International Review for Environmental Strategies
Vol. 7, No. 1, pp. 147 – 154, 2007

Essay

The Challenges of Tsunami Disaster Response Planning and Management

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No natural disaster in recent history has affected so many people's lives as the December 2004 Indian Ocean tsunami. The world's response in the wake of the tsunami seems so far to have revolved around recognition of the need for early warning systems linking countries and regions that are likely to be affected by the same tsunami or similar disasters. This paper introduces the main international initiatives for tsunami disaster response, and particularly for early warning. It then suggests some priorities for the current tsunami response planning and management efforts: (1) there should be no early warning systems without national actions plans; (2) there should be investment in preparing communities at risk; (3) tsunami early warning should be integrated into a multi-hazard system that also covers floods, storms, droughts, and other less frequent events; (4) there should be more cooperation with development banks to mainstream disaster management in countries that show willingness and commitment; and (5) the international community must not overlook other disasters such as famine and disease outbreaks in its haste to respond to the tsunami. Finally the paper argues that to undertake comprehensive tsunami response planning and management, there is a need for an approach that is grounded in both past evidence and present realities.

Keywords: tsunami, disaster response, early warning systems

1. Introduction

No natural disaster in recent history has affected so many people's lives as the Indian Ocean tsunami of December 26, 2004. Originating in an earthquake in the sea off Sumatra, Indonesia, the tsunami devastated coastal areas and killed at least 226,000 people in 12 countries, some as far away as Africa's east coast.

Within hours of the tragedy, people were attempting to apportion blame for the devastation and human tragedy wrought by the tsunami, which still occurred even though several hours elapsed before the waves reached some countries (Sainath 2005). Adequately functioning emergency plans were found to exist nowhere. Even when warnings were issued, the standing response plans and drills meant little, because they had not been practiced.

Normally, generating interest in disaster response planning and management is difficult. However, after the tragic events of December 2004 the international media propelled tsunami disaster relief to the top of its agenda. Four initiatives at a total cost of US$100 million have been announced including one for India with a budget of $27.5 million. The debates on early warning systems, however, focused on

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technology to the exclusion of the equally important issues of capacity building, security, and environmental planning. Even in areas not affected by the tsunami, experts now see now opportunities particularly in the areas of improvement of disaster prevention, creation of a "culture of resilience", creation of regional and international emergency response networks, and strengthening public awareness about the risks. These were major themes at the 2005 World Conference on Disaster Reduction (Kamlage and Süssdorf 2005), the World Health Organization Conference on the Health Aspects of the Tsunami Disaster in Asia, held in Phuket, Thailand, May 4–6, 2005,[1] and the Third International Conference on Early Warning, held in Bonn, Germany, March 27–29, 2006.[2]

2. Laying the groundwork for tsunami response management

Several important international and regional meetings, most of them taking place around the time of the tsunami, discussed collaborative measures that could be taken to mitigate the impacts of tsunamis and similar disasters, and ensure that citizens and authorities were better prepared for them.

The World Conference on Disaster Reduction, convened by the United Nations General Assembly, took place in Kobe, Japan, on January 18 to 22, 2005, with the intention of raising the profile of disaster risk reduction in development planning and practice, and thus making countries and communities more resilient to natural disasters.[3] A special session was scheduled within the conference on the Indian Ocean tsunami. The main topic of the discussions at the special session was establishment of a tsunami early-warning network for the Indian Ocean similar to the one that protects the Pacific. This followed calls for such a system by, for example, the Special Leaders' Meeting of the Association of South-East Asian Nations (ASEAN) on the Aftermath of Earthquake and Tsunami, held in Jakarta on January 6, 2005, and the United Nations Conference to Review the Implementation of the Programme of Action for the Sustainable Development of Small Island Developing States, held in Mauritius from January 10 to 14, 2005. The delegates at the World Conference also emphasized the importance of educating coastal populations so that everyone should know what a tsunami is and be able to recognize the warning signs (United Nations Inter-Agency Secretariat of the International Strategy for Disaster Reduction 2005).

A few days after the World Conference on Disaster Reduction, on January 28, 2005, the 59th session of the United Nations General Assembly passed the Resolution on Strengthening Emergency Relief, Rehabilitation, Reconstruction and Prevention in the Aftermath of the Indian Ocean Tsunami Disaster (United Nations General Assembly 2005).

Almost at the same time as the Kobe meeting, on February 6–9, 2005, Ramsar Center Japan's Asian Wetland Symposium was held in Bhubaneshwar, Orissa, India. A special session looked at tsunamis and coastal wetlands. This session produced recommendations as follows:

1. There is an urgent need for coordinated and harmonised assessments in priority stretches of affected coastline in order to identify areas where ecological restoration would be most effective.

1. For more information on the WHO Conference on the Health Aspects of the Tsunami Disaster in Asia, see http://www.who.int/hac/events/tsunamiconf/en/.
2. For more information on the Third International Conference on Early Warning, see http://www.ewc3.org/.
3. For more information on the World Conference on Disaster Reduction, see http://www.unisdr.org/wcdr/.

2. Develop predictive guidelines on the value and appropriate positioning, structure and composition of natural greenbelts to provide protection to coastal communities from severe storms/tsunamis.
3. Integrate wetland restoration and management options with the immediate response to the humanitarian needs and the short and medium term action and recovery plans in tsunami affected countries.
4. Develop community led approaches for protection and restoration of affected and other wetlands, drawing on traditional knowledge and practices and with provision of incentives for sustainable livelihood development.
5. Prioritise the enhancement of natural coastal defenses through greenbelt/coastal "bioshield" development and only consider hard engineering solutions in combination with natural measures and in areas where there are no alternatives to safeguard human life.
6. Establish and enforce "no construction zones" in vulnerable areas and manage them to enable sustainable use by local communities as well as ecosystem recovery.
7. Build on and strengthen the regional/international cooperation mechanisms to connect governments, agencies, institutions, communities and individuals. Combine their competencies in assessment and in developing and implementing action plans, related to the tsunami response and coastal wetlands (Ramsar Center Japan 2005).

Just over a year before the Indian Ocean tsunami, on October 16–18, 2003, the UN International Strategy for Disaster Reduction (ISDR) secretariat and the German Foreign Office organized the Second International Conference on Early Warning, held in Bonn, Germany. It discussed how the effects of natural disasters could be reduced by issuing timely warnings. A basic framework was agreed for installing appropriate systems worldwide (Second International Conference on Early Warning 2005). It also focused on what roles governments and the media should play in early warning and how to prevent the outbreak of disease in emergency situations. Germany announced that it wanted to establish a small early warning office in Bonn, at its own expense, which could become the nucleus of the early warning secretariat under the Geneva-based ISDR that many experts want. The first International Conference on Early Warning, held in Potsdam, Germany in 1998, had already drawn attention to various aspects of early warning and called for it to be made the subject the core of national and international precautionary strategies in the twenty-first century.

The June 6, 2005 ASEAN meeting in Jakarta committed the regional grouping to cooperate both internally and with other countries in the areas of emergency relief, rehabilitation and reconstruction and of disaster prevention and mitigation. This was quickly followed by the ASEAN Ministerial Meeting on Regional Cooperation on Tsunami Early Warning Arrangements, in Phuket, Thailand on January 28 and 29, 2005, which adopted the Declaration on Regional Cooperation on Tsunami Early Warning Arrangements (ASEAN 2005a). An ASEAN Agreement on Disaster Management and Emergency Response was signed at the 38th ASEAN Ministerial Meeting in Vientiane, Lao PDR, on July 26, 2005 (ASEAN 2005b). The intention of the agreement was to “provide effective regional mechanisms to mitigate the impacts of natural and human-induced disaster and serve as a joint response to disaster emergencies through concerted national efforts and intensified regional cooperation.” (ASEAN 2005c).

The ministers conceived of the agreement as a contribution towards efforts to develop a global early-warning system.

3. Institutional arrangement for tsunami warning

In July 2005, the UN Education, Scientific and Cultural Organization (UNESCO) announced the establishment of the Indian Ocean Tsunami Warning and Mitigation System, a cooperative system including an improved seismographic network, a real-time sea-level observing network, and deep-sea pressure sensors, feeding information to national tsunami warning centers and emergency services agencies in at least 19 countries. The planned system was expected to be complete by July 2006, at a cost of US$30 million. When fully operational, the system is expected to provide early warning of potentially devastating undersea earthquakes, and of the tsunamis they may cause, enabling the evacuation of coastal communities around the Indian Ocean. A similar early warning system had already been in place since 1968 in the Pacific Ocean, site of 85 percent of all tsunamis, centered on UNESCO's International Tsunami Information Center in Honolulu, Hawaii, USA. There are plans to expand the existing network of underwater sensors in the Pacific into the Atlantic and the Caribbean.

The Pacific Disaster Center (PDC) on the island of Maui, Hawaii, managed by the East-West Center, was in place at the time of the Indian Ocean tsunami. The PDC's mission is to provide applied research and analysis for the development of more effective policies, institutions, programs, and information products for disaster management in, and humanitarian assistance to, communities of the Asia-Pacific region and beyond. One component of the PDC's Asia Pacific Natural Hazards Information Network is the Indian Ocean Tsunami Response Geospatial Information Service, which provides geospatial information, including maps of coastal areas affected by the 2004 Indian Ocean tsunami, for emergency managers and the general public through the PDC website (www.pdc.org). In February 2005, the PDC launched a new website, ThoughtWeb Relief (www.thoughtweb.com/relief/), which intends to better prepare disaster relief experts to collect, interpret, and prioritize information they may use in decision making in addition to coordinating and integrating information on relief and recovery operations.

The World Bank's Hazard Risk Management Unit, founded in 1998 as the Disaster Management Facility, aims to provide proactive leadership in introducing disaster prevention and mitigation practices in the full range of development-related activities and improving emergency response. It operates on the theory that while natural hazards may not be preventable, losses can be reduced through knowledge of vulnerability of risks; sound engineering practices and construction standards; and sound environmental management and land-use planning. The key functions of the unit include, among others, partnership with non-governmental organizations (NGOs) and scientific organizations to promote dialogue on disaster management issues; examining the World Bank's disaster assistance portfolio; dissemination of a data base of good practices through the unit's website; and training in the areas of disaster prevention, mitigation, and response, including curriculum development and training events. The unit has a Consultative Group on Global Disaster Reduction, which addresses critical issues of disaster loss reduction in developing countries. It comprises a partnership of international financial institutions, governments, international agencies, NGOs, academic institutions, and private-sector institutions

dedicated to building more resilient communities. Its specific goals include the development of mechanisms to ensure a coordinated response to disasters and a unified assessment of damage and needs; new tools for evaluation and inclusion of disaster risks in development projects; strategies to reduce the vulnerability of low-income communities to natural disasters; and recommendations to address environmental degradation affecting the frequency and severity of disasters.

4. Recommended priorities for tsunami response planning and management

Clearly the December 2004 tsunami has inspired in the international community commitment to prevent a similar catastrophic loss of life and livelihoods should such an event recur. But translating these good intentions and grand plans into effective action on the ground is a longer project. Sound strategies and careful work right down to community level will be needed to make sure that projects such as the early warning system actually do make people safer. Planners and managers of tsunami responses should consider the following suggestions.

4.1. Local community capacity building

Invest in efforts to prepare communities at risk that could be sustainable over generations. Frequent changes in national government are a common feature of many of the countries most at risk from natural disasters such as the Indian Ocean tsunami, and donors' interest in high-technology early warning systems could wane or entirely dissipate as changes in government occur. An example of a sustainable solution would be investment in strengthening capacity in the areas of search, rescue, and first-line care. This would naturally be done at a local level, and thus be insulated from the vicissitudes of national government; and it could achieve much in reducing mortality rates from disasters, not least because most deaths from a disaster such as a tsunami or earthquake occur within six hours and it is virtually impossible for international rescue teams to arrive on the scene within that time.

4.2. Action plans

There should be no warning systems developed without action plans. A lot of information came to fore after the 2004 tsunami indicating that the national disaster warning systems in place failed to pass on or react properly and adequately to the warning information they received. India's defence ministry was allegedly content with simply informing the Home Ministry of the warning a day after it received the warning. To be effective, government agencies should know whom to inform immediately if people are to be told where to go for protection and hospitals are to know how to respond to exceptional emergency caseloads.

4.3. Multi-hazard warning system

A tsunami early warning system should form part of a multi-hazard warning system that also covers typhoons, floods, earthquakes, volcano eruptions, and other such rarely occurring events. A warning system exclusively for tsunamis would not be cost effective and could easily end up as one of the less important tasks of geological service functionaries who might neglect or even abandon it.

4.4. Developing disaster preparedness

Disaster preparedness is better done than talked about. Fewer international and inter-governmental meetings on precautionary strategies are needed and instead, more efforts should be devoted to training for disaster preparedness. Development banks should help countries that show willingness and commitment to develop their disaster preparedness, and thus minimize obstacles to achievement of development goals. For instance, at a low cost, development banks could assist countries to install low-technology but simple and effective local flood-warning equipment. This equipment, which could include, for example, a device that would automatically issue a loud warning whistle if water reached a critical level, would be a first line of defense against a natural calamity. It would be much more economical than spending huge effort and resources on rescue and humanitarian assistance if a disaster actually occurred and people did not have adequate warning. Of course, the ideal would be the presence of quake-proof seawalls of sufficient height, detailed hazard maps showing danger areas, and well-defined evacuation routes and shelters, as well as ways to alert the people at risk.

4.5. Threats other than tsunamis

In the haste to respond to the Asian tsunami, we must not overlook many other current threats that could also result in disasters of incalculable proportions, specifically in terms of loss of human life—and are perhaps more likely to do so in the medium term. Among these are famine and diseases such as avian influenza and dengue. These are also emergencies that call for warning systems and rapid responses.

4.6. Community to community parnerships

Extraordinary events call for extraordinary action. Interest after a disaster is generally high, but wanes rapidly. To sustain interest, a systematic community partnership program similar to a “sister city” program should be established. But unlike sister cities, the donor town, city, or state would be required to make a substantial and enduring commitment to provide assistance to the impacted community according to an agreed plan. Such inter-community partnerships could give private citizens and organizations leading roles, give the rebuilding effort a human face, and divide it into units that are comprehensible and accessible to donor communities. They would thus enable individual donor communities more easily to see the progress of the communities they are helping and encourage public and civic organizations to develop local sub-partnerships. The UN Development Programme (UNDP) could perhaps act as a broker, encouraging and helping to build partnerships, evaluating plans, and even linking private-sector and local community efforts with its own work (East-West Center 2005; Elliesen 2005).

4.7. International and regional regime

Developing an international regime for handling disasters should be a regional and global priority. While there are international systems in place with standards and norms that address world trade, nuclear non-proliferation, environmental protection, and human rights, nothing comparable exists for preventing and dealing with disasters. This is an area in which developing countries could take the lead by establishing standards, because disasters often hit the poor the hardest in developing and least-developed countries. As commentator Jeffrey Sachs correctly pointed out:

> What the rich world suffers as hardships the poor world often suffers as mass death. The rich, unlike the poor, can afford to live in fortified structures away from floodplains, riverbanks and hillsides. The rich, unlike the poor, have early warning systems – seismic monitors, weather forecasts and disease-surveillance systems… and rich countries, unlike the poor ones, can quickly mobilize food, drinking water, backup power generators, doctors and emergency medical supplies in the aftermath of disaster (Sachs 2005).

5. Alternative approaches

Environmentalists have had much to say about tsunami prevention and reconstruction. They are calling for education and awareness of coastal people about the dangers of tsunamis; a slowdown in development; and acceleration of establishing natural barriers. In recent decades, vast tracts of coastal mangrove forests have been leveled to make way for shrimp farms, tourist resorts, and industrial projects, while sand dunes have been looted by the construction industry. In the December 2004 tsunami, communities lying behind a fringe of shallow-water mangroves, like parts of India's coastline, or behind an intact coral reef, as in the Maldives, suffered less damage and loss of life than places exposed directly to the full force of the waves. Mangroves, sand dunes, and coral reefs can all act as a natural coastal defense. Environmentalists are pushing for the planting or re-planting of mangrove forests, and for more considered development and protection of coastal areas. The hope now is for a green wall to rise before the next tsunami occurs.

An environmentalist perspective has also helped in the rebuilding efforts. In the areas closest to the earthquake's epicenter, where acres of mangroves, coral reefs, and seabed grasses, all vital fish habitats, were damaged, timber donations were specifically requested from donor countries so that local people did not have to further denude mangroves for rebuilding. In areas where the tsunami waves left sediments and toxins in aquifers, farmers are being encouraged to plant salt-tolerant crops like pumpkins and kale so that the remaining uncontaminated aquifers can be used for drinking water.

6. Conclusion

As a Chinese proverb goes, "a calamity is a time of opportunity." The 2004 Indian Ocean tsunami served as a wake-up call and has provided the will—however fleeting it might prove to be—to radically improve disaster planning and management. It showed that there is an urgent need to develop a disaster management system for natural disaster-prone developing and least-developed nations. This management system should embrace not only provision of relief, prevention of disease, and rebuilding of communities, but should extend as well to development of institutions and warning systems that lead to action that can prevent human catastrophes, involve local people and NGOs, and build on voluntarism. The approach should be based not on superficial, knee-jerk reactions but on in-depth study of the challenges posed by tsunami response planning and management; on past evidence and on present realities. With well-considered plans and effective management schemes in place, many deaths and the destruction of large amounts of property could be prevented, or at least greatly reduced, in future disasters. And, in time, we could make our peace with nature.

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