DRAFT of a Proposal to the World Bank

El Niño Lessons Audit

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Introduction

Following the strongest El Niño of the Twentieth Century (1997–98), governments, ministries, nongovernmental organizations (NGOs), and academic researchers sought to investigate all aspects of that event – from the science to the impacts, from the costs and benefits to the ethics involved in El Niño-related decision-making. At present, more than a score of multi-country activities and global assessments of the event have been released, along with a yet-unknown number of national reports. Each of these reports, from peer-reviewed literature to the "gray" (unpublished) literature and even media articles, provides the reader with lessons on how better to deal with an El Niño event the next time one occurs.

Proposal Objective

The overriding objective of this multifaceted proposal is to identify why lessons drawn from recent disaster experiences worldwide often remain unused by a society's policy makers and its citizens when preparing for future disasters.

In this regard what could be considered "perverse" societal behavior, that is, a reluctance to capitalize on the lessons identified as a result of the consequences of previous natural hazards and disasters, with respect to contemporary climate-related anomalies portends little hope for societal ability to improve the way that they will likely cope with similar types of anomalies that might result from climate and climate-related changes in future decades.

A key aspect of this audit is an attempt to identify the factors that lead societies to 'discount' the value of lessons identified in past El Nino-related disaster assessments in order to lower that discount rate, thereby improving societies' ability to respond more quickly and more effectively to the forecasts as well as impacts of future recurrent ENSO extremes (e.g., El Nino and La Nina events), especially those in the near to mid term future when societies then are likely to be similar to those of today..

El Niño: What It Is

The term "El Niño" encompasses both a localized coastal ocean warming off Peru and Ecuador and the broader basin-wide event across the equatorial Pacific Ocean. When an El Niño occurs (every 3 to 7 years, on average), the sea surface temperatures (SSTs) in the western Pacific will drop by a couple of degrees Celsius and in the east by 2–3°C. In 1997–98, during the El Niño of the Century, the SSTs increased by 5–6°C. They typically

last 12 to 18 months, passing through an onset, growth, mature, and decay phase. The scientific community refers to El Nino-Southern Oscillation (ENSO) and El Nino interchangeably. However, researchers know the nuances associated with the use of these terms. The ENSO cycle refers to the quasi-periodic cycle of warm (El Nino) and cold (La Nina) extremes in sea surface temperatures in the central and eastern equatorial Pacific.

El Niño: How It Develops

Normally, the westward-flowing winds push surface water toward the western part of the Pacific Basin. The sea level there is 60 cm or so higher than in the eastern part of the basin. Deep cold water then wells up to the surface off the coast to replace the displaced water in a process called "coastal upwelling."

Every so often the westward winds weaken or reverse and the warm water that piled up in the western part of the basin "sloshes" back toward the east. The convective (rain-producing) atmospheric processes tend to follow the warm surface water as it moves from west to east. As the El Niño decays, the SSTs across the Pacific return to their long-term average regional values and often they continue to cool, leading to the development of a La Niña event.

El Niño: What It Does

El Niño conditions bring devastatingly heavy rains to Peru's normally arid coastal areas and droughts to Bolivia and southern Peru. They have been associated with severe drought in the semiarid Brazilian Nordeste and flooding in the southern part of the country. El Niño has usually, but not always, been associated with droughts in Australia, Indonesia, Philippines, Papua New Guinea, Southern and Eastern Africa and the Horn of Africa. Floods occur in Argentina, Paraguay and Uruguay.

The 1997–98 El Niño event was linked to major forest fires in Indonesia and resultant haze in South East Asia. Those fires encompassed about 9 million hectares and, although blamed on El Niño-related drought conditions, it was discovered that unscrupulous businessmen (and government ministers) paid people to set the fires knowing that a forecast of El Niño would translate into "no rain" to extinguish the fires. They could then buy the burned forest areas.

An El Nino economic assessment

The range of costs attributed to the climate and weather anomalies alleged to have been spawned by (or teleconnected to) the 1997-98 El Niño was estimated between US $32 and $96 billion. The former number was derived by NOAA and the latter by Swiss Re. Calculating the cost (or benefit for that matter) of an El Nino event can be quite subjective, depending on the values that have been associated with real and perceived losses of life and property. It is also difficult to identify El Nino's second and third order impacts in a society and economy as well. The truth of the matter is that there has never been an attempt to calculate the impacts of weather and climate conditions in a country

let alone globally for what can be termed a "normal" year. Thus, it is not clear what the cost estimates of an El Nino event really mean. Most recently, in the US context, there has been concern that a La Nina event may be more costly to the US economy that an El Nino. Clearly, more work needs to be undertaken to identify baseline impacts costs for weather and climate conditions against which future comparisons can be made. Rather than dwelling on which costs a society more, a warm or cold extreme, it is more important for governments to identify the range of potential impacts associated with each of the extremes and then to prepare to mitigate if not prevent those adverse impacts.

An El Nino societal impact assessment

In mid-1999, the United Nations Environment Program (UNEP) and the National Center for Atmospheric Research (NCAR) received a grant from the United Nations Foundation, a foundation created by a $1 billion contribution to the United Nations by US media mogul Ted Turner. The WMO, the UNU and the ISDR also participated in the study. The grant supported 10 country studies of the 1997-98 El Niño. Six additional country studies were added to the project to improve the geographic distribution of the examples of El Niño impacts and response strategies. The title of the project was *"Reducing the impacts of environmental emergencies through early warning and preparedness: The Case of the 1997-98 El Niño."* The 16-country study yielded several lessons; some were specific to each country, while others were of a general nature applying to most of the countries.

The study was completed at the end of 2000. The 16 reports were reviewed in a search for common lessons from which the other countries in the study and those countries not included could benefit in attempts to respond to future forecasts of El Niño (and La Niña) and to prepare both strategies and tactics for coping with the potential impacts of El Niño (or La Niña) events of varying possible intensities. It is important to note that the lessons listed in the following section are generalized from the 16 case studies. Each study team, however, has identified lessons specific to their country's unique geographic, social, political and economic setting.

Some Lessons Identified in the UN Foundation Study
(Each lesson is followed by potential questions that could be asked as part of an El Nino audit)

- *Many governments already know about the problems sparked by the impacts of climate anomalies but, for a variety of reasons, have not taken the steps necessary to cope effectively with those often-devastating effects.*

  Is this a valid, universally applicable conclusion?

- *For some countries the association of climate-related anomalies with El Niño events is very strong and is, therefore, reliable enough for use in decision making.*

  Do policy makers in these countries believe this is true?

- *Forecasts about the potential societal impacts of El Niño are needed as urgently, if not more urgently, than forecasts of El Niño's onset.*

  Are such forecasts being either prepared for or undertaken?

- *El Niño-related forecasts should be of interest to* **ALL** *government ministries and not just those that are primarily concerned with various aspects of disaster.*

  Are all government ministries aware of their need to know about El Nino? If not, why not?

- *The public, policy makers and educators need to know more about the various ways that climate forecasts can be used in the sustainable development of society and economy.*

  Is this being undertaken in these countries in light of the impacts of the 1997-98 El Nino event?

- *It is important for government agencies to identify the positive aspects of El Niño and not only focus on the negatives.*

  Are government agencies concerned with El Nino doing so?

- *Transparency between governments and donors is necessary, so that the needs and expectations of both about disaster assistance are well understand.*

  Do governments and major donors feel that there is now more transparency with regard to their motives for the amount and type of disaster assistance?

- *It is important, if not imperative, for each country and the sub-regions within it to develop the expertise needed to assess the El Niño forecasts which usually come from outside the country.*

  Is this being done within these countries? Can a climate affairs educational program achieve this objective?

- *Although there remains considerable uncertainty with El Niño forecasts, people must be educated about the El Niño phenomenon and how best to cope with it.*

  Are government agencies dealing with climate sensitive issues learning more about the ENSO cycle?

- *Countries most vulnerable to El Niño's impacts are especially in need of financial*

assistance to carry out programs to cope with El Niño's occurrence.

Are those countries most vulnerable to ENSO's extremes receiving asking for or receiving any assistance from international aid agencies?

- *National scientific establishments need the support of their governments, as well as the international donor agencies, to undertake studies on regional and local problems related to El Niño.*

How do governments of these countries view the importance and value for input to their decision making processes of their scientific establishment?

- *Institutions must review their operations during the 1997-98 El Niño event and identify strengths, weaknesses and jurisdictional constraints, and conflicts in institutional responses to the forecasts and impacts of El Niño.*

Are institutions reviewing the effectiveness of their actions in response to the 1997-98 El Nino?

- *Governments in a given region should consider setting up a regional mechanism focused on El Niño.*

Have there been any attempts as yet to set up a regional mechanism to deal with El Nino events? If not, why not?

- *Many adjustments are likely to be required in the ways that societies operate to make El Niño earliest warnings more effective.*

Are societies making any adjustments to better use El Nino earliest warnings?

- *Educators at all levels in a country's educational and training system should encourage their students to study the interactions between climate, society and environment. This capacity-building activity is referred to as "Climate Affairs."*

The good news is that lessons specific to a country as well as generalized lessons that can apply to most country settings have been identified. These have been made explicit for policy and other decision makers to consider and hopefully act upon. The bad news is that many of these lessons can be found in earlier climate- and disaster-related studies that had been undertaken in the past several decades. The question of major importance to ask is "why are solutions known to many climate-related issues, but not yet put into practice?" To be sure impact assessments for future weather- and climate-related

problems will be undertaken and they too will identify lessons learned. Can a way be devised so that we can build on the lessons already learned?

A Vicious Cycle

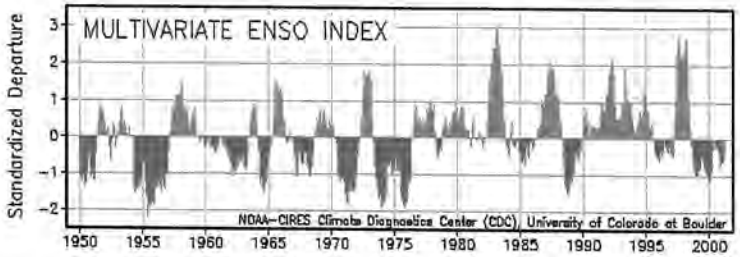
With regard to communicating a forecast of El Nino to the public and the public's reaction to the forecast, there appears to be a cycle of events: (1) forecast of a hazard, (2) impacts of that hazard, (3) responses to the forecast and to the impacts, and finally (4) the identification of lessons learned from that hazard. Unfortunately, concern dissipates over time for the hazard's impacts and for its victims as well. Concern to implement any relevant lesson also dissipates over time. Pledges from governments, made in good faith in the heat of the disaster to assist victims, go unfulfilled as new disasters occur in other parts of the globe. The original disaster victims are soon forgotten. Plans for mitigating the impacts of future events are often left unfinished or, if finished, are only partially implemented or just shelved. As a result, the impacted country and its inhabitants must do the best they can with limited resources to cope with the aftermath. How to break this apparent, truly unproductive, cycle?

Political Scientist Anthony Downs (1972) in his article, "Up and Down with Ecology: The 'Issue-Attention Cycle,'" identified five stages in the dynamics of societal responses to environmental problems. These stages are relevant to the climate-related impacts of El Niño faced by societies around the globe. They are as follows: (1) the pre-problem stage (changes in the environment exist but have not captured the public's attention), (2) the alarmed discovery and euphoric enthusiasm stage (as a result of some dramatic events, the public becomes both suddenly aware of and alarmed about the evils of a particular problem), (3) realizing the cost of significant progress stage (the realization that the costs and sacrifices required to cope with the problem are likely to be very high), (4) the gradual decline of intense public interest stage (some people get overwhelmed by the scope and cost of the problem, others get bored and shift to thinking about more pressing issues), (5) and the post-problem stage (problems that have gone through the cycle almost always receive a higher-than-average level of attention, public effort, and general concern than those still in the pre-discovery phase).

As with most crises, regardless of cause, societies (policy makers and citizens) tend to discount the past; that is, as problems appear to be resolved or terminated, attention shift to other more pressing issues that demand immediate consideration. So, once an El Nino has been forecast to end, societal concerns wanes rather rapidly. The adage of the farmer and the leaky farmhouse roof captures the attention span cycle: when it is raining and the roof is leaking the farmer says that he will fix the hole in the roof once the rains have stopped. Once the rains and the leaks have stopped, the farmer sees no immediate reason to fix the roof as he fixes other things on the farm. The rains eventually return and the cycle continues. Again, one must ask, "can the cycle be broken?"

1. A Review of the Lessons Learned from the 1997–98 El Niño Episode and an Audit of Their Use in Decision Making

It is clear that El Niño is a recurrent phenomenon. It can return between 2 and 10 years. The ability of the scientific community to forecast its onset is still marginal (Barnston et al 2000), although monitoring the sea surface temperature as well as ocean temperatures at depth across much of the tropical Pacific have greatly improved since the mid-1980s with the development of the TOGA TAO Array of buoys (MacPhaden, 2002). The following chart shows the distribution of the warm and cold extremes of the El Niño Southern Oscillation cycle. Note that there were more La Nina events than El Niño events before the mid 1970s and more El Niños than La Ninas after that period. Thus, El Niño as well as La Nina events can be prepared for in a general way by many countries known to be influenced by the climate related hazards that they can spawn. For some countries there is a very high probability that specific impacts can be attributed to either of ENSO's extremes. Thus, lessons learned from coping with one event such as the biggest ones in the twentieth century (1982-83 and 1997-98) should be useful to those decision makers who will likely have to deal with the possible impacts of future events.



By way of this proposal, we would undertake a review of the lessons identified in the many El Niño forecast and impact assessments that were produced following the 1997–98 event. The purpose of this overarching assessment would be to identify the wide range of lessons that had been proposed, separating out those that are unique to a particular country's situation from those that apply to many countries because they are viewed as generic in nature. This review is proposed based in part on the belief that many of the answers to the questions about El Niño events, the hazards they spawn and their societal impacts are already known but, for whatever the reason(s), have not yet been applied. It is foreseeable that the forecast-event-impact-lessons-forgotten lessons cycle will continue ad infinitum, unless a conscious effort is made to break that cycle.

During the process of organizing and overseeing the UN Foundation-supported study of the impacts and response strategies for reducing the impact of environmental emergencies through early warning and preparedness in 16 countries, I became aware of several natural hazards and disaster reports unrelated to El Niño whose findings also included lessons for coping with future disasters (e.g., the UK's IDNDR, 1998). As I had noted in the introduction to the Executive Summary of the final report for that project (Glantz, 2001), I had good as well as bad news for the reader. The good news was that our 16-country-study findings were strikingly similar in substance as well as in spirit to the findings of other hazard studies. This served to affirm the fact that we were on the right track, because we were identifying similar lessons learned. The bad news was that we had found similar lessons as had previously been identified in earlier studies. The question became, "are we making any progress toward coping with the forecasts and impacts of El Niño events as a result of learning from previous experiences?" (preventing, mitigating, and adapting to possible impacts).

Action Items:

In this proposed activity, published and unpublished reports (books, articles, gray literature) will be identified, collected, and reviewed in order to identify explicit as well as implied lessons learned and recommendations for action. Lessons and recommendations will be collected and collated. Crosscutting categories (trends) for lessons will be identified. Follow-up on the lessons for specific countries will be evaluated. Reasons for non-implementation of those lessons will be identified.

A workshop will then be convened, with the participants representing a subset of the Principal Investigators of the various studies, in addition to World Bank, NGO, and humanitarian aid organization representatives. This activity would encompass those who have identified lessons from the 1997–98 El Nino, as well as those who have had some influence on whether those lessons were implemented to improve a country's response and adaptive capabilities. A report on the workshop proceedings and the results of this study would be produced and released in hard copy and on the Internet at a website dedicated to the El Niño Lessons Audit.

2. Late Lessons, Early Warnings

A recent report (EEA, 2001) sponsored and issued by the European Union focused on a set of case studies involving the societal application of various chemicals for different industrial, agricultural, or health purposes. The summary of findings of this report notes that there is yet another type of lesson to be learned: the late lessons. For example, one of the report's case studies concerned asbestos. In 1898, a researcher identified the potentially adverse impacts of asbestos in the lungs. However, despite all of the scientific research focused on asbestos and health, asbestos was not banned from use for several decades into the twentieth century. The case studies in this report were compiled to provide a strong basis for relying on the "Precautionary Principle," a do-no-harm approach to environmental decision-making. It would be instructive to review a country that has been impacted by an extreme event more than once in order to see if there had

been any lessons learned from the earlier event(s). The impacts of Hurricane Mitch in Honduras provide such an example.

- ***A Case Scenario: Hurricanes Fifi/Mitch Comparison***

A useful case study to highlight actions and inactions in response to the impacts of a climate-related disaster relates to that of Hurricane Mitch. A review of the impacts and responses to Hurricane Fifi in August 1974 and the lessons learned stemming from its impacts in Honduras and their comparison to the impacts and responses to Hurricane Mitch in October 1998 can help identify whether lessons learned from the impacts in Honduras of Hurricane Fifi were applied to minimize future similar disasters in this country. A cursory review suggests that this particular case study can provide insight into the "lessons learned" aspect natural hazards and natural disasters. This study would laos identify issues related to intergenerational equity (see, for example, Glantz and Jamieson, 2000).

Action Items:

For this section of the proposal, we will undertake a search for post-Fifi reconstruction planning documents. We will gather post-Mitch reconstruction planning documents. With respect to the Fifi documents, we will identify which plans were implemented and which ones were not. For example, were hurricane reconstruction plans proposed in 1974 implemented or shelved? These plans could be compared with those recommended for the reconstruction of Honduras in the post-Mitch period. In addition, we could then develop a scenario that assumed that all the plans proposed in the aftermath of Fifi in 1974 had been implemented. Had they been implemented, would the damage in lives lost and property destroyed in Honduras in 1998 as a result of Mitch been as great as it was? A round-table to discuss the findings will be convened in Honduras.

3. Do Policymakers Use Lessons? (Once Burned, Twice Shy ... or Not?)

A popular quotation suggests that those who do not learn from history are doomed to repeat it. However, do decision-makers actually learn from history? If so, what do they learn? There appears to be a belief among a growing number of researchers and policy analysts that policymakers do not, cannot, and even should not learn from the lessons of past experiences. They argue that this is the case because (1) situations change over time; (2) the difficulty of identifying the cause of the event; (3) government's change, (4) demographic changes, and so forth. While a quantitatively oriented probability assessment may not be possible to determine if the lessons from previous impacts of natural hazards will be applicable to the forecast impacts of an upcoming hazard, it is reasonable to assume that certain impacts that had occurred in the past could *foreseeably* occur in the future. While the odds for its return may remain uncertain, that those impacts could recur at all is plausible. Therefore, it remains an important task for researchers to determine how best to get policy makers to take previously derived lessons into account

Action Items:

We propose to convene a multidisciplinary workshop to address how lessons have or have not been used by policy makers and to identify reasons behind their use or non-use of relevant information. The objective in this part of the proposed activity is to identify ways to increase the probability that previously identified lessons are taken more seriously and are at the least taken into consideration by policy- and other decision-makers. Participants would include policy analysts, present and past policy makers and advisors to policy makers.

4. Three Levels of Analysis about "why lessons are often known but not applied"

In the late 1950s, political science professor Kenneth Waltz sought to identify the causes of war. In doing so, he used a three-level-of-analysis approach: individuals, groups and the nation, and the international system. In fact at any given time factors at each of these levels can contribute to the onset of war. The responsibility attributed to each of these levels is not constant but can vary over time. This is a useful, enlightening heuristic device that can be of value in seeking to identify why disaster lessons once known often fail to be considered in preparation for the same disasters some time in the future. Is a lack of interest in previously identified lessons because people *assume* that they had learned all they need to know by having lived through an El Nino-spawned hazard? Is it that national governments have many crises to respond to at any given point in time? Is it that the international community (donor nations and organizations) has views of lessons that differ from those identified by the governments affected by El Nino?

We propose to apply the Waltz approach as an independent way to expose why some of the lessons identified in previous El Nino-related disaster assessment were not being considered once those El Nino events had passed. And, why, after each event, lessons are sought and identified only to gather dust on a bookshelf in various offices and libraries. This represents a different approach to identify why known lessons are frequently not applied. It can serve as a study to compare the results of activity #3 (above) and can serve as a stand-alone report, providing insights into the policy making process with reduced uncertainty.

5. Control Studies

During the course of the 16-country UN Foundation-supported assessment of El Nino impacts and response strategies for natural disaster reduction, we were repeatedly asked by people from other countries why *their* home country had not been included among the 16 cases. We believe that the results of our proposed "El Nino lessons audit" would benefit from an inclusion of some of those countries also considered to have been directly affected by El Nino. Thus, we propose to include in this audit, in addition to six of the original 16 countries in the UNF assessment, five additional countries: Mexico, Chile, India, Brazil and South Africa [or Zimbabwe]. These countries have likely undertaking impact assessments of the 1997-98 El Nino. To what extent have they taken

up lessons from previous events? Have plans been developed to put into practice lessons and recommendations identified as a result of the '97-98 event?

Questions to be Addressed by this Proposal:

1. What are the lessons from the 1997–98 El Niño that have been explicitly identify by various organizations and governments?
2. Which El Nino lessons have been taken seriously by their governments? By international donor agencies?
3. What were the constraints to addressing or implementing policies based on those lessons?
4. Are there examples of where lessons were learned and applied?
5. Are there credible arguments to support the view that policymakers do not learn from history?
6. In coping with El Niño response tactics and strategies, what are the generic individual, political, cultural, economic, and institutional constraints on appropriate actions?
7. What are the ethical and equity aspects associated with using (or not using) lessons learned from past disasters in order to prepare for future ones?

Deliverables

Workshop(s) and workshop reports; a report of the entire project's findings; an executive summary (like the one for UNFIP project); reports to the governments involved in the study [that means translation into Spanish, Portuguese, at least of the executive summary].; website for the project [with appropriate links]

References

Glantz, M.H. (ed.), 2001: *Once Burned, Twice Shy? Lessons Learned from the 1997–98 El Niño*. Tokyo, Japan: United Nations University Press. 294 pp.

Zafar and Glantz in GEC

Streets and Glantz in GEC

IDNDR (UK), 1998: [NEED REFERENCE]

European Union, 2001: [NEED REFERENCE]

Hammond, Kenneth, 1996:

Naranjo, L. 2001:

Ye Qian, 2001:

Budget and Timetable

What is needed to undertake the aforementioned 5 components to this study?

1. A Review of the Lessons Learned from the 1997–98 El Niño and an Audit of Their Use in Decision Making

NCAR PI (2 months)
Research assistant (3/4 time)
Co-PI (Dilley ?)
Publication support (Djan)
Post, Fax, Telephone
Fedex/DHL
Books, reports

Workshop

2. Late Lessons, Early Warnings: A Case Scenario: Hurricanes Fifi/Mitch Comparison

Honduran researcher
Research assistant (1/2 time)
NCAR PI (1 month)
Roger Pulwarty (1 month)
Publication support (Djan)
Post, Fax, Telephone
Fedex/DHL
Books, reports

Roundtable discussion in Honduras (to present findings)

3. Do Policymakers Use Lessons? (Once Burned, Twice Shy ... or Not?)

Co-PI (?)
Co PI (Adeel Zafar)
Research assistant
Publication support (and rapporteur)

Workshop
Workshop report preparation

4. Three Levels of Analysis about "why lessons are often known but not applied"

PI (Glantz)
Research assistant
Publication support (Djan)

5. Control Studies

$20K for each of the countries that are chosen to be included in the control studies assessment.

Duration of the project 24 months with results of the various components being produced within this period at timely intervals

Possible Participants:
Glantz
Dilley
Stewart
Oman
Naranjo
Ye
2 research assistants
Hammond

For the added studies: Mexico (Magana, Virginia); Chile (Aceituno, Renato); India (Kriplani, other); Brazil (Lemos, FUNCEME); South Africa (Vogel, Jury, other); Zimbabwe (???).

For the six out of the sixteen studies: Philippines (jegillos), Ecuador (pilar), Kenya (karanja(?), Bangladesh (??), Indonesia (kamal) , Mozambique (littlejohn)