QUICK Summary

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

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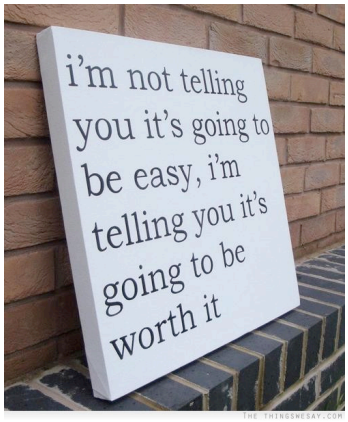
Hydro-Meteorological Disaster Risk Reduction (DRR): A Survey Of Lessons Learned for Resilient Adaptation to a Changing Climate

DRAFT (December 11, 2013)

INTRODUCTION



How societies approach a number of issues concerning risk that involve interactions between the natural and socio-economic worlds are strongly influenced by a belief that science, especially technology, "will save us." Today societies expect to save themselves from the anomalous behavior of a variable and changing climate through such new technologies. This perspective is often reinforced by a distinction that is still commonly made between the "physical" and the "social" sciences with the former being based on "hard" facts while the latter is being based on debatable (or so-called "soft") findings. The general belief by policy makers that "technology in the answer," Should evoke the response "But what was the question?" What this means is that 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). At local to global levels, DRR is hard to achieve, despite many positive programs and other efforts to protect human lives and livelihoods, as well as the ecosystems and the built environment on which societies depend. Recognizing the continued 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.

What is, What Ought to be, What could be

British historian E.H. Carr (1939) highlighted the differences between what was desired from the international politics at the time period between WWI and WWII (1919-39); 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 hazards and disasters. For example, an institution's published plans for programs for its disaster risk reduction (DRR) projects or for its longer-term development (CCA) efforts can be assumed to represent its highest expectations for success. Its publications represent that organization's understanding of "what ought to be" accomplished from its support. To be sure, however, most often circumstances arise that cause projects to fall short of those most desired (idealistic) outcomes. Unforeseen constraints, obstacles, intervening variables and the like tend to impinge on the best intentions of project stakeholders in producing what the reality of the actual world becomes—the "what is."

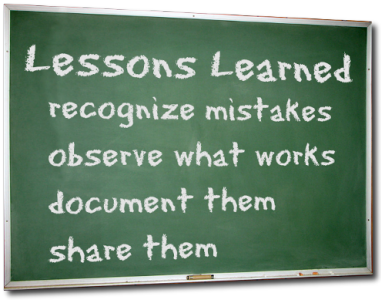
Towards Climate-proofing

New technologies, which are constantly being designed or proposed 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 that can assure a society that it has been protected from the adverse impacts of a variable, extreme or changing climate.

A climate-proofed society represents "what ought to be," the societal goal that is often sought in theories, reports and campaign promises but that is, in the end, likely unattainable. However, steps *towards* climate-proofing can be effective and must certainly be pursued. Therein lies the societal challenge of effective DRR. The notion of "**satisficing**" merits consideration with regard to climate-proofing. Satisficing involves being satisfied with an

outcome by sacrificing the "perfect" for the "good enough." For those hazards that cannot be avoided, governments can work toward preparing societies to resiliently adapt to the consequences of a changing climate. Satisficing represents realistically "***what could be***."

Lessons Identified are not the same as ***Lessons Learned***



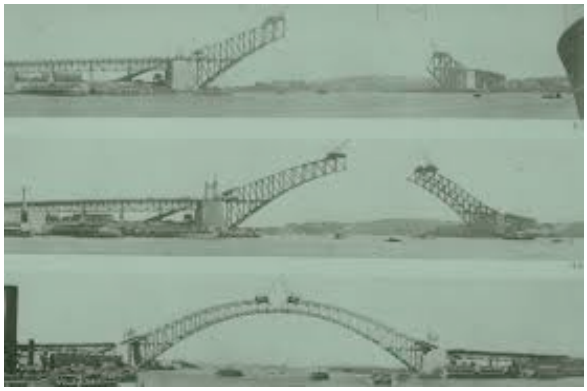
Lessons are more easily identified than learned, a difficult-to-challenge statement. For an identified lesson to be considered learned it must be evaluated, tested and—if truly useful—applied. Of course, at the end of reports can be found lengthy lists of recommended actions that should be taken to improve upon whatever activities were assessed in those reports. Those recommended actions are typically synopsized in the final report's executive summary. When one reads the full report closely, however, many other take-home messages (i.e. potential lessons) can be identified within the text that had not been highlighted as lessons even though they still meet all the criteria for being considered as such. In other words, many more lessons are embedded in a document than are labeled as lessons or appear as recommendations.

Why Bridge and Blend DRR and CCA

UNISDR defines DRR as "The concept and practice of reducing disaster risks through systematic efforts to analyze and manage the causal factors of disasters, including through reduced exposure to hazards, lessened vulnerability of people and property, wise management of land and the environment, and improved preparedness for adverse events" (UNISDR 2013a). According to a UN official, however, "Only 4% of the estimated $10 billion US [in 2006] in annual humanitarian assistance is devoted to prevention" (Schwartz 2006). A shift toward prevention through preparedness and capacity building at the community level will require a much larger percentage of assistance devoted to DRR.

Hydro-meteorological extremes such as severe storms, floods, flash floods and droughts are responsible for a major share of disasters around the globe annually and an increasing number are measuring up as "**Superstorms**." The apparent increase of such events in recent years has prompted longer-term (CCA) development specialists to turn their attention away from the distant future and back toward the present realities of humanitarian agencies (DRR) to see how such agencies are responding to disaster situations. The CCA community is aware that extreme hydro-meteorological events are likely to change in frequency, intensity, magnitude, location and extent of societal impacts. In addition, CCA specialists are concerned about how emergency and humanitarian responses in the short to mid-term might significantly affect an ability to achieve gains in broader longer-term development objectives.

A primary challenge facing humanitarian and development organizations centers on developing more effective linkages between DRR and CCA. More generally, development researchers are repeatedly making calls for "**mainstreaming**" DRR and CCA within development policy.



Bridging short-term humanitarian and longer-term development planning and activities has been identified by the USAID, among other organizations, as central to the success of new policy guidance to build resilience. To this end, attention now focuses on how to bridge Disaster Risk Reduction (DRR) and Climate Change Adaptation (CCA) efforts among different organizations and even within them. To be sure, there is an ongoing conflict between here-and-now emergency and humanitarian risk-reducing preparedness and response to hydro-meteorological hazards and disasters and sustainable development planning for an uncertain climate change future.

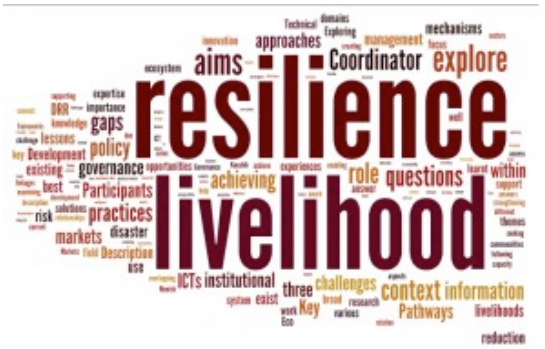
Some of the principle challenges to the integration of DRR and CCA include fragmentation of funding and implementation of resources, entrenched interests at different spatial and temporal scales, differing systems of

norms, and different kinds and sources of knowledge as well as of funding (Birkmann & Teichman 2010). 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.

DRR programs can reduce the ever-present risk of enormous social, cultural and psychological burdens associated with hazards and disasters, not only in terms of protecting lives and livelihoods but also in terms of reducing the economic and psychological costs at household to regional and trans-boundary levels. Sharing with stakeholders the notion of satisficing would help to better match expectations about DRR with what can realistically be achieved.

Effectively bridging (or blending) of DRR-related preparedness planning 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, forcing alterations, if not setbacks, in development prospects. **Bridging DRR and CCA is a necessity. However, even more necessary is blending their overlapping concerns**, while they continue to pursue different but equally important missions. One possibility might be to go beyond bridging by creating a fund that would be designated for those activities blended DRR-CCA activities in which the partners drawn from both "camps" truly demonstrate their collaboration.

Resilience and Resilient Adaptation



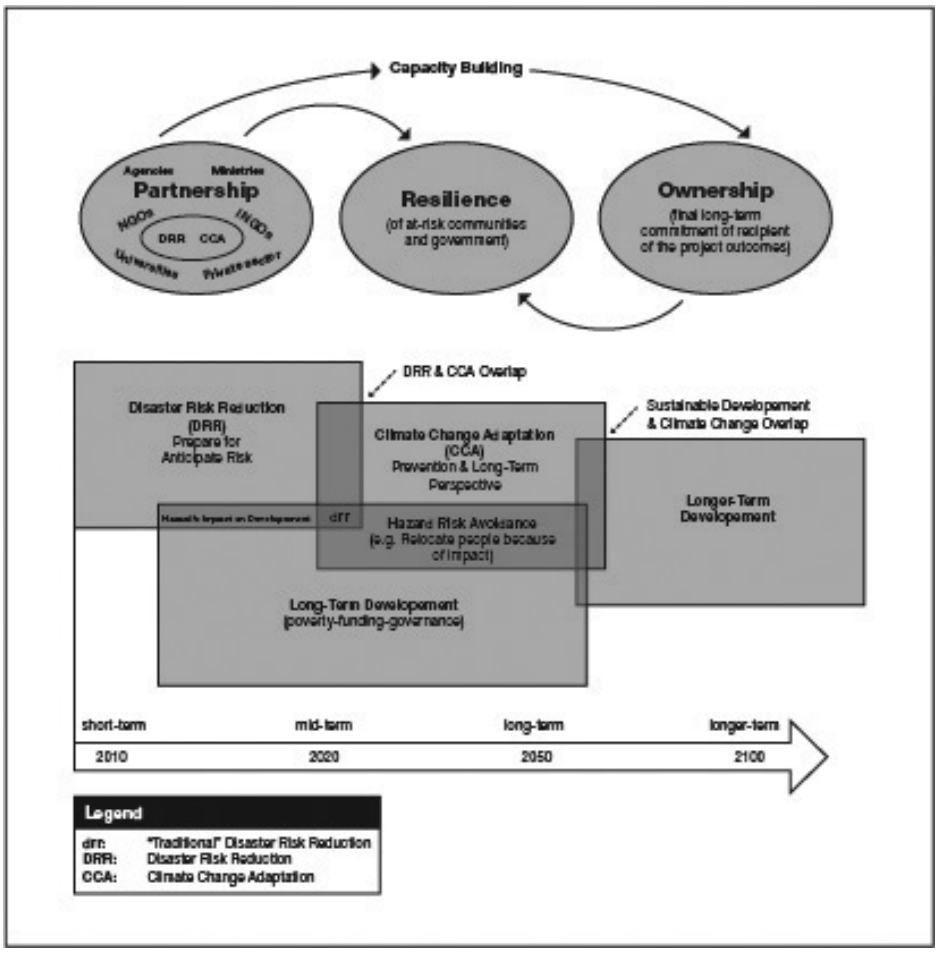
USAID's 2012 report *Policy Guidance for Building Resilience to Recurrent Crisis* is a potential bell-weather for the CCA and DRR communities. The document reflects a realization among international assistance organizations of the need to shift focus from adaptation to "resilience." The shift toward resilience is a marked departure from previous trends in development that emphasized at one time or another the concepts of vulnerability, adaptation, and sustainable development. The relationship between vulnerability and resilience is of particular interest because of the widespread use of the former in the development community. Resilient communities are likely to remain vulnerable to changing hydro-meteorological hazards. Hazards can also be expected to appear where they had not occurred before, increasing the exposure of relatively resilient communities.

"**Resilient adaptation**" is "a flexible, incremental approach to adjusting to and coping with the foreseeable adverse or beneficial impacts of an uncertain changing climate" (Glantz et al. 2008). It is more than just putting two popular concepts together. It is a concept from social psychology (Lothar 2003) ***of use by analogy*** for bridging DRR and CCA because it generates ideas about how societies might realistically (e.g., flexibly) adjust to an uncertain, longer-term, incrementally changing climate future. It may also help to identify new societal options for coping with the impacts of hydro-meteorological hazards and disasters while proving useful in operationalizing a vision of resilient communities, providing a framework through which the concepts of "resilience" and "adaptation" can be meaningfully merged.

The blending of resilience and adaptation at the overlapping margins of their separate missions directly supports the planning approach of USAID that calls for "layering, integrating, and sequencing" humanitarian recovery efforts with longer-term development actions. It entails incrementally coping with both short- and long-term consequences of climate variability and change in ways that are mutually reinforcing. Each community—DRR and CCA—can in this way benefit from closer collaboration and knowledge sharing.

Given that DRR and CCA communities share their goal of creating resilient societies in the face of changing climate and environmental conditions, bridging (better yet blending) can help to improve efficiency, effectiveness and sustainability of their projects' and programs' outcomes. Benefits can be attained through sharing of lessons identified and by working to blend, where beneficial, activities at the different times scales at which they operate. **One idea is to set up a special unique targeted fund to foster specific truly blended activities of a DRR-CCA partnership.**

The following graphic is an attempt to put order to the several overlapping concepts of the DRR-CCA "playing field."



Case Studies

The Greater Horn of Africa (GHA)

Hydro-meteorological risk prediction has clearly improved in the GHA, because of the timely initial support from OFDA for ICPAC (IGAD Climate Prediction and Applications Center) and its RCOFs (Regional Climate Outlook Forums) as well as in part from the continued support of other international agencies. Additional investment is of critical importance today to strengthen the effectiveness of the 2-way "communication stream" between climate experts and the users of their climate-related products. Communication problems are especially prevalent in local communities, where access to climate information is still significantly curtailed by (1) a lack of communication infrastructure; (2) the use of technical terminology in the dissemination and understanding of climate information; and (3) limited understanding of climate and weather processes. There is a need for increased focus, resources and research for improving the dissemination of relevant climate products to those most in need of them—those known to be at-risk of hydro-meteorological hazards and disasters. In fact, the potential ***victims are the true first responders*** (e.g. "zero-order responders," ZORs) when a disaster occurs, because they fend for themselves before outside help appears on the disaster scene. In this regard feedback from the receivers of climate information including early warnings should be explicitly fostered and incorporated into climate information products.

The Lower Mekong Basin (LMB)

At the end of its regional flood forecasting projects the MRC (Mekong River Commission) includes a section on lessons identified. The lessons identified and highlighted by various donor organizations (e.g., ECHO) engaged in hydro-meteorological DRR in the LMB are, however, similar to those identified during this review which suggests that those lessons had not been implemented and that chronic problems related to building institutional capacity in flood forecasting continue to persist. For example, it appears that increased coordination and cooperation among donor agencies for the various flood-related projects they support would likely improve the longevity of successful time-limited pilot projects. Sometimes when a project ends, however, the recipient organization must wait for new funding for the project to start again. To avoid such disruptions in continuance of the pilot project an agreed upon, pre-planned, sunset strategy with an eye toward recipient ownership would be needed. Staff retention at DRR-related organizations (e.g. the MRC or NGOs) following the end of a project is an acknowledged problem as it creates job insecurity and the departure of newly trained DRR staff.

The Hindu-Kush Himalayan Region (HKH)

Asia Flood Network (AFN) activities were launched in 2001 with OFDA support and its latest project ended in 2013. AFN's longevity demonstrates the program's sustainability. Under the AFN umbrella several projects were funded by other donor institutions that followed up on OFDA initiatives. Among these activities, training sessions for NHMSs were provided, and have continued to be supported until recently (as of 2013). Another useful outcome of the project has been the publication of disaster management manuals, developed by ICIMOD in partnership with some local communities and NGOs. Although the manuals involved local communities in disaster management activities, their involvement appears to have been quite limited, however. For example, it appears that the feedback loop in the warning system is not routinely pursued in most DRR activities. In general, attention given to "ordinary" (indigenous) local knowledge remains limited even though it needs to be better integrated into risk management plans. In the context of climate change, real-world observations of disasters have shown that advances in technologies alone will not effectively reduce disasters' impacts on societies. Moreover, additional longer-term training for the staff of the NHMSs in the region would effectively build capacities within and among these institutions.

Central America and the Caribbean

The Central American Flash Flood Guidance (CAFFG) is considered a successful system. Additional training is required for the staff in the National Hydrological and Meteorological Services (NHMSs) to significantly build capacities within the region's hydro-meteorological institutions. Training must also involve stakeholders to enhance their accurate interpretation of early warnings and to encourage strong support for the program from governmental agencies. This would help to foster eventual program ownership by the host countries. Partnerships should also be built among decision-makers and climate scientists in making explicit the feedback mechanisms inherent in EWSs. Also, the end-to-end system (E2E) can be strengthened with increased collaboration with the at-risk communities, the actual users of the warnings. Communication and risk education has not yet been fully implemented in the CAFFG. These apparent gaps are opportunities for future activities.

RANET (Radio and Internet for the Communication of Hydro-Meteorological and Climate Related Information)

In addition to infrastructure challenges to deliver weather-related information to remote communities or to mobile people, helping users know their information needs and better providing them with such information is necessary. Lay users of weather, climate and water information are innovative, often informally incorporating such information into their decisions. Innovations include but are not limited to using social media platforms (i.e. Facebook or Twitter). Nevertheless, satellite-based broadcast communications are still critically important to geographically marginalized communities, as governments seek to provide them with hydro-meteorological services, especially early warnings. Therefore, using remote training material is necessary. A desired outcome of RANET and DRR and CCA communications-related development projects is that they lead to ownership once donor support has ended.

Insights From Other Project Evaluations

1) Evaluations studies, particularly those made public, tend to emphasize positive outcomes. While focusing on successes is understandable, it runs the risk of leading to conclusions and continued support for programs that seem unwarranted or unreliable.

2) It is difficult to connect specific programs to outcomes and difficult to measure reduction in damages before 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) 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 estimates based upon initial development and capacity patterns, is essential to monitoring progress. Time should be allowed to elapse before assessing how and whether projects continued once the implementation phase has ended; however, not too much time should pass because institutional and participant memories of programs will likely fade and lessons will be lost.

4) Development actors around the world are struggling with the challenge of synchronizing various kinds of aid and ensuring that humanitarian, development, and climate variability and change adaptation programs are synergistic rather than isolated, redundant or counteractive. Agencies and NGOs around the globe must share experiences and learn from successes and challenges in a more formal and structured way.

Concepts As "*Social Inventions*"

Social inventions in the form of concepts can 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 in a way similar to how corporations compete in developing popular slogans for their products to capture attention and encourage brand loyalty. Notably, these inventions might also provide opportunities for disaster-related decision makers to more effectively base their pronouncements about hazard realities as they are and not on what they believe is "what ought to be" in the modern world. The 32 concepts discussed in the base report and executive summaries are noted in the following graphic. A few examples then follow the graphic.

- **1.The 'Rs' of DRR 2.Satisfice 3.Foreseeability 4.Re-functioning 5."Social Inventions" 6.Improvisation (by Zero Order Responders, ZORs) 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" (outreach, outputs, outcomes) 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."End2End+ feedback" Forecast System 25.DRR RANN (Research Applied to National Needs) 26."Ordinary Knowledge" as a usable concept 27.Working with a changing climate, not against it 28."Partnership vs. Ownership" (to bridge DRR and CCA) 29.Climate Proofing 30.Risk Taking, risk aversion... and "*risk making*" 31.Decision Making Under Uncertainty (DMUU) 32.Decision Making Under Foreseeability (DMUF)**

- **Improvization**: Most victims in a disaster, regardless of type, are forced to fend for their families under great stress and deprivation of basic needs. They are the true first-responders to their needs in such situations. Can at-risk communities be taught ways to improvise in the first few days following a disaster? Can the DRR community learn from past disasters how people improvised until help arrived? Sharing ad hoc improvisations with DRR trainers from around the globe can be used to inform those developing preparedness measures.

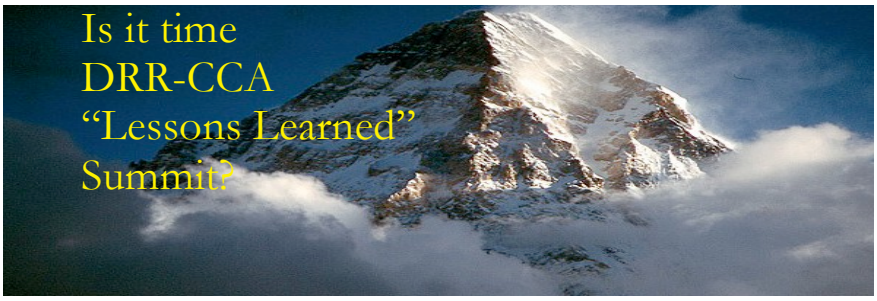
- **Project Scribe**: A major problem with identifying lessons from any time-limited activity relates to when those lessons are to be identified. The reality is that memories and interest of those who participated in a given project tend to fade with time, even in the short term. To counter this, at the onset of a DRR activity assign a "record keeper" (in essence, a scribe) to record lessons from participants throughout the project.

- **DMUF**: Decisions are constantly being made under uncertainty, whether one has half, 2/3rd or 90% of the information needed for a decision, urgency requires that a decision must be made. With information in hand and drawing on previous knowledge a likely outcome is foreseeable though not assured. Despite the remaining uncertainty, there is also a foreseeable (likely) desired outcome.

- **The 3 O's**: These are outreach, outputs and outcomes. Outreach includes any activity where ideas are shared: workshops, lectures, and discussion groups. Outputs are the often measured by the number of reports printed, articles published, numbers of participants, workshops convened and the like. Outcomes are the most desired but also the most difficult to measure, especially in the short term. Organizations favor quantifiable outputs as a measure of success of an activity. Outputs, however, are not the same as the expected longer lasting impacts that activities are expected to have, such as capacity building of institutions or communities.

- **Communications**: 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 very important aspects of communication for CCA as well as for DRR. The value of a timely warning is diminished if each phase of the entire communications process is not functioning. This is not just a tech issue.

A "Lessons Learned about Lessons Learned" Summit



Why: Philosopher Santana was noted as having said, "Those who do not learn from history are doomed to repeat it." People around the globe have, through trial and error, been forever learning tactical and strategic coping responses their local hydro-meteorological hazards and disasters. Much of what they have learned in their local environments could, if shared be of value to others facing similar hazards far away.

Who: Corporations, educators, government agencies, the military and other security organizations, among others, have engaged in searching for and collecting of lessons resulting from their activities. There is a sub-field of researchers focused on the theory and practice related to learning lessons. An Internet search exposes widespread writings on lessons, positive and negative, in science, culture, politics and the application of science to societal concerns.

When: Some organizations wait till 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 project for later evaluation. Using a scribe 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 again the project's mission statement.

How: Searching for lessons has been carried out in formal, structured and routine ways or can be undertaken in an informal, ad hoc way Some organizations collect lessons, organizing and guarding them for reuse at a future time. A "lessons learned" process could identify and store lessons for internal use, not wanting and not for sharing with outsiders.

In Sum, A Lessons Learned gathering could identify and share insights on how best to use previous lessons that had often learned at great expense to life, livelihood, and property.