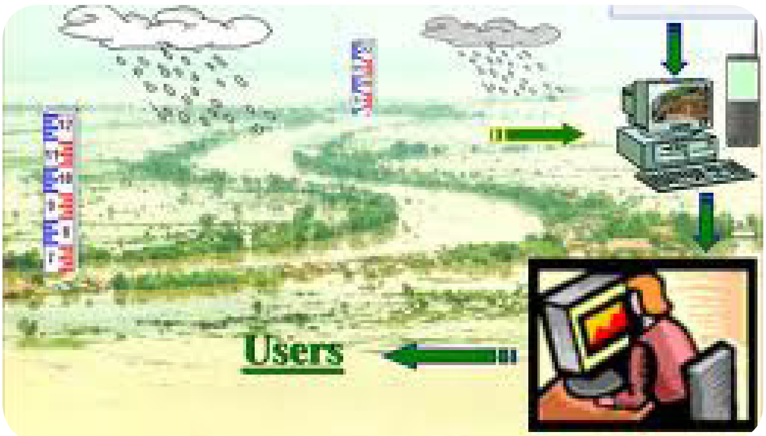
The issue of flooding in the LMB requires the four national governments in the region—Thailand, Vietnam, Cambodia and Lao PDR—to adopt a trans-boundary perspective in order to understand its natural and human-induced causes and to propose solutions. The MRC, as an intergovernmental regional river basin organization, receives support from each of the four LMB member countries. As noted, it also receives vital external support from humanitarian and international foreign assistance agencies.

OFDA's initial support for flood-related activities in the LMB came at an important juncture in the development of MRC's flood preparedness and flood emergency management and mitigation program. By early 2003, in partnership with NOAA, OFDA's support had led to the introduction of a village-level flood forecasting and warning system in Cambodia, while in the 2004-2010 period, under the Flood Management and Mitigation Program (FMMP), it provided catalytic support to enhance flood forecasting through the MRC and other member countries. As Cogels (2005) notes, "The FMMP is a good example of an integrated approach to water resource management that fits well with the MRC's new orientation and commitment to integrated water resources management [IWRM] at the basin level, our vision for development in the region." Notably, OFDA also collaborates with the MRC on various operations as well as in the conduct of its ongoing research in meteorology, hydrology, flood management, capacity building of emergency personnel, LMB development programs, and dissemination of flood information (i.e. preparedness, forecasting and warning) at the community level.

The Asia Flood Network (AFN) was developed to strengthen the capacity of national hydro-meteorological institutions in climate, weather, and hydrological forecasting while seeking to directly involve at-risk communities in reducing vulnerability to hydro-meteorological hazards in the basin. Similarly, through the OFDA-funded Technical Assistance for Hydro-meteorological Disasters project, the U.S. National Weather Service and USGS provided technical advice and guidance to the MRC and the International Center for Integrated Center for Integrated Mountain Development (ICIMOD) on various hydro-meteorological issues. Such issues have included community-based flood mitigation, data collection and transmission using telecommunication systems, and data sharing across trans-boundary river basins. The development of flood early warning systems across the Mekong River Basin also increased flood forecasting capacity and early-warning information transfer to communities in the LMB, which encouraged scientists to become more aware of the needs of at-risk populations. These scientists worked with community-based partners to develop tools, methods, and protocols to enable flood-vulnerable populations to utilize MRC flood information more effectively.

Cambodia Flood. Source: www.maszol.ro

One of the major achievements of OFDA support in the LMB has been the development and strengthening of the Regional Flood Management and Mitigation Centre (RFMMC). As of today, the RFMMC continues to actively provide information to its member countries. "During the June-November flood season, for instance, [it] issues daily flood forecasts and warnings [based on] data from 138 hydro-meteorological stations that predict water levels at 23 forecast points in the MR system. The FMMP communicates these daily bulletins by fax, e-mail, and on the MRC homepage as well as through a dedicated Flood Forecasting Website to National Mekong Committees, NGOs, the media, and, most importantly, the public" (MRC 2013).



The initial development of models for the Mekong Basin had two main objectives: 1) flood forecasting to mitigate the human and economic costs of large floods; and 2) ambitious plans for regional development. The biggest focus to date has been on hydrology, with a number of quantitative models having been developed and applied to assess flow, hydrodynamics and sediment dynamics. As a result, the MRC is now capable of monitoring the river waters to provide forecasts to LMB countries with a 48-hour lead-time. Moreover, LMB member states, donors and the MRC now recognize that disaster risk reduction activities (DRR and emergency humanitarian responses) and climate change adaptation activities (CCA and longer-term development) must be linked, integrated, blended or bridged. Bridging will enhance the building of community "resilience," though how to effectively link these two development sub-fields remains a challenge.

ILLUSTRATIVE LESSONS

Identifying lessons for the Mekong case has proven different than doing so for the other regional cases. The fact is that in both forward planning and retrospective DRR-related documents produced by or for the MRC, lessons about what needs to be done in order to improve understanding and implement DRR programs in the LMB, are already regularly identified. These lessons, which include general problems for DRR program management, are intended for donors, governments, the MRC itself, and local communities. The following post-project observations (e.g., lessons) listed in an MRC (2009b) report, provide an example of MRC's concern for lessons:

- Many methods and tools are available for adaptation planning, but limited guidance on selecting appropriate ones to use is available;

- Training and sensitization about what adaptation is and how it can be approached is necessary;

- Methods are not "plug and play"; skill and training are required and data is needed;

- Expert judgment is most important [NB: as is ordinary and indigenous knowledge];

- No single approach can successfully support adaptation planning;

- Include a system for monitoring progress from which "real" lessons can be drawn for application elsewhere; and

- Tools need to be continuously reviewed, as further resources for follow-up or ongoing monitoring may be unavailable.

Much as the MRC itself regularly identifies lessons, donors have often done so, often presenting them as observations that can be used to guide future funding needs in the region. As an example of this, the selection of lessons below are taken from a review of the FMMP by the European Commission Humanitarian Aid Department (ECHO 2010). It is presented here to show some insights into DRR needs that have been identified for the LMB region by another development organization:

- Those in the project must see it as a contribution to a development matrix rather than as just a stand-alone donor project;

- Flood preparedness activities at the commune training level were found to be excessively challenging and, therefore, less effective. The volume of information was difficult for commune/village people to assimilate, especially in such a short period;

- Usually there are no funds available for follow-up and refresher training;

- Be cautious in drawing conclusions on sustainability as projects may be funded from a variety of sources. Hence, a compatible exit and handover strategy needs to be agreed upon with counterparts;

- Capacity [enhancement] of key officials in key departments at provincial and district levels is recommended; and

- A major challenge of the FMMP project is retention of technical staff who have knowledge and experience.

OFDA programs, particularly in the areas of flood forecasting and DRR, have a long history of supporting MRC member countries in the Lower Mekong Basin. MRC's FMMP program in particular has been supported by OFDA for several years. It has also been co-supported by donors such as ECHO, GTZ, ADPC and others at various times.

OFDA support was significant in establishing the MRC's flood forecasting system networks through the MRC Flood Forecasting Center in Cambodia, the Mekong River Commission's FMMP and the AFN. It has also played an important role in strengthening community-based flood forecasting systems through the FMMP in collaboration with the National Red Cross chapters of the MRC countries, the American Red Cross, ACF, ECHO, MRC-FMMC and others. OFDA also supported MRC to develop the flash flood guidance (FFG) system, which strengthened community-based DRR activities. Through these efforts, OFDA programs have supported both the scientific upstream developments of MRC's flood forecasting systems (for both riverine and flash floods) and sought to strengthen community-based risk reduction measures linked to flood forecast systems in target countries.

Some of the key lessons that have emerged from the region after more than a decade of OFDA support can be categorized under the following headings: (1) those that strengthened flood forecasting and dissemination networks across LMB countries; (2) those that strengthened various levels of government agencies through capacity building initiatives; (3) those that raised general awareness and increased public education and established processes for fostering a "Culture of Safety;" (4) those that mainstreamed flood risk reduction into DRR and development plans; (5) and those that mobilized resources for DRR and EWS activities. Specific lessons identified appear within the categories that follow.

1. Strengthened flood forecasting and dissemination systems in MRC countries

- OFDA-supported activities to the FMMP helped establish the MRC Flood forecasting system, which has provided improved access to and dissemination of flood early warnings from national to community levels. Some community-level flood forecasting activities have been conducted through demonstration projects involving various stakeholders. Flood Information Boards and Flood Marks were perceived by local authorities and community members as good tools to effectively prepare for, respond to and cope with floods. These enhancements were, however, only made on the main river, which means that further actions are needed to establish tributary-level flood forecasting and dissemination systems that have interpretive capacities, local references and procedures of operation that enable greater sustainability at all levels of society. The need for such programs was especially indicated by at-risk communities in the flood plains and provides an example of how scientific developments can be suitably adapted for effective, concrete societal application.

• Although HYCOS is not supported by OFDA, it is a complementary project funded by others. The phasing out of the HYCOS Project is underway, beginning with the handover of operation and maintenance responsibilities from MRC stations to member country NHMSs. At this point, however, the NHMSs do not have adequate mechanisms to sustain operations and maintenance of the stations. This inadequacy could prove critical in the coming years.

• Initiatives under existing programs were more focused on the pilot sites and at the pilot level. What is required, however, is to go beyond piloting and move towards a longer-term programmatic approach and an up-scaling to a wider geographical area to ensure that the flood management and mitigation policy objectives become solidly embedded, or mainstreamed, into the national disaster management strategies of MRC's member countries.

• At this point, many of the flood management and mitigation tools developed by the MRC through existing support programs have adopted a basin-wide approach that needs to be adapted, if those programs will be able to support local-level interventions. Some continued follow-up support is needed, for example, in order to integrate basin-wide to local-level interventions for community engagement and resilience building.

• While existing support programs strengthened access to river stage-level flood forecasting information, they lacked adequate data and interpretation to better enable them to assure the livelihoods of community members. Continued innovation in flood forecast information that includes interpretation for specific sectors and livelihood activities (i.e. agriculture, fisheries) in the LMB is crucial, if the risk of negative flood impacts on the livelihoods of the people living in the basin is to be reduced.

2. Strengthening of various levels of government agencies through capacity building initiatives

• Enhanced capacity building initiatives for provincial-, district- and community-level disaster management authorities working on a number of programs encouraged continued skill development and interest by various types of stakeholders. These programs included planning for flood preparedness and emergency management, community-based flood forecasting system and risk management, search & rescue, swimming lessons for children, and teachers training on school flood safety.

• Experience indicates that increased capacity building initiatives for key officials in provincial-, district- and commune-level Disaster Management (DM) committees have led to better flood preparedness in selected provinces of MRC member countries. Initiatives for flood preparedness and emergency management have also helped targeted provinces to better prepare for floods. Such initiatives were found to be particularly important for enhancing communication, coordination and cooperation between stakeholders as well as for making implementation of national disaster management and mitigation policies more consistent.

• Active involvement of national governments and local authorities at provincial, district and commune levels in the formulation and implementation of Flood Preparedness Programs (FPP) has been a major step in ensuring consistency, ownership and sustainability. Such involvement has also improved the integration of Flood Risk Reduction (FRR) into local devvelopment plans.

• Community-Based Flood Management (CBFM) trainings for commune-level disaster management officials that were aimed at improving their practical skills in flood management and strengthening their capacities in flood preparedness planning and implementation were deemed useful. These trainings enabled officials to manage and mitigate the negative impacts of floods with greater skill and enthusiasm.

• More focused training on community-based flood forecasting systems, which were not fully touched upon in existing capacity building initiatives, are needed. Such systems should include measures to establish observation networks (flood markers), to develop information sharing and dissemination strategies, to enhance risk resource and evacuation maps to link EWSs, to produce Standard Operating Procedures (SOP) for local communities, and to expand provisions for the interpretation of flood information for both livelihoods and local reference.

3. Efforts to raise awareness, increase public education and establish processes to foster a "Culture of Safety"

• A number of activities on raising awareness and public education was undertaken in existing programs supported by OFDA and others in this area. These initiatives still require up-scaling, as with the establishment of standards for communication and coordination along with policy support for wider use. At the same time, the activities undertaken remained only within the pilot sites and were not used in a widespread manner for various reasons, related to governance issues.

• More attention is needed to foster a "Culture of Safety" through a sustained Community-Based DRR (CBDRR) as well as through awareness programs at the community level. While existing programs have set a good foundation through ongoing school safety initiatives and other activities, such programs need to be up-scaled in a systematic manner to encourage wider societal resilience building for flood preparation.

• Promoting public-private partnerships between authorities and private sectors for public awareness activities has not yet even come close to achieving its potential.

4. Lessons from the mainstreaming of flood risk reduction into DRR and development plans

• Provincial and district level disaster preparedness planning processes have been useful for building both institutional capacity and confidence among local DM officials for contending with annual flooding. Both provincial- and district-level officials, for instance, were shown to have better coordinated their efforts in recent disaster events than they had done in the past. A Flood Preparedness Program manual was also found useful, though truly realizing its benefits would require follow-up guidance, which has been lacking.

• Strengthening of mainstreaming efforts for flood risk reduction into DRR and development processes would help define the roles and responsibilities of provincial disaster management offices (i.e. PCDM/ DCDM Secretariat) as well as line departments for implementing DRR and disaster emergency response.

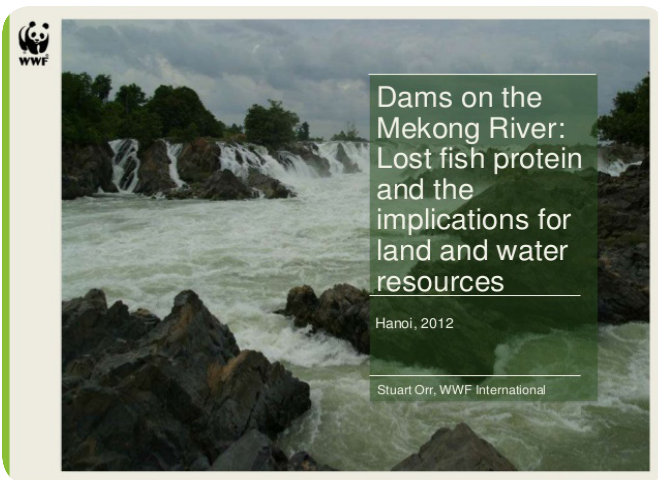
• The Sectoral DRR Plan and its implementation was considered a new and innovative approach to ensure the mainstreaming of DRR into specific socio-economic sectors. To fully realize the possibility of this approach, each sector must allocate or be able to mobilize resources from development partners for implementation. The integration of flood DRR into local development planning through local socio-economic development processes is a crucial step for the sustainability of DRR actions; such integration needs to be strengthened in the future.

5. Lessons on resource mobilization for DRR and EWS activities

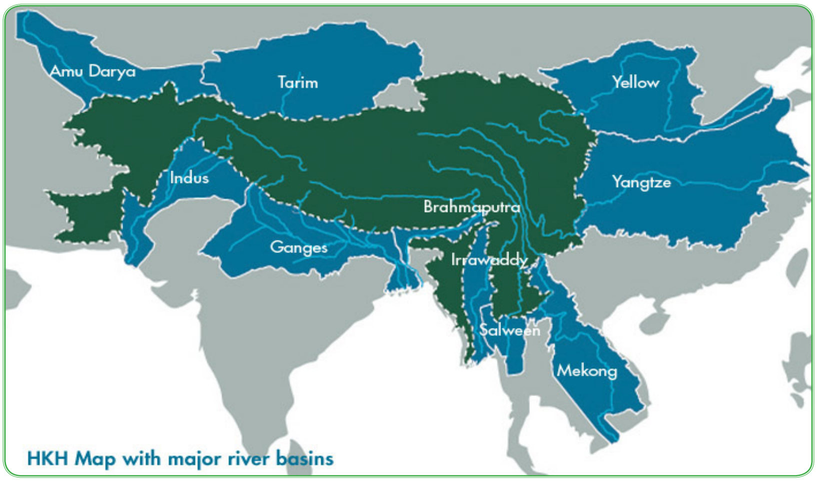
- One of the key lessons to emerge centered on resource mobilization for sustaining DRR and EWS activities at the local level. Such actions require longer-term measures in terms of budget availability and mechanisms to better enhance the innovative and efficient mobilization of resources. Measures of these sorts should be put in place at every level, from the regional (MRC).

- Challenges exist in terms of the fact that there are insufficient resources to support each line department, both for scaling up and for implementing DRR Plans at the local level. The challenges of resource mobilization also make it difficult to replicate the pilot initiatives in other areas and provinces.

Although dams are not of direct concern to the DRR community, they are of concern to the CCA community. We would be remiss not to note that several dams are being proposed for the mainstem of the Mekong and its tributaries. Dams are known to have environmental and biological impacts upstream as well as downstream that must eventually be considered. This is a concern to the missions of the DRR and the CCA communities. Clearly, dams and other water diversions provide yet another important common issue and reason that these communities must bridge and blend.



Source: slideshare.net/CPWFMekong/stuart-orr-keynote



www.icimod.org

CASE SURVEY: THE HINDU-KUSH HIMALAYAN (HKH) REGION

THE PROJECT

Beginning in the early 2000s, OFDA invested in a number of programs to explore flash flood risk reduction in the HKH region. One of OFDA's primary DRR contributions in the region was the development of the Asia Flood Network (AFN). From its inception, the AFN, an umbrella program that includes various DRR projects and initiatives, was supported through an OFDA partnership with the Kathmandu-based International Centre for Integrated Mountain Development (ICIMOD). Other donor institutions also provided funding support for various aspects of the program, and technical support was supplied by the US National Oceanic and Atmospheric Administration (NOAA) and the United States Geological Survey (USGS).

Regional cooperation for flood and, more recently, flash flood management is at the core of the AFN initiative, which has four specific goals:

- To identify and fill in gaps in flood and river forecasting and early warnings;

- To strengthen regional and national institutional capacity on hydro-meteorological forecasting;

- To promote data and information sharing between member states; and

- To improve dissemination of forecasts and warnings to all regional users, including at-risk local populations.

It should be said that the application of the fourth goal remained limited, as the AFN is, before all, a hydro-meteorological program, which focuses on strengthening the climate science regionally for flood predictions in the HKH.

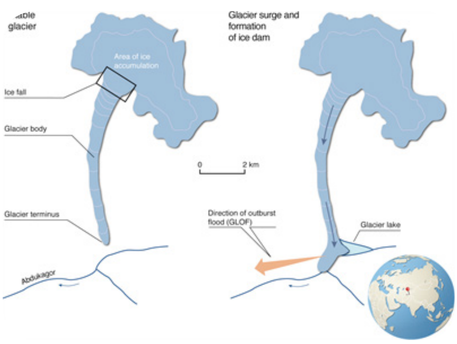
The AFN has three distinct phases of development, which were active between 2001 and 2013. The initial phase—or Phase Zero—involved preparation in terms of studying the feasibility of a regional information-sharing system, identifying gaps at national levels and setting the basis for future collaborations on flash flooding. Phase One essentially revolved around training, testing and validating satellite rainfall estimates (SRE) in selected pilot river basins, and Phase Two, which only recently ended, focused on scientific research to improve rainfall prediction models and flood forecasts as well as to enhance knowledge about regional climate change impacts.

While actively receiving support from OFDA, most projects under the AFN umbrella focused on enhancing inter-state collaboration and technology advancements. Remote sensing techniques were tested in several locations for validation and, as of today, are not operational as yet for routine flood forecasting. The adequacy of the SRE for flood forecasting in the HKH region has raised questions, suggesting that more tests are still needed to validate the model's potential. Regarding the enhancement of risk preparedness among local communities (i.e., the fourth AFN goal), the levels gradually improved over the course of the program, though this part of the program still requires considerable attention and resources to be successful.

CONTEXT AND PROBLEMS

The Hindu Kush Himalayan region extends some 3,500 km across Asia and serves as the direct livelihood basis for more than 210 million people. It is also the source of 10 large Asian river systems. Flash floods, which are characterized by their sudden occurrence, overall violent impacts, and predominately localized scale, constitute one of the most frequent and disastrous hydro-meteorological hazards in the region (Montz and Gruntfest 2002). Although flash flooding can be caused by natural factors (e.g. cloudbursts, landslides, dam breaks, and glacial lake outburst floods - GLOFs) and by human factors (e.g. settlements in dangerous locations, deforestation and inadequate infrastructure), human activities and common development pathways have been shown to substantially worsen the already sizeable impacts of flooding in the region. In fact, the costs of flooding in Asia are greater than anywhere else in the world (Jonkman 2005), and global influences have only increased such risks in the HKH region in recent years. Anthropogenic global warming, for example, has led to increased temperatures and widespread deglaciation, which has increased the risk of GLOFs across the region (IPCC 2001). This situation is expected to worsen into the future as temperatures continue to increase, leading to even greater flood and flash flood risk.

Flash floods occur in Asia more frequently than any other type of flood. At the same time, flash floods are also more difficult to predict than other types of floods, especially in the high mountain areas of the Himalayan region (Jianchu et al. 2006). Together, these two factors mean that flash flooding causes a significant loss of lives and property in the region every year. In response to flash floods and other types of flood, early warning systems (EWS) have been developed to augment other localized flood risk reduction measures in the region. As framed by planners of such systems, their primary purpose is to increase flood forecasting capabilities and the speed at which warnings can be issued.



Formation of lakes and glacier lake outburst floods (GLOFs), Medvezhi Glacier, Pamirs. Source: www.grida.no

Attempts to improve the climate science and enhance forecasting capabilities so critical to the EWS have, however, been consistently hampered by the real-world difficulties. For instance,the extremes of climate and terrain that are found across the rugged HKH region make collection of the precise data needed for accurate modeling extremely difficult, costly and time-consuming. At the same time, regional economic realities also mean that national weather services in the region may lack some of the equipment necessary to generate let alone analyze the products of such models, resulting in the inaccuracies of rainfall prediction that can impinged on the success of such forecasting efforts like the regional SRE program.

In addition to technology gaps and a lack of adequate equipment to collect accurate rainfall data across countries in the HKH region, the geopolitical context of the region also hampers the capacity of models and satellite estimates to predict the onset of flooding. Flood and flash flood events in the region are often transnational boundary disasters, requiring cooperation and the sharing of hydro-meteorological information among states. Such collaboration is often hampered, however, by the tension and mistrust that exists between some neighbor states, which, like India, as a rule tend to classify hydrological data that are proximate to borders of Pakistan, China and Bangladesh as state-strategic secrets. In such areas, if national data statistics are made available it is often only after significant delays, further limiting the operational value of those forecasting technologies that had been the focus to begin with of regional programs like the AFN. Thus, the quick-onset nature of flash floods continues to make them very difficult to predict, leaving little time for action before they strike with devastating effects. This makes all the more important efforts that prepare populations for timely, proactive response before the onset of an event.

The lesson from this situation is that while producing better forecasts into the future is an important goal, such improvements might not lead to a desired decrease in losses from flood events. Forecasts and the science supporting them constitute one of several components of an effective early warning system (EWS).

Many social factors such as risk preparedness, awareness raising and communication of risks also require equal consideration in developing effective EWSs. This is true of systems that have been operationalized in a flash flood context like those observed in the HKH region where forecast predictions are not yet accurate and may not become so in the near-term future.

Although the AFN especially focused on improving the climate science for flood prediction, dissemination of information to and ongoing communication with the members of local communities, who are most at risk to the impacts of flash flooding, remains significantly important. In truth, community members caught up in a disaster situation are the real "first responders" (e.g. civil defense) and thus should be referred to as "zero-order responders" (ZORs). Past depictions of ZORs is that of individuals as passive victims of disaster circumstances. Yet, immediately after the onset of a hydro-meteorological disaster people around the world respond immediately and actively to protect themselves, their families and their communities as best they can. This level of response in the HKH region is especially important to identify and record, especially to reach areas where hazard forecasts tend to be unavailable or not so accurate and where any assistance following disaster can take several days or even weeks to arrive. On this matter, separate community-based programs (not related to the AFN) were launched by other aid agencies and local NGOs, such as Practical Action in Nepal, to train communities on responses to disasters. Coordination between hydro-meteorological programs such as the AFN and DRR community-based activities could, nonetheless, benefit climate scientists and local populations: the latter have knowledge and risk management experience that would serve in the planning and operation of local EWSs.

The ICIMOD, mentioned earlier, is an important institution in the Himalayan region, based in Nepal. It was established in 1983. Since then, one of its major regional tasks has been to improve the management of flash flood risks and to enhance both forecasting technologies and the preparedness of stakeholders, including those in local communities. ICIMOD focuses on generating and sharing knowledge on natural hazards to promote regional cooperation for water and flood management in the region. It has been part of several bilateral programs over the past decades that have sought to fill in gaps in EWS and to improve flash flood risk management in the region. As one example, it is part of the WMO's World Hydrological Cycle Observing System (WHYCOS), which was also partially supported by OFDA . WHYCOS aims at establishing an efficient and operational flood information system based on timely access to real-time data at the regional level.

Consistent with the AFN's main focus, ICIMOD has focused largely on improving forecasts, adopting the end-to-end (E2E) approach to modeling disaster scenarios. Nonetheless, its strong focus on the science stems from a general belief that little can be done without getting the science perfected first, followed then by a focus on other related needs such as EWS. The theory behind this E2E approach is quite sound, basically asserting that, with improved forecasts, communities will generally be less vulnerable to the hazards that disrupt livelihoods and result in loss of life and property. Although E2E implies there is a feedback loop from the communities to the climate scientists in order to improve climate information they receive, in practice, the E2E approach tends to consider local communities only as recipients of forecasts or potential victims of hazards. Recent modeling efforts, including those from ICIMOD, have made commendable attempts to better involve local actors and to study their local knowledge and responses to hydro-meteorological risk; some of these efforts were initiated by OFDA's DRR programs in the region.

DRR AND THE HKH REGION

A first important observation is ICIMOD's key role as a regional center involved with regional flash flood issues. OFDA has supported flash flood projects at ICIMOD from the early 2000s, providing, for example, catalyst funding to propel the AFN initiative forward from its earliest planning stages. Even though its direct funding of the initiative ended, OFDA continued to serve as a "connector" for other donor groups that continued to support this long-term initiative. The following paragraphs focus on successes and limitations of the AFN from 2001 to 2013.

Source: www.heraldsun.com

The AFN focused heavily on forecasting and technological improvements for flood prediction. It was managed primarily by ICIMOD with additional technical support provided as needed by NOAA and USGS, over the course of its existence. This focus is consistent with the E2E approach to modeling that has been primary to ICIMOD's organizational framing of its AFN activities. The benefit of maintaining such a consistent focus must be expand- ed to enhance the value of the AFN to prepare the forecast system for eventual real-world operations. For example, the SRE rainfall prediction model is one of the main projects promoted through the AFN, yet to become operational. Aside from some observed improvements with the addition into the model in 2008 of the impacts of climate change on glacier and snow melt (which critically influence streamflow and therefore the occurrence of flash floods), problems for SRE estimates persist such as the underestimation of rainfall, especially during the monsoon season. Such problems have continued since the SRE's first application tests in the mid-2000s. Such inaccuracies continued in 2013 when the model was last tested over Nepal (Shrestha and Bajracharya 2013). These inaccuracies were reportedly accentuated in recent tests because of such issues as the time lags between the production and the dissemination of data generated by the model.

To improve the SRE, it is necessary to act first on issues related to the regional network to collect data for model input. Such issues had been anticipated at the outset of the AFN in 2001 and acknowledged difficulties in data collection that resulted from rugged terrain, from the geopolitics characteristic of the HKH region and from a lack of capacities among NHMSs. As a result, these three constraints, among others, allowed for disparity to continue among ICIMOD member states in terms of infrastructure, information shared, and number of skilled staff. An additional constraint is that ground-level data from across the HKH region tended to be inconsistent and plagued by data gaps, even as remote data-collection and forecasting technologies continued to improve over the course of the project.

The first issue—rugged HKH terrain—results in important difficulties to collect relevant data, due to difficulties encountered to install rain gauges in hard-to-reach areas as well as a shortage of adequate equipment at the few hydro-meteorological stations that were embedded in such areas.

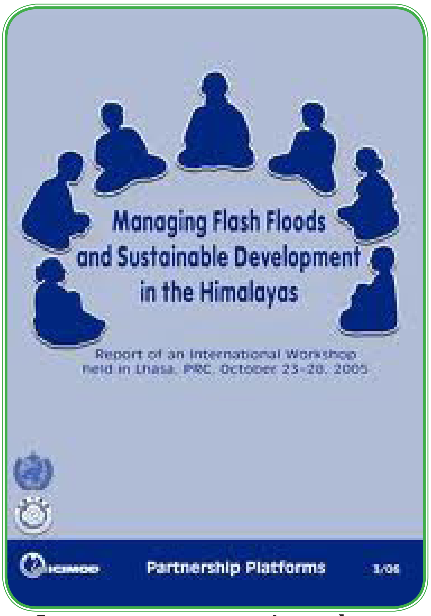
The second issue—foreign policy among regional states—significantly slows down regional cooperation. Wide-ranging data exchange and sharing is not as yet widely practiced among HKH countries. For example, the apparent reluctance among national governments to openly share climatic and hydrological information inhibits the potential success of the SRE and other programs under the AFN. In this situation, the example of Nepal provides a wealth of climatic and hydrological data on the Internet and is the exception to the rule. The general absence of data sharing among ICIMOD's member states can in part be explained by the specific geopolitics of the HKH region. This is problematic in light of the fact that the AFN was founded based on an agreement by regional states to collaborate and share information to mitigate flood risks in their countries.

These issues culminated in a situation in which member states would make differential contributions to the regional EWS, which further limited applications of the SRE model for national flood risk forcasting. Such applications require at minimum a reliable internet connection, a necessity that is sometimes unavailable in regions within some ICIMOD member states. National disparity affects each member state's capacities to absorb and use rainfall estimate models. Differences also arise in the type of floods that affect each state in the region, with some seeing flooding caused by extreme monsoon rainfall, others seeing flooding from GLOF events and still others seeing flooding from rapid snowmelt as a result of global or localized warming. It must be remembered what models like the SRE are designed for in the first place and the limitations imposed by those designs. For example, the SRE is designed only for monsoon-affected river basins such as those found in Nepal, which means that the model may not be useful for some member states where flash flooding is usually a consequence of rapid snowmelt (e.g. Afghanistan).

Regarding the third issue—forecasting capacities among NHMSs—numerous capacity building workshops for staff of NHMSs were held through the duration of the AFN. Yet, as known, sustainable improvements in institutional capacity are difficult to achieve, because they require long-term investments and consistent training sessions for the staff. As of today, skilled staff remains a critical need for most of the natioNHMSs in their desire to increase their climate monitoring capacities. Sustaining personal skill enhancements were difficult despite OFDA's ongoing support for training sessions. The short lenght of OFDA's training sessions, in addition to the "brain drain" that commonly affects NHMSs in the region (and elsewhere in the developing world), hampered sustainable capacity building training within such national institutions. Several meteorologists interviewed for this review specifically requested more regularly and more in-depth training that might have resulted in sustained capacity building support for their institutions. The point is that the capacity building of staff requires longer-term investments that could be provided during and after the project. In addition, institutional capacity building is also needed when models like the SRE are eventually operationalized nationally. This is especially necessary in some of the "poorer" NHMSs. With regard to the loss of trained personnel, funding provisions could be used as incentives in an effort to retain staff at their home institutions once they have been trained.

RISK COMMUNICATION, PREPAREDNESS AND AWARENESS IN THE HKH REGION

At the opposite end from the E2E modeling and data collection of the flood early warning system that was put in place in the region are risk communication, awareness and preparedness. These items need more attention and investment in time and resources than in the past. Managing flood and flash flood risks is an activity that requires improved communication between climate experts and civil society.



Source: www.preventionweb.net

Despite pilot activities led by local actors, such as Practical Action in Nepal, it seems that such communication and feedback between climate scientists and local communities remain a weak spot for DRR in the HKH, and is an issue not yet fully addressed let alone resolved within the AFN. Moreover, there is need to raise awareness among decision makers about the significant difference between floods and flash flood risks: most governments in the region have not yet drawn up plans for flash flood mitigation, which is included in general flood management protocols that are often only appropriate for riverine floods (Shrestha and Bajracharya 2013). Although the AFN originally focused on riverine flood, the need to provide better predictions, information and support in regard with flash flood stems from their often disastrous consequences. For instance, partnerships between scientists and policymakers could usefully alert the latter about the particular aspects of flash floods, and to produce climate products that are used in scientific research and are readily usable for decision-making purposes.

To the sustainable success of any such project the involvement of local communities in AFN risk reduction activities is of key importance. Recognition of local people as key actors in flash flood mitigation has improved over the years and is illustrated in recent ICIMOD publications. To date, however, attempts at outreach towards local communities as "equal" stakeholders is crucial, to complement the technology-centered approach to DRR. Local knowledge about risk-related strategies and tactics should be valued. Such knowledge has the advantages of being locally appropriate, flexible and cost-effective. A gradual acknowledgment of this value seems to be on its way, as ICIMOD recently conducted several pilot activities at the local level, in partnership with NGOs and the communities. It now needs to translate this recognition beyond pilot studies into concrete measures and activities.

ILLUSTRATIVE LESSONS

• Being a catalyst must be one of the key roles for an aid agency, enabling it to provide an organization with critical initial support that may contribute to the future resilience and ownership of DRR activities by the recipient organization.

ICIMOD is an important regional organization, and OFDA funding was a crucial catalyst early in the millennium to help the development of a regional flood early warning system. Though other organizations now provide considerable support to ICIMOD's continued efforts in this regard, OFDA's early support for DRR could be viewed as the sine qua non for various future attempts at developing effective regional flash flood warning systems.

> **Ramifications:** If an aid agency seek only quick, visible outputs from its support for DRR activities (i.e. the number of workshops held or the number of attendees at such workshops) instead of pursuing long term, but less visible outcomes such

as the enhanced collective resilience of communities or DRR institutions, then DRR efforts linked to a specific time-limited program will likely come to an end when that program ends.

• Climate science must be continued to be advanced to support concrete applications to address regional and local needs.

The Asia Flood Network's flood modeling and forecasting technologies and techniques benefited significantly from OFDA support: for instance, many test research projects were conducted to verify the SRE in different regions. However, given the nature of flooding in mountainous regions like the HKH, partners involved in the program expressed their doubts regarding the SRE's efficiency for flood forecasting, and raised issues of time lag in receiving relevant data for modeling.

Risks related to floods and flash flooding, as high as they may be today, are expected to increase in future decades. Thus, technological improvements will continue to be increasingly necessary, to ensure reliable and credible real-world applications of the SRE model or, more likely, of a new model that reflects local reality and needs in regards with flood forecast. Improvements, however, must be shared through training with partners so that local scientists can improve the capacity to make credible risk predictions at their level; according to interviews, it seems that, so far, the AFN has not been able to enhance internal capacities among NHMSs, for reasons noted earlier. Such an outcome would be a positive step towards national ownership of risk reduction activities if or when donor support comes to an end.

Ramifications: If technological improvements are not tailored to serve society by providing real-world application tools for local level operationalization, disaster risk will likely continue to increase in the coming years, regardless of how great the forecasting science improve.

- Regional collaboration between states that face similar hydro-meteorological risks are necessary, if better risk predictions and effective EWS are to be shared.

Regional collaboration takes place in the HKH region but the region also faces geopolitical problems. Some seem intractable as several neighboring countries are involved in a range of political disputes. As a result, trust is generally a victim, which in turn means that nations are reluctant to share their hydro-meteorological information. Such sharing would likely lead to increasingly effective and efficient responses to flash flood warnings.

> **Ramifications:** A lack of trust in the HKH region is likely leading to increased hydro-meteorological risks, especially for vulnerable communities located in those countries (e.g. flood-prone areas in India and Bangladesh in June 2013).

- The capacity to collect data, monitor forecasts, and absorb and apply new technologies and techniques are very different among HKH countries. Disparities must be addressed to reduce bias in DRR flood and flash flood initiatives.

Disparities exist between countries in the Greater South Asian Region with and having a different level of absorptive as well as adaptive capacity. Humanitarian assistance can level the development playing field by assisting those countries most in need of DRR support for capacity building.

> **Ramifications:** Such disparities must be addressed at the beginning of a regional program. Otherwise the program will likely benefit some of the relatively more developed states—such as Nepal in this region—but not others (i.e. Afghanistan). There is a risk the latter will see little benefit from increased risk prediction capacities. Disparities may increase the reluctance of better off countries to form collaborations, reinforced by a lack of trust between states is already high.

- Sustainable capacity building needs repeated investments in staff and resources until a favorable tipping point has been reached, if the likelihood is to increase of ownership of future regional DRR initiatives.

Although ”capacity building” is emphasized everywhere these days, it is seldom explicitly presented as a continual task that must include ongoing upgrades to the skills of those who had been previously trained in DRR. In the HKH region, capacity building activities have generally been implemented through short-term, unlinked training sessions. This creates a circumstance in which staff, once trained, might seek higher paying positions elsewhere. Effective training of trainers, including volunteers, requires investments over a longer-term and multiple sessions enabling those trained to train others. Doing so can help transform, for example, a national flood-related project from what may only have been a limited partnership to an ongoing commitment grounded in ownership.

> **Ramifications:** Without identifying ways to sustain investments in capacity building for the staff, activities will likely end when donor funding ends. Moreover, local staff or institutions may not be in a position to absorb and use new technologies or techniques that are developed during a project: for instance, interviews revealed difficulties, among NHMSs' staff, to understand and apply forecasting techniques at the national level, after having participated in a workshop.

• Local knowledge about hydro-meteorological risk and its management must be studied and included into DRR measures in the HKH.

Arguably, a narrow focus mainly on the scientific aspects of DRR and of CCA can overshadow addressing the contemporary needs of local communities. Yet, within those communities, there is a wealth of knowledge about existing hazards and of local response mechanisms that are triggered in times of disaster. Local level inputs into future DRR and CCA planning heightens the potential for community ownership of projects. Local communities have long coped with variable, changing and extreme climate, and can be of considerable value to planners for the short- as well as the longer-term development.

Ramifications: Without necessary interactions (a two-way dialog) between local populations and scientific experts, trust issues will be a significant limitation.

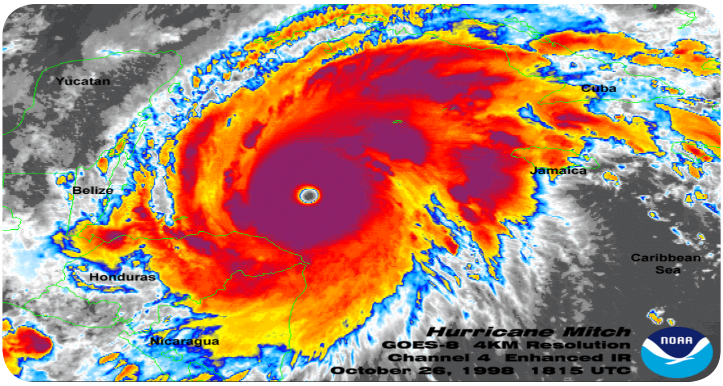
• Communication gaps in climate information including early warnings remains significant. Gaps need to be identified and addressed for scientific improvements in prediction to be useful to society and especially to those individuals who live in isolated at-risk communities.

Communication and cooperation are vital components of a successful DRR program, especially in regards to an effective EWS. Clear and reliable communication must also exist between the scientific community and policymakers at the local level for decision-making. Warnings must be based on the best available science, must be timely and must be understandable to the general population.

Ramifications: Without establishing communication channels that allow for timely, reliable information that is presented in a user-friendly form, the scientific community runs the risk of producing predictions (and other products) that are of considerable interest from an experimental research standpoint but that are of marginal use in real-world applications.

• Climate Change Adaptation and Disaster Risk Reduction must work in partnership, and with a wider focus that includes development issues in order to face current and future climate regimes as well as pressing socio-economic challenges. Doing so is necessary to improve the resilience of at-risk populations.

A shared focus on climate, water and weather variability from season to season and year to year by the DRR and the CCA communities would help to bridge their activities in regards to local communities.



Hurricane Mitch , October 1998 making landfall in Central America

CASE SURVEY: CENTRAL AMERICA AND THE CARIBBEAN

THE PROJECTS

USAID/OFDA has supported various programs in Latin America and the Caribbean (the LAC region) in order to reduce risk by enhancing institutional and community capacities to respond to and mitigate the effects of disasters, to strengthen the resilience of vulnerable communities and to reduce exposure to hazards (USAID/OFDA 2012). Among the different projects implemented, two specifically funded by OFDA are reviewed as case study in this report.

(1) The Central America Flash Floods Guidance (CAFFG) was launched in 2004 to improve flash flood forecasting in Central America. This project, focused on technology improvements, aimed at identifying, assessing and monitoring disaster risks and at enhancing the Early Warning System (EWS). In this purpose, a concept for the implementation of the CAFFG was developed that could be used as a diagnostic tool by National Meteorological and Hydrologic Services (NMHSs) in the region. The program underwent several evaluations and upgrades since its onset and was recently (in 2013) included into a flash flood global initiative that has been developed in partnership with the World Meteorological Organization (WMO). The CAFFG

basically met its goals at the completion of the project.

(2) A process for Natural Hazard Impact Assessment – Environmental Impact Assessment (NHIA-EIA) was launched in 2008 in the Caribbean and Small Islands in order to increase the resilience of development activities and projects. OFDA, in partnership with the Pan-American Health Organization, has provided financial support to this initiative necessary for the Caribbean Small Islands, highly exposed to extreme climatic events like floods and hurricanes. The NHIA-EIA promotes the introduction of hydro-meteorological hazards in project design in order to potentially limit or reduce vulnerability to natural hazards. For this purpose a sourcebook was developed. It compiles mechanisms for assessing, within EIA, potential interactions between a proposed project and natural hazards. The sourcebook presents a generic approach to the NHIA-EIA process that can be adapted to existing EIA processes at national and regional levels. Furthermore, it addresses all natural hazards, including those associated with climate change.

CONTEXT AND PROBLEMS

Central America (CA) and the Caribbean regions have been a center of innovative DRR activities around the world for many years now. They also form one of the most disaster-prone areas, due to unique geological characteristics combined with a subtropical location. These features predispose this region to a large number of natural hydro-meteorological and geological hazards, including hurricanes, earthquakes, floods, flash floods, droughts, landslides and volcanic eruptions (USAID 2012a). Such hazards could be exacerbated by projected climate changes in the region.

In Central America, disasters have continually increased over the past three decades. In 32 years (from 1970 to 2002) the region lost an annual average of more than $318 million due to natural hazards. Moreover, with the increased frequency of flood events, the number of fatalities from floods has also increased sharply. Consequently, delays are now increasingly observed in the process of economic and social development (CEPREDENAC 2009). For instance, Hurricane Mitch, in 1998, caused catastrophic floods and estimated losses were equivalent to 30% of regional GDP. This event highlighted Central America's increasing vulnerability to the occurrence of natural hazards. Likewise, inappropriate land use and human settlements in hazard-prone areas such as along riverbanks, coastlines and wetlands, combined with poor infrastructure and social services, further increase risks. Risk areas often constitute places of high concentration for vulnerable social groups with poor economic capacity and low resilience.

Infrastructure as victim. Source:www.allvoices.com

Relief arrives. Source: www.un.org

Access to technologies for better warning and to reduce vulnerability to natural hazards is critically needed in Central America and the Caribbean Islands. Though such technologies have grown more and more effective and available in recent years, access remains difficult because of human and financial resource limitations. Hence, implementing effective warning systems in the region remains critically needed as they (EWS) provide a significant tool for producing warnings in a timely manner.

DRR IN CA AND THE CARIBBEAN TODAY

With the support that OFDA provided to the CAFFG, collaboration between NHMSs in Central America was enhanced. Moreover, strong technological transfers from American institutions to low-income countries in the CA region were made possible. As of today, the CAFFG system is (partly) operational in the NHMSs of the seven countries in the Central America region. It can be used as a tool for early warning purposes to analyze weather-related events that can lead to flash floods, strictly defined as floods that can develop in six hours or less as a result of heavy rainfall induced by hurricanes or other tropical storms.

Nonetheless, uses of such products have been irregular and differential at national levels, with Costa Rica operating CAFFG close to its full potential. El Salvador has been established since 2011 as a second regional center in Central America. It has been in an experimental phase and, according to NOAA has since become operational. On the one hand, despite promising results from the system, constant reviews, validation tests and upgrades remain necessary to avoid false alarm rates or problems in obtaining adequate climatological data. On the other hand, disparities persist as a result of differences in the structures and levels of technical development among regional NMHSs and in their relations to disaster prevention agencies. Such disparities could lead to significant biases in achieving adequate regional integration. Hence, additional work is required to develop CAFFG to its full potential and for it to have a discernible impact on risk reduction policies through the improvement of EWS.

Training was provided through OFDA's funding for the technical staff from the NHMSs in the CA region. However, existing disparities among regional states in this region also indicate a need for longer-term investment in staff training as well as for gap identification at the national level, within nations that are part of a wider regional program. There is also a critical need for longer-term investment in capacity building. Moreover, training sessions should not only concern the staff from the NHMS but also stakeholders and policymakers.

Raising awareness about the real potential of EWS is important in order to avoid false expectations, to promote good interpretations and to ensure strong institutional support in these social sectors. Missing partnerships with local and regional disaster agencies should also be addressed, possibly through collaborations and joint training programs. In other words, climate scientists should work more closely with policymakers and existing institutions in order for the end-to-end global flash flood warning system to be efficient.

Finally, partnerships and collaboration between the NHMSs and other groups of society are still required. Appropriate means for communicating to individuals in local areas who will actually use the warnings subsequently issued by NMHSs were identified as important issues yet to be addressed. Communication with them and their involvement in the program are crucial, if timely steps in emergency management are to be taken. Reliable warnings for communities depend on strong and fast communication networks that are focused on the local level. This point constitutes an important difficulty that needs to be overcome in the Central American region, where end users of forecast products and warnings are still often insufficiently linked to what is too often still an end-to-end (E2E) and not an end-to-end-to-end (E2E2E) early warning chain.

Thus, the CAFFG is an important and, so far, successful program to all partners. Yet, to fully achieve its ultimate goal what is necessary an expansion of focus on and support for the technical part of the EWS chain (the detection, monitoring and prediction of hydro-meteorological hazards) to encompass to a greater degree awareness raising, education and "commodification" of EWS outputs with all stakeholders. Such a shift in focus will enhance levels of response and public awareness and, ultimately, community resilience. These socio-economic (non-technical) issues are sometimes overshadowed in a project; they have to be adequately addressed as an integral component of an EWS. Understandably a primary goal is to strengthen the capabilities of NMHSs, but for EWS the societal aspects must be addressed, especially how best to communicate interactively with civil society. They offer opportunities of actions and interventions for DRR agencies such as OFDA to save lives, livelihoods and property.

Problems were also identified in the application of the Natural Hazard Impact Assessment–Environmental Impact Assessment (NHIA-EIA) process in Caribbean Small Islands. To the contrary of the CAFFG this initiative does not focus on technology transfer but on improving the resilience of development programs by integrating disaster risks and climate change impacts into project designs. This program, therefore, is full of promises to enhance the resilience of projects, though it is not quite operational yet.

Uncertainties that remain in climate variables hamper the potential application of the NHIA-EIA. They are related to the lack of historical climatic data to assess particular risks linked to climate change. Uncertainties generate fears of potentially unnecessary investments in project design. This, consequently, plays against the process's potential application. However, this project is quite young and such issues could be addressed through DRR activities that promote capacity building. For instance, skills of those working in such assessments could be enhanced through training sessions on climate change issues designed for the scientists.

Yet, climate scientists are not the only one in need of capacity building. A crucial component of DRR activities is at risk to be neglected. The review revealed that strong political and institutional commitments towards the incorporation of Natural Hazard Impact Assessment within development processes remain missing. On this matter, raising awareness among policymakers and stakeholder of the benefits to use this tool to address disaster risks and strengthen the resilience of development projects would be of great importance. In addition, scientists should give consideration to local experience that could be relevant for any climate risk assessment, and for identifying relevant indicators and adaptation options. This points to the significant relationship between development and societal issues, and natural hazards, a relationship that should not be forgotten: environmental and social impacts cannot be addressed separately.

LESSONS

Central American CAFFG Illustrative Lessons

- OFDA has played an important catalytic role in the region for modeling and data collecting.

> **Ramifications:** The absence of support from OFDA to the CAFFG activities would have made it extremely difficult to establish concerted action between donors and recipients to carry out the needed transfer of resources and technology.

• The CAFFG system fosters the integration of meteorology and hydrology in real time and, therefore, can serve as a catalyst in the improvement of flood warning protocols in the region with a commensurate improvement in DRR policies.

> **Ramifications:** The lack of a system such as CAFFG would hinder if not prevent the development of effective proactive measures in the flood warning protocols in the region with a higher cost in more damages and human casualties.

• Efforts must continue to be adequately supported to improve science to improve the CAFFG model, understand, forecast and warn at-risk populations about flash flood preparedness, prevention and mitigation. This is best done by enhancing the development of all elements of a holistic EWS from data trans-boundary collection and sharing of hydro-meteorological data to effective education, training and timely warning dissemination to local. communities. Efforts must focus on all parts of the EWS chain, societal as well as technological. With regard to science of the models and of forecasting and EWS, they must be constantly improved and regularly reviewed.

> **Ramifications:** To fail to improve the science behind the model-based CAFFG will likely lead to a rapid degrading of the quality of predictions with a consequent loss of reliability. This would negatively impact all the EWS chain.

• The end user is a vital link in an effective EWS, in that collectively they can provide feedback to the forecasters. In addition they have been coping with a changing climate for the past several decades and can provide insights into changes that have occurred at the local level as a result of climate as well as other environmental changes. They have survived the impacts of such changes and can provide feedback to modelers and forecasters about the performance and accuracy of the parameters used in their model-based forecasts of hydro-meteorological events.

> **Ramifications:** The lack of appropriate feedback would become all the effort in a "blind alley". The true value of the effort would not be properly evaluated, eventually leading to a high risk of investing huge efforts and money with very low use of the climate products such as forecasts.

• CAFFG must seek to benefit from the better understanding of the application of CAFFG for early warnings, of local conditions and how best to work closely with local and regional disaster managers. Bridging with local communities will convert a top down approach to EWS into a closed system in which a feedback loop is provided from the at-risk users to the modelers and forecasters.

• The transfer of technology in CAFFG is based on a closed system with regard to modeling. This means that the NMHSs are not allowed to modify the models to fit national realities and needs. Although this feature has to do with policies of intellectual property protection, a coordinated effort should be established to remove this barrier.

> **Rami ications:** Modeling efforts and fine-tuning are rapidly evolving and improving worldwide, and some of the NMHSs already have their own programs, which run parallel to the use of CAFFG. If there were not a way to share results nor to be able to introduce the national improvements in modelling into CAFFG, this system would become dated and therefore obsolete.

• During the development of CAFFG, training was necessarily focused on the technical staff of the NMHSs. While some efforts have focused on outreach to users, those efforts must be intensified involving the public in general, at risk communities or groups and policy makers (e.g., stakeholders).

• Despite the relatively high degree of regional integration in Central

America, there remains a high level of disparity among and within countries of the region. The adverse impacts of the disparities on the effectiveness of the regional EWS in terms of technological and scientific capabilities, levels of development, cultural and political diversity need to be identified and reduced.

> **Ramifications:** If pathways to a more effective integration are not promoted, the application of project findings would be less possible in those areas with less infrastructure; paradoxically those areas are the most vulnerable and needy for assistance. Moreover, if follow-ups of CAFFG products are not conducted taking into account the poorest countries, their usefulness at the local level might remain of marginal value.

• The region's unique features of stable political systems, relatively strong regional cooperation, high level of cultural integration creates a social environment that has enabled OFDA to succeed in developing and implementing several important DRR-related activities in the region. Now, climate change preparedness must become a challenging uncertainty for decision makers.

• The science of the models, forecasting and EWS must be constantly improved and regularly reviewed. However, national budgets are constrained to different degrees in different countries in the region and support for the transfer of new technology from the international community will likely be required in regional efforts to cope with the hydro-meteorological extremes related to climate change.

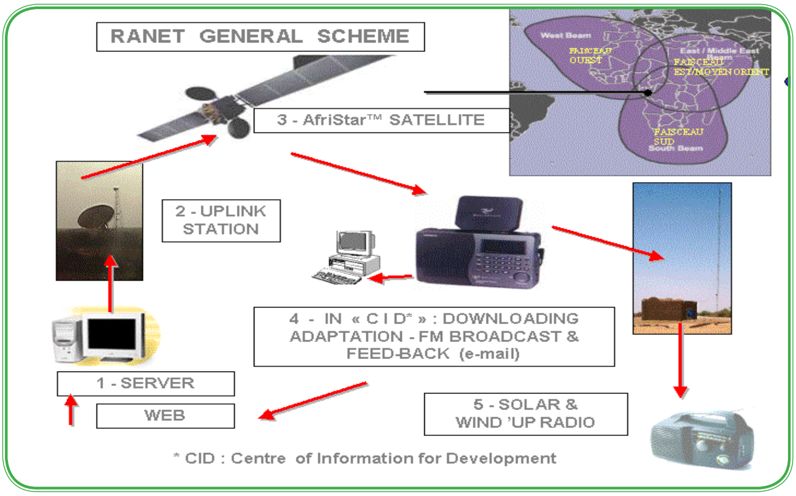
> **Ramifications:** If improvement in technology and the updating of the science are not continued, the value of the forecasts will decline and the risks to hydrometeorological hazards will surely increase.

• Considerable scientific expertise and experience with hydro-meteorological extremes exists within the region. Yet, with regard to CAFFG it appears that most reports and much training is done in English in a region where Spanish is the main language.

Ramifications: Training activities must increasingly focus on the language of the trainees. To greatly improve the value and retention of information of the trainees, Spanish-speaking scientists and experts should be increasingly relied upon to carry out the training exercised related to the modeling and the forecasting and dissemination of warnings. That would be true capacity building focused on the science and not just on scientific concepts explained in English.

- SWOCT constraints highlight areas that require attention, some of which are as follows: the absence of the optimal hydro-meteorological observation network in the region, lack of giving a high priority to education and training on DRR, let alone DRR in the face of a changing climate, high levels of poverty in vulnerable, flood-prone areas, corruption and a lack of trained personnel focused on DRR.

Ramifications: SWOCT reviews of a project in fact highlight the needs that have been identified by those closely involved in DRR and in CCA activities as well as in modeling hydro-meteorological variations, changes and trends. Serious consideration must be given to SWOCT assessments.



CASE SURVEY: RANET

CONTEXT AND PROBLEMS

Technology propels the science of meteorology forward and becomes the basis for operational services. The domain of Information and Communications Technologies (ICTs) or more generally communications technology, however, is quite broad. It can involve core infrastructure for data exchange, dissemination platforms, routine IT management, software development, protocol and standards development, and of course, the specific technology can range from radio to satellite to internet to telephony. Moreover, technology is rapidly evolving. Systems and skills provided today can be easily irrelevant in just a few years. The domain is always changing.

All the more challenging to the community is that there are significant regional differences in how the public can and does interact in the 'information age', which may not directly affect operational services, but certainly affect how the public receive and access the information produced by national services. The world of social media, mobile devices, and the like are challenging the community in still new ways. While certainly the new technologies, or more specifically implementations of technologies, offer advantages, these do not come without a disruptive price to operations and policy on public provision of weather services.

Quite simply at the core of regional and national meteorological, hydrological, and climate services are communications and computing technologies. Capacity development of these entities necessitates development of ICT capacity in support of operations, as well as public dissemination and outreach.

THE PROJECT

RANET is an initiative of national meteorological services to improve rural and remote community access to basic forecasts, observations, and warning information. Initial and continuing funding of the program is provided by the USAID Office of Foreign Disaster Assistance (OFDA) through an interagency agreement with the U.S. NOAA National Weather Service (NWS) International Activities Office (IAO); however participant countries and other donor countries have and continue to provide funding as well as significant support in kind resources.

The RANET program grew out of the Regional Climate Outlook Forum (RCOF) of Africa, where participants noted that the full potential of seasonal forecasts could not be realized, unless there was an effort, parallel to the RCOF, attempting to improve information access of the rural poor. As a result the program's approach to the challenge of communication is largely infrastructure based; focused on examining how to best move information from urban centers of production to remote areas with typically limited information access due to remoteness, a lack of resources, or both. Since its initial work in Africa, the program has undertaken projects in various parts of the Americas, Asia, and Pacific to provide training, establish pilot demonstrations, or build out various systems from HF radio, to mobile phone, community radio; of course web based systems, satellite broadcasts, and even satellite telephony.

While the initial mission of RANET was to address rural and remote community access to information, the program does work on improving communication capacities that benefit the operation of meteorological services. Often this is done out of necessity, as an

NMHS cannot attempt to support rural and remote communities, if it cannot reliably access information it needs to generate a product for the public. Additionally, regional warning centers for cyclones and tsunamis often provide the base information that is further contextualized for sub-national dissemination.

Despite a technology and infrastructure focus, the program traditionally values, and often relies on, efforts that address the social science aspects of communication which stress use, understanding, and application of information products into existing decision making processes. Often national services suppose forecasts are the most valuable information they can provide. Yet, not only is there a structural challenge of getting information to a remote, mobile individual, but there is also the necessity of engaging users to really understand information needs and to provide them with valuable climate observations. Moving information from point A to point B is not enough.

Similarly, RANET has often found that public warning and alert are anathema to many developing countries. Such concepts of warning are very Western notions that may not have the same sense of urgency in developing countries for such reasons as the following: more critical demands and needs (e.g. chronic hunger, disease); unclear national regulatory frameworks or ill-defined authorities and responsibilities for warning; a lack of respect for national or provincial governments, which typically host warning authorities; or simply that slow onset (creeping) hazards can become a disaster in the long term though likely remain of little concern during its creeping, accumulating phases or that complex hazards are often more difficult to address than quick onset ones such as floods, tsunami, or even violent storms.

At its core, RANET is a small technology transfer program. Only in specialized cases, such as management of satellite broadcast capacity, does it operate entire systems. RANET began its activities, as the development community initially began addressing the 'digital divide' mid-to-late 1990s. Since then, the development and humanitarian community's larger concern about information access, and later knowledge management, has undergone several foci; access for the sake of access, creation of information communities, and later development of specialized applications. In each phase, RANET has participated and learned from its own success and failure. One of the program's advantages today is its longevity. The program has spanned various changes in policy, approach, and fads and, in recent years, has been able to utilize lessons from earlier attempts at technology transfer, and in ICT for development, to direct how it proceeds.

MAIN LESSONS

- Capacity development in communications, and indeed most NMHS functions, is in essence a technology transfer initiative. RANET approaches, which emphasize user driven perspective, small investments, and a high degree of decentralization, allow the project to explore solutions and identify NMHSs ready for assistance, at relatively low cost. In short, it promotes community driven innovation that is evolutionary in nature. While capacity development in this approach is slow, it often is less disruptive to operations, current policy, and fiduciary capacity;

- Capacity development of NMHS, and specifically the services provided to the public, often assumes that improvements in the products, such as forecasts, will benefit users. Users must be engaged to determine if information provided is actionable and understandable;

- Lay users of meteorological information are innovative and often informally incorporate information into their decisions. Community dialog is critical, but the ability to conduct research and speak with many communities is impossible with particular funds. Relying on remote training material is necessary for scale;

- Broadcast communications are still critically important as telephony and point to point are comparatively expensive for national operations;

- Regardless of reason, it seems that while the meteorological community emphasizes visually intensive products, the rest of the world is moving towards short message platforms. The public adoption of short messages may be forced by form factor, such as a mobile phone, or it may result from organically developed norms on social media platforms as Facebook or Twitter. Even when images are utilized, often it is iconography that quickly imparts a short message and does not contain detailed information;

• Any move to short form material will require increase public outreach and education on meaning of messages, jargon, and how to access further details; and

• Multipurpose systems, while hard to coordinate and manage, are inherently more sustainable and often lead to growth without donor support.

Source: http://thewhitedsepulchre.blogspot.com/2009/11/target-rich-environment.html

ABOUT LESSONS (INSIGHTS) FROM EXISTING DISASTER RISK REDUCTION AND HUMANITARIAN EVALUATIONS

USAID's Office of Foreign Disaster Assistance seeks to extract lessons from its projects as well as looking at how other organizations have structured and conducted their assessments makes sense. This section summarizes the goals, methods, evaluation criteria, findings, and common themes from six evaluation reports that were produced by international DRR and humanitarian organizations. The following six reports included in this review were selected from a variety of organizations and approaches to evaluation.

- Catholic Organisation for Relief and Development Aid (2010). Programme Evaluation of DisasterRisk Reduction.

- UK Department for International Development (2011). Multilateral Aid Review.

- Federal Ministry for Economic Cooperation and Development (2011). German Humanitarian Assistance Abroad.

- Swiss Agency for Development and Cooperation (2011). Disaster Risk Reduction in International Cooperation:

Switzerland's Contribution to the Protection of Lives and Livelihoods.

• Swedish International Development Cooperation Agency (2008). Are Sida Evaluations Good Enough?

• Global Facility for Disaster Reduction and Recovery (2010). Evaluation of the World Bank Global Facility for Disaster Reduction and Recovery and Contribution to the Protection of Lives and Livelihoods.

Lessons from these evaluations are summarized below.

GOALS

Most organizations conduct reviews to gain insights into program effectiveness in an effort to become more efficient and effective in the future. The UK Department for International Development (DIFD) Multilateral Aid Review (MAR) took a slightly different approach: selecting quantitative indicators to determine the funding allocations. This common interest in program improvement is logical given limited funding and widespread anticipation of greater need for disaster and humanitarian aid in the future.

METHODS

Consistent, systematic and transparent methods are important to overall credibility. Appropriate sampling and standard protocols lend legitimacy to results. Reviews that used unsystematic anecdotal evidence or made unsubstantiated claims lack authority, despite the potential value of their findings. Most organizations faced limitations in the availability of data and consistent reporting. Studies that address limitations openly appear more credible because they acknowledge dificulties rather than glossing over challenges and emphasizing positive outcomes.

EVALUATION CRITERIA

Despite differing goals, five evaluation criteria were common to many of the studies and applicable to a variety of programs: effectiveness, efficiency, sustainability, relevance, and impact. Because of the different methods used, these criteria were operationalized and defined differently in each study. In general, however, clear delineation of measurement and data collection procedures is essential to the credibility of indicators. Used consistently, such indicators can provide a balance between standardization and flexibility.

Clear goals that relate to organizational mission should be a prerequisite to an evaluation. Greater degree of specification of evaluation criteria before funding is dispersed (as in the case of the Swedish International Development Cooperation Agency's (Sida) standard criteria) can help set expectations, facilitate monitoring and evaluation, and foster overall accountability and effectiveness. It is also recommended that programs with similar goals be evaluated according to the same predetermined metrics and methods. (See Table 2 in the full report for a summary of all the evaluation criteria used.)

FINDINGS & COMMON THEMES

Four common themes emerged from review of these studies. General findings and recommendations are summarized below.

1) Tendency to Focus on Positive Lessons

Evaluations studies, particularly those made public, tend to emphasize positive outcomes. While focusing on successes is understandable, it can lead to conclusions and continued support for programs that seem unwarranted or unreliable. Failure to support conclusions with adequate evidence erodes credibility.

2) Challenges of Measuring DRR Impact

Impact is also notoriously difficult to measure, as tracing and attributing causality in complicated systems is nearly impossible. It is, therefore, more likely that evaluators are actually assessing outreach and outputs as opposed to outcomes, using them as a proxy for impact. In the case of DRR, it is difficult to connect specific programs to outcomes and difficult to measure reduction in damages until an event has occurred. A drought in the same place at different points in time may have different consequences, as societies, like climate, are dynamic and change in unexpected ways. Assessing what might have occurred in the absence of an intervention is difficult and resource intensive.

3) The Importance of Regular Monitoring and Evaluation

Having clear goals and measurement criteria before program implementation is necessary for consistent monitoring. Collecting baseline data, whether from a previous or recent disaster or an estimate based upon initial development and capacity patterns is essential to monitoring progress. Attempting to determine results after a project has ended is difficult, if not impossible, without uniform data and regular reporting.

Of the six organizations, only Sida and the Global Facility for Disaster Risk Reduction and Recovery had consistently considered evaluation prior to project implementation. Sida's assessment guidelines and "Terms of Reference" are a step in the right direction, providing uniform standards and pointing project managers towards essential goals to be considered.

Consideration of "unintended consequences" is another important step in learning from the past. Along with increased monitoring and evaluation, further attention should be given not just to project successes and failures, but also to unintended or unforeseen events. Some time should be allowed to elapse in order to assess how and whether projects persist after the immediate implementation phase. Not too much time should elapse, however, as institutional and participant memories of program implementation will fade and lessons may be lost.

4) Integration of Humanitarian, Development and Other forms of Aid

The need for "layering, integration, and sequencing" was repeated throughout USAID's 2012 policy guidance document, Building Resilience to Recurrent Crisis. The six reports examined here voice similar concerns. Development actors around the world are struggling with the challenge of synchronizing various kinds ofaid and ensuring that humanitarian, development and climate variability and change adaptation programs are synergistic rather than redundant or counteractive. Rather than struggling independently to address these challenges, agencies and NGOs around the world would do well to share experiences and learn from successes and challenges abroad in a more formal and structured manner.

Source: http://www.esunet.uji.es/

saptstrength.com

USABLE CONCEPTS

Concepts or notions can arguably be viewed as “social inventions” in that they are not only attempts to describe and inform but are also often designed to influence individual, group and/or societal behavior. Specific ideologies (often in the form of ‘isms’) and sometimes even slogans that appear on placards held by protesters in the streets can be categorized as social inventions, if they become rallying points. As far as we can tell the roots of the phrase “social invention” go back to the mid-1960s and early 1970s and can be linked to the notion that humanity had entered the “Space Age” (see Mazlish 1965), a slogan that one could effectively argue inspired people to look differently at earth’s place in the universe and people's relationship to the earth.

A key understanding about social inventions is that they often have as great an impact on individual, group and societal behavior as does the development of new technologies. Concepts, however, have to compete for the attention of the public and policymakers alike in a way similar to how corporations invest in developing popular slogans for their products to capture attention and encourage brand loyalty.

In completing this survey and especially in searching for lessons learned from climate-, water- and weather-related hazards and disasters many concepts were identified that might be of use in decision-making processes for coping with—as well as planning for—the adverse impacts on societies and ecosystems of hydro-meteorological events.

In the following section, examples are provided of the 32 thought-provoking concepts and ideas based on the full report that could be viewed as social inventions through which to inform the public and policymakers about hazard and disaster situations. A list of the 32 concepts appears at the end of this section. The following examples are meant to be illustrative of a larger set of usable concepts in the full report and are not presented in any specific order of priority. Notably, these inventions might also provide opportunities for disaster-related decision makers to more effectively ground their ongoing debates and pronouncements in hazard realities as they are and not as distilled through abstractions of what is believed "ought to be" their always uncertain reality in the modern world. As such, these concepts merit serious consideration.

Assigning a "Project Scribe"

A major problem with identifying lessons from any process relates to how, when and where those lessons should be identified. Some have suggested that lessons that have been learned while a project is still in progress could be identified by convening a mid-course correction project workshop. Others suggest that such lessons could be identified only after the project has ended. But, how far after a project ends should the search for lessons learned begin? All of these approaches have merit but can legitimately be critiqued. For example, the latter approach can (and often does) lead to a situation in which people have difficulty remembering many of the lessons that had been identified over the course of the project, especially if it was a multi-year project or if people involved in one phase have since moved on to other, unrelated projects. The reality is that for a host of reasons memories and interest fade with time, even in the short term.

One suggestion to counter this persistent problem is to assign a "scribe" or "record keeper" who is tasked with regularly recording lessons (i.e. daily, weekly, bi-weekly, monthly) that have been suggested at those time intervals by project participants. Lessons can be sought from individuals or during occasional group meetings as well as through observations, interviews or focus groups. Near the end of a project, the lessons that have been identified can then be reviewed and assessed in terms of their meaningfulness, with useful ones being archived in a lessons learned library and shared with agencies and donors for consideration and possible implementation. ECHO (2010:34) suggests that routine monitoring, even for "lessons," will assist in keeping a focus on the activity's deliverables and timeline.

The "3 'O's"

The "3 'O's"—Outreach, Outputs, and Outcomes—provide a simple means by which to categorize activities in an organization.

Outreach encompasses participation in discussions, lectures, social networks, mentoring sessions, trainings and educational experiences, and the like. Just about everyone in an organization engages to some degree in outreach, either in person or electronically.

Outputs are activities that can readily be counted, such as the number of training workshops held, the number of participants or countries represented in those workshops, the number of papers published, the number of plans of action developed, or the number of people assisted directly or indirectly by a project. Managers in organizations tend to like outputs because they can easily be quantified and are often viewed as signs of success. The longer lasting impact of outputs tends, however, not to be considered.

Outcomes are what are left in place once the "outsiders"—in this case, humanitarian emergency aid planners and responders—leave at the end of the DRR project. While outcomes are the most desired indicators of sustainable impacts of a project, they are also the most difficult to verify in the short term or difficult to attribute to a specific project. In fact, many organizations regularly confuse outreach and outputs with outcomes in their project assessments. This tendency is partially to do with the fact that organizations focus much of their efforts on outputs (e.g. workshops, reports, conference papers presented, funds dispensed, etc.) as measures of success because these are easier to quantify and are visible in the short term. It must be stressed, however, that OUTPUTS are not the same as OUTCOMES! The problem is that organizations often favor short-term objectives over longer-term ones, and outcomes may not be visible in the short-term. Only patience (by donors and recipients) and the passage of time can validate the potentially positive outcomes of a pilot project or a development activity. The problem is that most government agencies and especially donors do not have the time (or patience?) to wait for the real outcomes of an activity to emerge over time; instead, they tend to count the proverbial "beans" of outputs even though those outputs might be pale surrogates in comparison to hard-won, successful outcomes.

Satisfice

To satisfice is to "decide on and pursue a course of action satisfying the minimum requirements to achieve a goal;" "optimization requires processes that are more complex than those needed to merely satisfice." <www.thefreedictionary.com>

The word satisfice was given its current meaning by Herbert Simon (1956). "To optimize: (1) we usually do not know the relevant probabilities of outcomes, (2) we can rarely evaluate all outcomes with sufficient precision, and (3) our memories are weak and unreliable. A more realistic approach to rationality takes into account these limitations: This is called bounded rationality." <en.wikipedia.org/ wiki/ Satisficing>

To satisfice is in fact a novel combination of two concepts 'satisfy' and 'suffice' that has ethical as well as economic implications. "Satisficers," those who are satisfied to meet minimal requirements to achieve their goals through their actions, are usually viewed in opposition to 'maximizers,' who seek the best result possible from their actions toward their goals. Perhaps the notion of 'satisfice' has a useful role to play in disaster preparedness, response & recovery, especially in designing bridging and blending activities of DRR and CCA. In fact one could argue that the adage "Do not let the perfect become the enemy of the good" could serve as a reminder to agencies that 'satisficing' is an option for development activities.

Decision Making Under Uncertainty (DMUU)

Over a decade ago, the US National Science Foundation developed a program to solicit proposals to research the notion of "decision making under uncertainty" (DMUU). DMUU has value for applying science to societal decision-making processes. The scientific community's "job" focuses on what we do not know and on reducing uncertainty. Libraries are filled with books, articles and reports about uncertainty in decision-making and attempts to reduce it.

DMUU focuses on and highlights what we do not know, as opposed to what we do know. This brings to mind the adage about whether a glass is half-empty or half full. With regard to scientific inquiry we can ask if a glass is 1/4th empty or 3/4th full. Scientists by nature tend to focus on the uncertainties, and on the part of the glass that is 1/4th empty. The reality is that most decisions are made with less than perfect information in hand. It is important to keep in mind that, even with perfect information in hand, there is no assurance that the best possible decisions will be made. Perhaps it is useful to consider a positive and perhaps more realistic perspective for most decision-making situations, such as "decision making under foreseeability".

Decision Making Under Foreseeability (DMUF)

Decision makers always have some information in hand and are often forced to make on-the-spot decisions. Scientific curiosity may have the luxury of time to focus on reducing any remaining scientific uncertainty. However, decisions need to be made and decision makers cannot often wait for additional scientific discoveries. A key concept for decision makers, then, is "foreseeability." People can relate to the foreseeability of the occurrence of an extreme event that had occurred in previous times, even though they do not know about the science-based probability of its recurrence at a specific place or point in time.

The notion of foreseeability is used in the law as a qualitative expression of probability to determine accountability or fault when someone has been injured or killed (or when property has been damaged).

Thus, a FORESEEABLE RISK could be viewed as a risk "whose consequences a person of ordinary prudence would reasonably expect might occur…"

The concept of foreseeability clearly applies to hydro-meteorological hazards and disasters. It is uniquely relevant for dealing with the uncertainties surrounding potential hazards spawned by climate, water and weather variability, extremes, and change. By its application we can foresee not only which adaptation measures should be considered for implementation and when, but can also identify in advance adaptation's ripple effects in environment and society.

Re-Functioning

While many organizations consider re-structuring, few consider re-functioning, that is, changing their mission about what they actually do. Given contemporary concerns about climate change and its likelihood of increasing the number as well as the frequency and intensity of extreme climate-related events, humanitarian aid agencies, pursuing a "business as usual" scenario to prepare populations at-risk to climate change will have difficulty keeping up with demand for disaster-related emergency assistance.

Donor agencies will have to consider re-functioning, that is, re-thinking not only how they provide emergency assistance or approach DRR programs but also what tools they keep, discard or add to their disaster-avoidance or disaster-mitigation "toolbox." Re-functioning is especially important, considering the likelihood that national budgets of humanitarian aid agencies may likely increase incrementally at low levels over time when the need for such aid is expected to increase as the impacts of climate change become more apparent in the coming years and decades.

"Partnership in" vs. "Ownership of" Projects (that seek to bridge DRR and CCA)

Having ownership of an activity is different from being a partner in that activity. The difference relates to possession and responsibility. Once a partnership in a specific activity ends, neither party is obligated to continue to work with the other party on that activity. This applied to projects or programs related to DRR and/or CCA. The goal of the partnership may itself be time limited (2 or 3 years is common), which means that whether an objective has been reached to the satisfaction of the partners, the project ends. Thus, a partnership can be time-limited without any commitment to its continuance by either partner.

The problem with a partnership is that it does not require a strong commitment, which suggests that once a project comes to an end the motivation to continue pursuing its goals, especially if doing so would require the recipient partner to use its own funds, might be lost. This might be so even if the other partners (and funders) had expectations that the pilot project would continue once funding ended.

Another problem is that donors sometimes come to realize that there is a lack of commitment on the part of a partner, even though the donor might be very committed to the activity's goals (DRR, CCA or both). At the end of the project, the donor might then choose to seek a new partner, e.g., to "re-partner."

Ownership differs from partnership, because taking ownership to address a longer-term issue requires a commitment to the project by donor and recipient that does not hold for mere partnerships. Ownership suggests that each actor must be committed to contribute its own resources to continue the activity until it succeeds. It also demonstrates that the recipient of a donor's funding really did place a high priority on the activity as being of benefit to the stakeholders affected by it.

Re-educate

Once is not enough. Approaches must be devised to continuously educate at-risk populations about hazards they are likely to face and about DRR practices that might help them prepare for and mitigate hazard impacts. People trained in DRR or CCA at the village level will require refresher courses every few years to be brought up to date on new technologies and techniques they might use.

Resilient Adaptation

The concept of "resilient adaptation" is borrowed from the field of social psychology. It represents the need for a flexible decision making approach in the face of an uncertain future. It can be applied as an approach to coping with climate-related changes to regional and local hazards as well as to the possibility to foresee disasters. This is NOT a simple merging of the two climate change concepts of 'adaptation' and 'resilience.' It represents a flexible approach to societal and individual adjustments to the potential, but still uncertain, impacts of climate change. Pursuing a Resilient Adaptation approach in response to the uncertainties to come in the years ahead certainly merits consideration by humanitarian and development assistance agencies. It requires, however, the ability of decision makers to change policy direction as new evidence about climate change impacts becomes available.

Climate Change Risk Disclosure (CCRD)

CCRD provides a qualitative as well as a quantitative way of identifying and explicitly cataloguing first- and second-order risks a society might face from hydro-meteorological hazards. CCRD would potentially be of value to communities and governments, because it provides a useful way for individuals and communities to explicitly identify risks in urban and rural settings as well as for providing early warning of potential hazards and disasters. It would be useful for DRR as well as for CCA.

An important addition to CCRD is CCR(B)D. Although it is nearly the same as CCRD, it includes a search for the potential benefits (B) of a changing climate that might be identified and explicitly acknowledged. For longer-term strategic development purposes, a systematic assessment of climate change risks AND BENEFITS disclosed to donors, their partners and their funded recipients as partners could enhance the sustainability of humanitarian and development responses well into the future.

Late Warning Systems

Certain segments of any population tend more toward being "risk takers"—or even "risk makers"—than other segments, which can be considered risk-averse. Risk-takers delay taking action, even when reliable information or an early warning of an impending hazard is in hand. Thus, the idea to establish a late warning system (LWS) separate from an early warning system (EWS) is based on observations as well as a belief that most people do not respond to early warnings but only respond as the seriousness of subsequent warnings increases. A need exists for developing late warning systems, because those risk-takers who wait to be sure that they must respond to an impending, forecasted disaster usually require different information in different formats than the traditional EWS warnings (watches and alerts) that is typically provided in a succession of early warnings.

E2E+Feedback

The model of an "end-to-end" (E2E) forecast system is prominent in hydro-meteorological communities. In it, a forecast of climate, water or weather conditions in the near term is generated and disseminated to prospective users in various socio-economic sectors, including decision makers in government ministries. Hence, the direction of flow of information is from forecaster to user. The E2E model became well established in the early 1990s, when attempts were being made to emphasize the importance to societies of hydro-meteorological forecasts. What has not, however, been made explicit in the model, even today when better understanding has become available, is the calling for the feedback that "the users" can provide to corroborate and fine-tune the user-friendliness of the forecasts.

Adding an explicit third "end" --- feedback from users --- to early warning forecasters to the "end-to-end" model addresses if not resolves this particular communications issue, with feedback from civil society being not only legitimized as possible but also increasingly sought after by those responsible for hazard- and disaster-related forecasts and warnings to improve their models for more reliable forecasts, e.g., an E2E+feedback forecast system.

"Ordinary Knowledge" as Usable Science

Lindblom and Cohen (1979:12) defined ordinary knowledge as "knowledge that does not owe its origin, testing, degree of verification, truth, status, or currency to distinctive … professional techniques, but rather to common sense, casual empiricism, or thoughtful speculation and analysis." Local, indigenous, and traditional knowledge are subsets of ordinary knowledge that draw on "knowledge of things beyond the local setting."

Decision makers are likely to rely heavily on their own accumulated ordinary knowledge. Yet, they have a responsibility to listen to the public's views also based for the most part on its collective ordinary knowledge about DRR and CCA issues they might face. And scientists have a responsibility beyond their research to make clear to non-scientists their research, correct misperceptions of environmental cues and media reports and to foster scientific indicators in ways that reinforce or calibrate "ordinary" knowledge.

Regrettably, communication between scientists and the public has been inadequate for a very long time. As H.G. Wells (1904) wrote, "many of those scientific people understand the meaning of their own papers quite well. It is simply a defect of expression that raises the obstacle between us."

Incorporating ordinary knowledge into research facilitates a social discourse that surpasses top-down strategies of the past in favor of more equitable possibilities for action and understanding that can emerge only when voices from a range of stakeholders are heard.

Dialogue taken from *Slumdog Millionaire*

Q: "How could you answer 12 difficult questions?"

A: "They asked me the 12 things I do know."

Ordinary Knowledge is Usable Knowledge for Descision Making

USABLE CONCEPTS FOR DRR

We consider the following concepts to be useful to DRR and CCA for identifying and using the so-called "lessons learned" from OFDA's DRR programs, projects and other activities. This Report provided a glimpse of some of these concept. All those noted below are discussed in the working draft of the 400-page Base Report (USAID/OFDA archives).

1. **The 'Rs' of DRR**
2. **Satisfice**
3. **Foreseeability**
4. **Re-functioning**
5. **"Social Inventions"**
6. **Improvisation**
7. **Lessons Identified - Lessons Learned**
8. **Creeping Environmental Problems (CEPs)**
9. **Drought follows the plow (DFP)**
10. **Re-educate**
11. **Resilient Adaptation**
12. **Grain Storage Improvements**
13. **Climate Change Risk Disclosure (CCRD)**
14. **CCR(+B)D development**
15. **Late Warning Systems**
16. **Sunsetting DRR Assistance Programs**
17. **Reversed Triage: Help the bottom group first**
18. **Hotspots; Flashpoints (hotspots pyramid)**
19. **"The 3 'O's"**
20. **Disaster Risk Reduction (DRR) Bank**
21. **Forecasting by Analogy (FBA) and the search for "lessons"**
22. **Mitigating the impacts of CCA (Climate Change Adaptation)**
23. **Assigning a "Project Scribe"**
24. **"end-to-end+forecast" (E2E+Forecast System)**
25. **DRR RANN (Research Applied to National Needs)**
26. **"Ordinary Knowledge" as a concept**
27. **Working with a changing climate, not against it**
28. **"Partnership vs. Ownership (of projects that seek to bridge DRR and CCA)**
29. **Climate Proofng**
30. **Risk Taking, risk aversion... and risk making**
31. **Decision Making Under Uncertainty**
32. **Decision Making Under Foreseeability**

QUICK EXECUTIVE SUMMARY OF COMMON FINDINGS FROM THE CASE STUDIES AND RAMIFICATION STATEMENTS

The comments in the following section are based on crosscutting observations drawn from case surveys, interviews and desktop research activities. Note that the recommendations in this section are followed by brief ramification statements about the foreseeable consequences (i.e. those having a high likelihood of resulting) if those recommendations are, for whatever reason, not implemented. The reason for including foreseeability is to remind—if not inform—decision makers that "not taking action is no less a form of action." In truth, most reports that identify the so-called "lessons learned" from a project or event response do not take the next step in actually learning from such lessons identified by making explicit the possible ramifications of d isregarding such lessons in preparing for and responding to future events. This axiom is especially true in regards to measures involving disaster risk reduction and climate change adaptation. The selected comments are meant to be illustrative and not exhaustive of key points that have been touched upon in the full report.

PARTNERSHIP IN VS. OWNERSHIP OF PROJECTS (THAT SEEK TO BRIDGE DRR AND CCA)

Lessons: As noted earlier, having ownership of an activity is different from being a partner in that activity. The difference relates to possession and responsibility. Once partnership activity ends, neither party is obligated to continue to work with the other party on that activity or to maintain the activity on their own. This general axiom especially applies to projects or responses related to DRR and climate change adaptation CCA. For such projects, the goal of the partnership may itself be time-limited (two or three years is common), meaning that, whether or not objectives have been met to the satisfaction of either or both of the involved partners, the project ends when the project end date has been reached.

Importantly, ownership suggests that the aid recipient is committed to using its own resources to continue the activity until it takes hold. Continued commitment by the recipient also demonstrates that it actually values the activity and considers it of benefit to its affected stakeholders.

> **Ramificiations:** The ramification of not realizing the difference between forming a partnership to undertake a DRR project and having the recipient eventually take ownership of it exposes the activity to abandonment or considerable delay once funding for the initial partnership between donor and recipient comes to an end. The potential for ownership, which is not guaranteed at the outset of the DRR project, is one of the most important factors in determining whether a collaborative pilot project or a program is sustainable in the long term.

TEACHABLE MOMENTS, TEACHABLE MOMENTS, TEACHABLE MOMENTS

Lesson: Glances into the future can be had in the present. The hydro-meteorological future of an area that is subject to a specific hazard can often be glimpsed in the disasters that occur each year when similar hazards occur in other places on the planet. Floods, flash floods and droughts, for example, occur at different locations on every continent each year. What few people seem to appreciate is that each of these events can be framed as a "teachable moment" that provides information on the consequences of extreme hydro-meteorological hazards and disasters as well as on the strengths and weaknesses that have previously surrounded coping with such hazards.

Using such concepts as "forecasting by analogy" and "foreseeability," as pointed out earlier, societies can gain some insights about improving the possibility to lessen the adverse impacts on society and on ecosystems of such events.

> **Ramifications:** Failure to attempt to glimpse the future, for example, by looking at recent past experiences of the ways in which other societies or cultures have dealt with the consequences of their hydro-meteorological extremes needlessly exposes societies to risks that might otherwise have been reduced or avoided. Put differently, the history of hydro-meteorological hazards and disasters can be said to have a future value to those who capitalize on using that history as "teachable moments."

COMMUNICATION, COMMUNICATION, COMMUNICATION

Lesson: Make early warning systems "(w)holistic." In contexts of disaster preparedness and response, communication comes down to ensuring that each sub-component of an early warning system works well in and of itself but also as a functional part of a true system. The forecast of an impending hazard is only one, albeit important, part of an early warning system that also includes dissemination and clarity of the warning, timely reception and response to the forecast, and feedback to the forecasters about the use as well as relevance of their products to various sectors and at various levels of civil society. These and other important components beyond the forecast itself (e.g., timeliness and clarity of warning, methods of dissemination) are often neglected because forecasting and communication hardware (e.g., technology) are typically considered as the answer to society's risk reduction needs. A focus on the technological aspects of an EWS prompts one to ask from the societal side the following: "Technology is the answer, but what is the question?".

> **Ramifications:** Reports evaluating early warning systems usually point out failures in various aspects of the communications of technical, forecast-based early warnings to key, need-to-know, at-risk recipients. Such failures tend to result from the use of complex concepts and scientific terminology (jargon), time lags in warning-delivery-systems and lack of knowledge among populations about the potential benefits provided by as well as trust in national weather service forecasts. Failing to view early warning systems as a part of a broader system, by analogy, would be like failing to understand that a chain can only be as strong as the weakest link and that that weak link in EWSs typically has to do with effectively communicating with the public.

FEEDBACK, FEEDBACK, FEEDBACK

Lesson: Use the end-to-end+feedback notion to encourage users to provide feedback regularly. The E2E model in which forecasters produce a forecast and pass it on to climate-, water- and weather-sensitive socio-economic sectors and civil society in general has within it an implied chance to provide feedback. However, an explicit seeking of a feedback links society back to the forecasters. Such a connection would not only enable forecasters to fine-tune early warnings to better meet the needs and the language of potential users of the forecasts and especially the early warnings. Such improvements would in turn increase the usability of information in terms of the world that "is."

> **Ramifications:** In terms of feedback, to pursue a "business as usual" scenario that lacks explicit recognition of the importance of the knowledge and opinions of at-risk stakeholders perpetuates a message that input from civil society may neither be needed nor wanted by forecasters using an E2E model of the world. In contrast, E2E+feedback as a model include civil partners in the development and operation of early warning systems for hydro-meteorological extremes. The absence of an open encouragement for feedback from end-users can weaken user trust in the forecast system. This, in turn, can lead to less effective warning systems and sub-optimal outcomes in terms of delayed responses to those warnings.

IDENTIFY, IDENTIFY, IDENTIFY

Lesson: The process to identify lessons must start on the first day of a project, with the designation of someone in the project as the project's 'scribe.' Identifying and supporting a "lessons-learned scribe" for the duration of a project is a positive step towards assuring that lessons can be identified regularly, especially while such lessons are on the minds of project participants. It also ensures that lessons can be applied as the project progresses. At the end of the project, the collected set of lessons can then be reviewed, assessed and prioritized.

> **Ramifications:** Many articles about lessons learned warn of the problems encountered when the search for lessons from a project has been undertaken months or years after the project had ended; memories fade, the interests of donors and aid recipients in past lessons wane, and people tend to "discount the past" in the belief that we are smarter now than those who worked previously on such DRR issues.

USABLE SCIENCE, USABLE SCIENCE, USABLE SCIENCE

Lesson: "Usable science" requires that scientific and technological efforts are bridged with societal needs. It also requires that scientific forecasts be translated into user-friendly climate products. In truth, a considerable amount of information that could be useful for decision makers today, remaining scientific uncertainties notwithstanding, is already available. Moreover, cheap usable technologies, techniques and concepts already exist that can help bridge stakeholders (e.g., RANET, mobile phones, MP4 players, smartphones, etc.), especially those in the poorest communities. Finally, identifying ways to explain clearly and plainly concepts and products that emerge within the research community and that affect civil society, the ranks of which are not trained or educated at the level of those in the scientific community, is important.

> **Ramifications:** It is important to understand that the terminology and concepts (jargon) used in disciplinary research or operational activities require translation into user-friendly

(locally understandable) ideas in order to assure that science builds bridges of awareness with civil society in other cultures. If this does not happen, the risk is high that following a workshop of outreach and outputs, no sustainable longer-term outcome will be likely. If the science is not "user-friendly," in other words, understanding will be low as will public trust in forecasts and forecasters. The result will likely be a low use-value of climate products for society.

PRIORITIZE, PRIORITIZE, PRIORITIZE:

Lesson: Distinguish what is interesting from what is essential. Effective prioritization in the context of hazard and disaster research distinguishes between humanitarian emergency assistance that is essential for DRR and for longer-term CCA and assistance that is wanted by recipient countries but is less essential. The economic notion of "satisficing," which seeks less than optimal solutions by accepting improvements that are considered "good enough," is worthy of consideration in this context.

Ramifications: Not prioritizing according to what is essential can lead to a situation in which aid and recovery resources become so thinly distributed that what is provided can have little more than marginal impact in regards to sustainable and beneficial development. As Winston Churchill once remarked about country X putting just enough troops into combat to lose, so too in the context of DRR and CCA can countries put just enough resources into DRR or CCA to squander those resources without making any reasonable or sustainable headway in reducing the consequences of climate-, water- and weather-related hazards and disasters.

OUTCOMES, OUTCOMES, OUTCOMES

Lesson: All 3 "Os"—outreach, outputs and outcomes—are necessary for sustainable development to be an achievable goal. The outcomes of a DRR or development project are more difficult to identify and assess because an adequate amount of time must pass before the true sustainability of a project can be determined and they are more difficult to assess and attribute to any particular intervention. To the three "Os", however, should be added a + 1, which refers to project ownership. As noted above, ownership refers to the time in the life of a project when the initial phase (and project funding) comes to an end and the beneficiaries (recipients) of the project perceive its objectives as being so worthwhile that they choose to mainstream the project activities into their own development agendas at their own expense. At the outset of a project one can assume that it is expected that success would be followed by continued support by the original donor or a new donor and perhaps by the recipient, though funding would likely be a constraint for the latter.

> **Ramifications:** Without explicit and adequate consideration about what might be the follow-up scenarios once the initial project has ended, chances are great that a project will end when the funding runs out without the project having sustainably reduced disaster risk in the project area.

CAPACITY BUILDING, CAPACITY BUILDING, CAPACITY BUILDING

Lesson: Capacity building needs a "phase 2" because "Once is not enough." As learning is a lifelong experience from "K to Grey," (from kindergarten to the elderly) repeated capacity building activities are necessary. This means that once a training or awareness workshop has been held, the task of capacity building must not end. Re-education—of at-risk populations, of mid- and high-level decision makers, and of climate scientists—is a necessity in the form of refresher training activities that build capacity among the public. Of course, the rub often is that sustained capacity building requires sustained funding, which is not always forthcoming.

> **Ramifications:** Refresher courses are a "must" for people who have been once trained in disaster risk reduction. Otherwise, retention becomes the greatest enemy of sustainable DRR. The problem is that those who have been trained learn some things but their retention of information after some period

diminishes. It's only natural for this to happen. Capacity building must also overcome difficulties of communicating concepts (as noted above), however, as trainers must pay attention to the fact that the ranks of civil society are composed of those from all educational levels.

FORESIGHT, FORESIGHT, FORESIGHT

Lesson: When has enough information for decision-making been made available? DMUF (Decision Making Under Foreseeability): Most if not all decisions are made with less than perfect information in hand. Foreseeability can be seen as a qualitative expression of probability or of the likelihood that some event will occur. Scientists tend to focus on reducing uncertainty and to use quantitative expressions of probabilities; however, most people do not have the training necessary to understand probabilities. But everyone can appreciate analogy, especially those that describe similar situations of hydro-meteorological risk and hazard.

> **Ramifications:** While researchers focus on reducing uncertainties in their projections, civil society and political leaders usually cannot wait until all scientific information is in hand before making decisions. In truth, to delay making decisions in order to have more timely or perfect information may not be prudent in regions that are at risk to the impacts of today's variability under changing climates. DMUF is a positive way to look at decision making in that it focuses on information at hand as opposed to lamenting the absence of perfect information.

MISSION, MISSION, MISSION

Lesson: Serving as a catalyst by funding a pilot project is an important role that a humanitarian organization can perform. It supports DRR experiments that, if successful, could produce longer-term beneficial outcomes. Government leaders that provide support to their humanitarian and development assistance agencies must realize that the pilot projects they might support initially for DRR and CCA might receive further support from other humanitarian or sustainable development agencies if those pilot projects are seen as leading to potentially promising to their organization's long-term mission. New donors can and have built on the progress that was made during pilot projects. Thus, it is important for decision makers to understand the important contributions of pilot projects, when they evaluate the effectiveness of their respective country's foreign assistance programs.

> **Ramifications:** The failure of governments to support agency start-up programs that do not produce visible outcomes in the short term puts sustainable development prospects at risk.

DEMYSTIFY, DEMYSTIFY, DEMYSTIFY

> **de•mys•ti•fy (verb)**
> Make (a difficult or esoteric subject) clearer and easier to understand (e.g., "this book attempts to demystify technology").
>
> **jar•gon (noun)**
> Special words or expressions that are used by particular professions or groups and that are difficult for people outside of those specific professions or groups to understand.

Every profession has its own set of concepts that others in the same profession understand and use in daily conversations. To outsiders, however, those concepts often constitute incomprehensible jargon that is for others similar to hearing to an unknown language. In addition, concepts, phrases and words can also be homonymous, sounding the same but having different meanings (e.g. read and red), which only adds to the confusion of the uninitiated.

Even more confusing, climate science, natural hazards and development communities have similar jargon, but use those specialized words in different ways, complicating communication across disciplines. For example, the word "mitigation" has nuanced but important differences in meaning for climate and disasters researchers. The problem is that each profession uses its 'jargon' and assumes that others in different professions understand their nuanced meanings. This is often not the case. Demystifying profession-specific jargon to outsiders must be a one of the tasks of every professional.

Exacerbating the problem of jargon is that professionals must not only communicate amongst themselves but also with decision makers and members of civil society: their target audiences. Most people in civil society have neither the time nor the expertise to demystify scientific terms, which means that doing so falls upon the hydro-meteorological community to discuss their climate, hazards and development concerns in a language that is clearly understandable to local communities. Without such clarification, little headway can likely be made to enhance understanding of and preparedness for the consequences of human-induced climate change.

> **Ramifications:** Despite over a decade of discussion in various countries—industrialized, "graduated developing" and developing—about the importance of educating the public about various aspects of the science and impacts of climate change and about the need for enhancing disaster risk reduction at local levels, reviews of projects that have attempted to do so continue to note the difficulties encountered in educating villagers about important aspects of DRR and of CCA projects. If more effective ways of demystifying and communicating science-based terms to the at-risk communities are not sought then attempts to demystify and communicate an important aspect of building resilience at the local level will remain strained and the hoped-for outcomes will suffer.

VARIABILITY, VARIABILITY, VARIABILITY

A major goal of climate science impacts and applications research is related to coping with variability within a season, between seasons and inter-annually. Despite this goal, climate change continues to dominate science news today and is in large measure a recurring news story in major electronic and printed media. In this same vein, climate change also dominates climate science funding. As a result, modelers have continued to focus considerable attention on improving their computer-based projections of plausible scenarios about changes in the global to local climate regimes to the end of this century—about 87 years from now. From a societal needs perspective, however, efforts to improve socio-economic tactics and strategies to cope with climate variability will likely require just as much concern as well as a substantial sustainable resource stream as do responses to climate change decades into the future. At this point, neither this concern nor that resource stream appear to be immediately forthcoming.

Climate scenarios modeled nine decades into the future are not immediately relevant to most policy makers or civil actors. To be honest, most people in the world today, whether rich or poor, from developed or developing nations, only concern themselves with seasonal variations and changes that will occur during their lifetimes, which is generally far less than 87 years. Improvements to science-based forecasts must be coupled with effective communication and dissemination procedures so that seasonal to inter-annual forecasts and their associated early warnings are effectively relayed to communities and socio-economic sectors at-risk to hydro-meteorological variability and extremes and acted upon.

> **Ramifications:** Along with climate change, variability issues must be kept on the proverbial front burner of development issues. If societies, communities and individuals cannot improve their ability to coping with today's variability they are unlikely to be able to cope with climate change related variability in future decades. An over-focus on climate change concerns at the expense of paying adequate attention to the science and impacts of variability can hinder interest in climate change of local communities about future climate change as they are most concerned about the inter-annual variability, both its "knowns and unknowns."

TRAINING, TRAINING, TRAINING

Training, like education, is not a one-time event, though clearly some training is better than none at all. This applies to training for DRR, for CCA and for linking (whether bridging, blending or integrating) them in a meaningful way. DRR training of trainers who in turn are in a position to train volunteers in at-risk communities must be undertaken on a continual basis. New ideas and more effective approaches seem to overshadow "accepted best practices," especially in light of the fact that the climate is always changing. A concern exists now that climate changes are occurring at a more accelerated pace than in the recent past. Training of trainers would help to incorporate a top-down infusion of new information and a reconsideration of approaches to DRR and CCA with a bottom-up infusion of the strengths, weaknesses, constraints and opportunities existing in different communities with different socio-economic and cultural settings.

> **Ramifications:** Updating initial training of people at the local community level shows trainees that the country has a commitment to them and an awareness of their value to society in educating the general public about climate and the climate change-related risks they face. Conversely, not to do so sends the wrong message to trainees in that there would be no assurance after the initial training has ended that the trainer will remain in his or her job. It suggests that the funders did not really care enough to upgrade their training skills, as new scientific and other information becomes available. Commitment by trainers to their tasks will have been weakened.

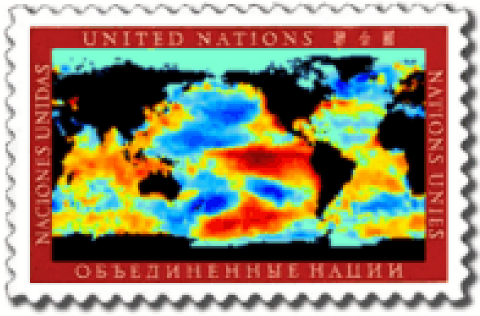
IMPROVISATION, IMPROVISATION, IMPROVISATION

At-risk populations are potential victims in situations where hazards become disasters. They are on the proverbial frontlines when a disaster strikes. As victims, defined here as people living in the disaster affected area, can be viewed as Zero-Order Responders (ZORs). They are immediately forced to improvise and innovate in order to feed their families, help other affected people and to survive under harsh conditions. To respond—using whatever has not been buried under mud and debris, washed away or contaminated—people must survive and adapt on their own in dire, life-threatening situations for hours or days, sometimes even weeks, before the first responders can reach them. This raises the question whether people can be taught to improvise in the face of disaster. Here introducing the concept of an improvisatory is relevant.

An "improvisatory" is analogous to a laboratory or collaboratory. It is a place where, in a fixed location or virtually via the Internet, stories about improvisation in the face of hydro-meteorological hazards and disasters can be collected, catalogued, and shared. They can be compiled based on formal interviews and anecdotal comments on their observations.

> **Ramifications:** Viewing those affected by hydro-meteorological disasters only as victims and not as the true first responders—as zero-order responders—misses the opportunity to teach at-risk communities to identify and to practice innovative ways to survive those first hours, days or weeks as the need may be until the official first responders arrive on the scene. It would mean that an important aspect of disaster risk preparedness training—self help through learning to improvise—would remain unaddressed.

source: https://nbstcloud.lpplus.net/schools/lincroft/website/Pages/Performingarts.aspx



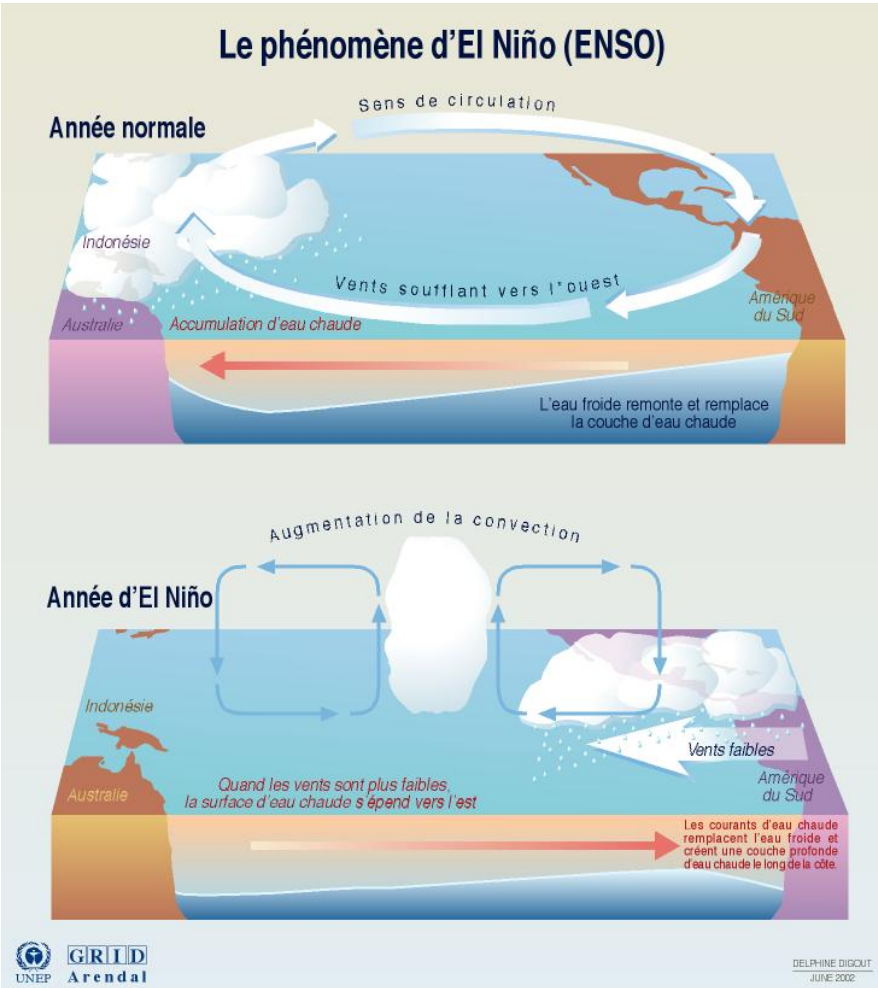
Proposed UN postage Stamp
M. H. Glantz 1998

EL NINO AND LA NINA AS POTENTIAL "HAZARD-SPAWNERS" WITH VALUE FOR DRR AND CCA

Forecasting ENSO extremes (El Niño and La Niña) provides a relatively bright spot in forecast-based hydro-meteorological warnings to societies about the potential occurrence of an El Niño or a La Niña event. Each ENSO extreme, whether El Niño (a warm event) or La Niña (a cold event), is associated with a cluster of likely impacts --- droughts, floods and fires --- on societies and ecosystems around the globe. Despite the general value to some countries of the forecast of these events, missed forecasts are to be expected. Nevertheless ENSO researchers continue to improve their forecasting skill including their early warning systems.

It is important to keep in mind that forecasting the onset or duration of an El Niño even is different than forecasting the consequences of that El Niño once the onset of an event has been observed. ENSO extremes have likely impacts in certain countries or regions based on observed physical linkage or from statistical assessments, e.g. Australia and the South Pacific Islands, the Philippines and Southeast Asia, Zimbabwe and southern Africa, the West coasts of the Americas, Northeast Brazil, among other specific locations.

Once an El Niño, for example, has been forecast likely impacts can be prepared for, because we have a reliable glimpse of the "teleconnections" between El Niño or La Niña and droughts, tropical storms, floods, and food insecurity. The bridging or blending of DRR and CCA activities can benefit from ENSO knowledge, as the phenomenon has both longer term impacts and on the "here and now" need for preparedness for hazards and disasters. ENSO extremes forecasts need not be perfect for preparedness of local communities to take action. It is important to note that the impacts of global warming on ENSO are not as yet known.



Sources : Centre de Prédiction du Climat-NCEP; NOAA.

"LESSONS LEARNED ABOUT LESSONS LEARNED" FOR DRR

In mid-March 2015, the UNISDR will facilitate development of a post-2015 framework for DRR. The process, to be held in Sendai, Japan, is a 10-year follow-up to the HFA (Hyogo Framework for Action). Since the first HFA Summit, much work has been done worldwide on DRR by a wide range of organizations. Outcomes from these activities have been printed in the form of “lessons learned.” Identifying lessons is important and it seems that every organization directly or indirectly engages in lessons learned activities. They do so to improve efficiency and effectiveness of operations or activities. Lessons also appear as recommendations and comments. These identified lessons need to be shared among those involved in disaster risk reduction and in longer-term development.

In order to promote such knowledge sharing, we believe it is important and beneficial to convene a Lessons Learned Summit (hopefully in advance of the UN Conference on DRR and Resilience). The Summit would provide avenue for discussions among representatives of government agencies, corporations, and communities about the prospects for and problems with identifying, evaluating, storing, sharing, re-using and updating lessons related to DRR. This effort would include discussion of how to effectively bridge or blend DRR with CCA in order to enhance the resilient adaptation of societies to a changing climate.

Through the Summit, lessons already identified and the ways and means of collecting them could be shared among governmental and non-governmental organizations, corporations, and civil society.

Learning from others could help to provide insights and serve as a guide to future behavior of individuals, communities, groups, and governments in the face of hydro-meteorological hazards and disasters.

ABOUT LESSONS LEARNED

Why:

Philosopher Santana was noted as having said, "Those who do not learn from history are doomed to repeat it." There are now variations on this theme, uttered by famous as well as the not so famous individuals, but the core message remains: people must know history in order to learn from it. People around the globe, through trial and error, have forever been learning tactical and strategic responses to their local and regional hydro-meteorological hazards and disasters.

Much of what they have learned in their local environments could be of value to others facing similar hazards and disasters far away.

Who:

Corporations, government ministries and agencies, the military and other security organizations and educators, among others, have engaged in formal searching for and collecting of lessons resulting from reviews of their activities. There is in fact what might be called a sub-field of researchers in universities and in corporations focused on the theory and practice related to learning lessons. A search on the Internet identifies the rather widespread interest and writings in science, culture, politics and the application of science to societal concerns. Lessons can be positive as well as negative, though interest leans toward the latter.

When:

Some organizations wait until a project has ended in order to seek lessons or guidance with regard to future responses to hazards and disasters. Others undertake mid-course reviews of their activities to change those activities that seem in need of correction. Still others favor using a scribe from the outset of an activity to record possible lessons throughout the duration of the project for later evaluation. The scribe approach circumvents the problems associated with a loss of memory about lessons that might have been identified but not recorded by participants.

Where:
In just about every local community country, corporation or government ministry around the globe lessons are sought in one form or another. Foreign assistance agencies, specifically, often review their projects to identify and evaluate the impact of their work, matching progress against the project's mission statement.

How:
Searching for lessons can be undertaken in a formal, structured and routine way. It can also be undertaken in an informal, ad hoc way (whenever someone in authority believes there is a need to search for lessons). Some organizations collect lessons, organizing and guarding them for re-use at a future time. To some organizations, a "lessons learned" process intends to produce information about lessons for internal, and "our-eyes-only" use, not wanting to expose to outsiders bad corporate management practices.

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