

Here Comes the Rain Again:

Flooding and Disaster Mitigation in Peru, A Case Study from the 1997-1998 El Niño

Josh Gellers

Background

Peru, the country responsible for giving El Niño its name, suffers from massive flooding, mudslides, and even avalanches as a direct result of the catastrophic climatological phenomenon. While the effects of El Niño on Peru can be simply observed by reading the international section of a newspaper every four to seven years, the depth of the impact that El Niño makes goes much further than body counts or dollar signs. Therefore, in order to establish a deeper understanding of El Niño's march on Peru, I present this case study examination of the 1997-1998 El Niño, with a particular emphasis on flooding and disaster mitigation.

Before engaging El Niño from a country-centric standpoint, it is prudent to look at how El Niño affects the entire western coast of South America. Under normal conditions, a circular loop of convection called a Walker Cell governs precipitation in the Pacific Ocean. The thermocline (level at which the ocean temperature is 20°C) slopes sharply from the eastern Pacific to the western side, leaving cooler waters off the western coast of South America. Finally, southeast trade winds push air masses away from the coast, keeping some convective forces at bay.

During an El Niño, this carefully orchestrated system is thrown for a tailspin. When this phenomenon takes place, the Walker cell is disrupted, usually marked by a splicing of that cell which then churns convective activity in the center of the Pacific along the Inter Tropical Convergence Zone (ITCZ) and drops off right onto the western coast of South America ("Atmosphere," El Niño: The Child Re-

Josh Gellers is an undergraduate student in the Department of Geography at the University of Florida, and winner of the 2005 Florida Society of Geographers Undergraduate Student Honors competition

turns). Additionally, the very thermocline that brought cool waters conducive to anchovy fishing takes a dive deeper into the Pacific, revealing perilous warmer waters. Finally, the trade winds and equatorial easterlies that formerly deflected wind away from South America are weakened, leaving the coast more susceptible to convection and an extension of warm water emanating from the Golfo de Guayaquil, known as a warm “finger.” These relatively abrupt changes in the climate proved particularly traumatic for Peru during the ’97-’98 El Niño, a point I will explore in the next section.

Description

The ’97-’98 El Niño is widely regarded as “the weather event of the century” (El Niño to Continue Wreaking Havoc...). For Peru, this meant enduring a substantially devastating version of El Niño. During the ’97-’98 El Niño, Peru felt the heat from an anomalous 1.7-5.3°C rise in sea-surface temperatures (SSTs) which severely impaired its fishing industry that thrives off of cold-water fish such as anchovy. However, perhaps the most volatile factor of the ’97-’98 El Niño came in the form of alarmingly high amounts of rainfall. Northern and central Peru as well as low-lying areas along the Andes Mountains incurred the greatest losses of life and damage to infrastructure and farmland due to flash flooding, mudslides, and avalanches.

Flooding in Peru

With regards to the damage caused by floods brought on by El Niño, the numbers are staggering. In terms of infrastructural and agricultural losses, 28,000 homes were demolished, 200,000 hectares of farmland were adversely affected, 3,000 hectares of crops were totally lost, 6,353 kilometers of roads were damaged, 883 kilometers of roads were destroyed, 59 bridges were swept away, and 125 kilometers of railway lines were torn up. To add a human component to the devastation, 40,000 people were left homeless and over 300 people died as a result of the symptoms of El Niño experienced by Peru. Overall, the ’97-’98 El Niño ravaged the Peruvian countryside, leav-

ing \$1.2 billion in estimated losses in its wake (“Balance of Harshes El Niño”; “El Niño’s Other Threat...”).

PAHO and Disaster Mitigation

In order to combat the effects of El Niño, Peru and other countries in South America decided to band together. The '97-'98 El Niño marked the first time that certain Latin American countries developed comprehensive prevention and disaster mitigation programs. To achieve this, countries established Internet-based diagnostic and response-oriented communications. The Pan-American Health Organization (PAHO), an arm of the World Health Organization, has aided greatly in coordinating disaster relief efforts among countries. PAHO has helped facilitate countries' exchange of information regarding damages and needs and has utilized the Internet as a conduit through which countries can access up-to-date information about El Niño. Unfortunately, due to the lack of technological infrastructure in Latin American countries Internet access is not readily available to everyone, even for disaster relief (“El Niño Phenomenon”).

For the past one hundred years, the Pan American Health Organization has served the Western Hemisphere through implementing relief strategies, providing health care to the less fortunate, disseminating crucial information, and offer technical assistance. Recognized as a Regional Office of the Americas for the World Health Organization, PAHO also functions as the only major non-governmental health organization for the Inter-American System. PAHO's mission is “to strengthen national and local health systems and improve the health of the peoples of the Americas, in collaboration with Ministries of Health, other government and international agencies, nongovernmental organizations, universities, social security agencies, community groups, and many others” (“What is PAHO?”). PAHO has acted as the preeminent international public health agency in the Americas since 1902, unifying its member countries under the umbrella of a common interest in promoting the health of its citizens. This agency is also unique in that it addresses health issues at all levels, from assisting volunteers deployed in a disaster-stricken country distribute supplies to aiding governments coordinate relief efforts.

In addition to providing humanitarian assistance, PAHO organizes training programs for officials from Latin American countries to better prepare them for disaster mitigation. One of the essential factors for successful disaster mitigation stressed by members of PAHO is called rapid needs assessment. The first detail outlined in PAHO's website emphasizes that "Immediately following a disaster, the needs of the population must be assessed as part of the comprehensive approach that the responsible national authorities employ to the overall situation" ("Rapid Needs Assessment"). This kind of large-scale assessment must be hierarchized into three main areas. The first and most important area of concern is to assess the quality of life of the victims. This translates into seeking out the status of communication systems, infrastructure, population and geographic region affected, transportation, basic services, and food availability. The next area of concern is to assess the scope of the damage by determining the death toll, how many people have been reported missing, how many people have been injured, the current status of health facilities, urgent needs, and local resources. Finally, secondary health hazards need to be assessed. These hazards occur as the indirect result of a disaster and might not be detected as quickly as the need for medical supplies or food, but they are also very important.

When one thinks of an El Niño, images of rains and flooding or drought and fires (depending upon the Southern Oscillation Index of a given country) are conjured. Rarely do people associate contaminated water or malaria or dengue fever with an El Niño, but all of these aftermath effects pose certain threats to the livelihood of a population affected by the phenomenon. Mudslides, for example, can cause the accumulation of mud to occur in irrigation systems needed for crops to thrive or in reservoirs and dams, creating a harmful buildup of sediment in places needed for clean drinking water. Pedro Luque, an agronomist, describes the underestimated effect that mud can have; "The floods are catastrophic and have an immediate spectacular effect, but sedimentation is a hidden, progressive threat that generally goes unattended" ("El Niño's Other Threat..."). Also, people do not necessarily consider that the standing water created by the torrential rains associated with an El Niño instigates malaria and

dengue outbreaks. However, such diseases are commonplace after an El Niño, especially since disaster areas are prone to be hotbeds for infection.

Disaster Relief Techniques

PAHO also assists countries through another critical aspect of disaster mitigation, effective aid and donation methodology. PAHO suggests that following a disaster, one interested in making donations or providing some sort of aid should consult with the health disaster coordinator of a given country charged with the duty of determining health needs. Another suggestion made, and one perhaps widely overlooked by people wishing to make some contribution to the effort, is to “donate cash or credit directly to the national health authorities, to international agencies, or channel it through well-established private agencies” (“International Health Relief Assistance”). A point also worth considering is that people who are willing to donate their time and/or money to a disaster relief effort should assist countries during the “preparedness, rehabilitation, and reconstruction phases.” All too often people help out when the immediate emergency is apparent, but then the country exhausts its resources and requires additional aid as the disaster relief phases progress and aid and donations stop coming in. Lastly, PAHO urges the coordination of “independent assessment teams or fact-finding missions with those of the affected country and other agencies” (“International Health Relief Assistance”).

Delving further down into disaster relief literature, PAHO provides clear guidelines for dispatching and receiving donations in a section on the organization’s website called “The Do’s and Don’ts of Humanitarian Supplies Management.” Some of the key points to remember when donating supplies are: use strong packing materials, make a list of the contents, make each box easy enough for one person to carry, separate donations by category, label multiple consignments as part of a series, with the name, address, and telephone number of the consignee, and inform consignees about the dispatch of every single shipment. PAHO suggests that when considering donating used medical equipment, new equipment, tents, and vaccines, one should consult with the Ministry of Health or PAHO/WHO. In terms

of actually receiving supplies, this sometimes presents itself as a daunting task. Upon first hearing of a disaster, many times the amount of donations is overwhelming for the country in need or a non-governmental organization (NGO). Since a massive amount of donations may flow into a country during a disaster, PAHO has developed a classification system called SUMA that categorizes donations into ten groups, including medicines, food and beverages, water, etc. From these ten categories, each package of donations is assigned a level of priority. Priority 1 refers to items that should be distributed immediately. Priority 2 refers to non-urgent items that may be used in later phases of relief. Priority 3 refers to non-priority items that have “no foreseeable use or benefit” (“The Do’s and Don’ts of Humanitarian Supplies Management”).

Equally important to knowing what to donate and how, people should be aware of things that they should not donate. Items that people should avoid for the purpose of donating are: used clothing, household foods, household medicines and prescriptions, blood and blood derivatives, or anything not requested by the affected country. Also, people should not send medical or paramedical personnel or teams to a disaster site since local health personnel are already able to care for disaster victims (“International Health Relief Assistance”).

Conclusion

Peru is a country that faces consistent environmental, economic, and societal hardships due to El Niño. The '97-'98 El Niño was one of the worst in this century, an occurrence marked by massive damage to infrastructure and substantial loss of life. The rains attributed to El Niño poured down on Peru vehemently, erupting in flash floods, mudslides, and avalanches. Because Peru has been subject to the worst that El Niño can bring, the coastal South American country has made a conscious effort to combat the effects of the climatic phenomenon by improving prediction methods, monitoring, and disaster mitigation. The Pan American Health Organization has also aided Peru greatly in its endeavor to assist Latin American countries, integrating technology and sound methodology to better coordinate disaster relief efforts. PAHO’s guide for the rapid assessment of

needs and proper donation strategies has helped expedite disaster recovery in Peru and other countries. In 2003, Peru and 29 other countries with the support of the United Nations helped establish the International Center for El Niño Phenomenon Research in Guayaquil, Ecuador. With the assistance of organizations such as PAHO in place to help countries cope with disaster and the increasing availability of technology and excellent methodologies, Peru will be better prepared for El Niño in the 21st century.

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