Disaster Preparedness and Resilience process in India

AT-A-GLANCE

Population: 1,210,000,000
Major Threats: Floods, Cyclones, Earthquakes, Landslides, Droughts;

Populations Affected: Urban & Rural Poor, Dalits, Women & Children, People with Disabilities;

Locations Affected: Northern Regions (flash floods, landslides); Coasts (storms, floods);

Industries Affected: Agriculture, Technology/Communications, Manufacturing;

Compounding Issues*:* Urban Migration, Informal Settlements, Environmental Degradation, Climate Change;

INTRODUCTION

Though it only comprises two percent of the world's landmass, India is home to one-sixth of the world's population. Approximately 85 percent of Indian land is vulnerable to one or more natural hazards, with 68 percent vulnerable to drought, 57 percent to earthquakes, and 12 percent to floods .

Drought and flood have a widespread effect on the population. The India Disaster Knowledge Network estimated that 50 million people are affected by droughts and 30 million by floods annually .

India has experienced high economic growth, especially in the communications and technology industry. Thus, a large-scale disaster can have a significant impact on the country's economy and destroy any progress in economic development. Human factors such as deforestation, poor agricultural and land use practices, urbanization and construction of large infrastructure all contribute to disaster risks and people's vulnerability.

"India has a highly diversified range of natural features. Its unique geo-climatic conditions make the country among the most vulnerable to natural disasters, which occur with amazing frequency and regularity," said Surya P. Loonker, Give2Asia Field Advisor in India. "While the society at large has adapted itself to these regular occurrences, the economic and social costs continue to mount year after year."

International donors can help people, communities and industries across India defend against disasters through community-based programs, including rainwater harvesting and recycling systems, training first responders to floods, and implementing early warning systems and evacuation plans.

MAJOR THREATS & THE ECONOMY

Population growth and urbanization has increased India's vulnerability to natural disasters, as more people reside in slums and informal settlements. There has been a great push from administrators, practitioners and NGOs to re-examine settlements constructed by private developers which can increase the population vulnerability and the impact of disasters.

Approximately 25 percent of the population lives in poverty and are therefore least resilient to disasters. The poor often extract and exploit environmental resources to sustain their living which exposes them to even greater risks.

CLIMATE CHANGE IMPACT

Due to climate change, disasters are occurring with higher frequency and intensity. They are also happening in new areas, causing more damage to populations that are less prepared. The warmer climate will increase snowmelt and the occurrence of avalanches leading to fatalities and property damage, flooding in the lower basin and prolonged droughts. Drought will not only affect agricultural activities, it will affect the availability of water for the entire country.

As the global temperature increases, sea level rise will contribute to coastal erosion and displacement of many densely populated coastal communities. Cyclones will also continue to be a threat to these coastal communities.

"Several studies show a decreasing trend in the frequency of tropical cyclones and monsoon depressions over the Bay of Bengal in recent years," said Loonker. "However, their potential for damage and destruction still continues to be significant."

HYDROMETEOROLOGICAL VULNERABILITY

Floods

The most common disaster in India is flooding, which constitutes 46 percent of all disaster events and contributes the highest economic loss . About 3,000 square miles flood annually.

The northern region of India experiences recurring floods from major rivers, including the Ganges and Brahmaputra and their tributaries, especially during monsoon season. The plains of Uttar Pradesh and Bihar are frequently affected by water overflow from major rivers. Excess rainfall over a short period can also lead to flash flooding, while insufficient rainfall will lead to drought.

High magnitude floods during the monsoon season are considered to be India's recurring and leading natural disaster. The country has to face loss of life and damage to property due to severe floods time and time again. Heavy flood damages were experienced in the country during the monsoons of 1955, 1971, 1973, 1977, 1978, 1980, 1984, 1988, 1989, 1998, 2001 and 2004. The Central Water Commission has compiled the damage figures due to flood since 1953 and reports yearly average loss to life to be about to 1,590 and that damage to public utilities has totaled approximately $132 billion .

Severe losses were also caused by floods in the recent past. Heavy monsoon rains triggered landslides and flooding in India in July 2006, specifically in the regions around Mumbai. Over 1,100 people lost their lives, and the insured property damage amounted to US$800 million.

In a report by Swiss Re covering the 20 worst catastrophes of 2007, India was shown to be one of the most victim-prone countries, as more people were affected inside India that year than in all non-Asian nations combined.

Cyclones and Storms

Storms are the second most recurring disaster following floods. Of India's 7,500 kilometers of coastline, approximately 5,700 kilometers are prone to cyclones and other storms from both the Bay of Bengal and the Arabian Sea. The East coast of India is vulnerable to cyclones and coastal flooding during the months of May to June and October to November. Storms are frequent in Andhra Pradesh, Orissa, West Bengal and Tamil Nadu along the Bay of Bengal and parts of Maharashtra and Gujarat at the Arabian Sea .

Drought

Although drought is of a low three percent of the total recorded disasters, it causes the most fatalities and number of people affected. A single drought event impacts an average of 75 million people – more than the combined population of California and Texas – whereas a flood impacts 3 million people. Thus, although drought occurs less frequently, it has a widespread effect on the whole country .

Drought is recurrent in the Rajasthan, Gujarat and some parts of Maharashtra state, and it has a widespread impact on people's livelihood, food security, and health. Droughts are aggravated by the El-Nino Southern Oscillation (ENSO) and shortage of food production. About 68 percent of arable land in India is vulnerable to drought .

During 1999, 2000 and 2001 drought conditions prevailed over some parts of India, not affecting the country as a whole significantly. During 2002 twelve out of 36 subdivisions of the country were struck by moderate to severe drought with about 29 percent of the total area of the country affected.

GEOPHYSICAL VULNERABILITY

Earthquakes & Landslides

India lies along major fault lines between the Indian Plate and the Eurasian plate that run through the mountainous region making it vulnerable to seismic activities. Another friction exists between the Indian Plate and the Burmese Micro-Plate in the Bay of Bengal and the Indian Ocean, which exposes India to tsunami threats. In total, about 60 percent of India is vulnerable to seismic damage of buildings to varying degrees . The Himalayan, Sub-Himalayan, Kutch, and the Andaman and Nicobar Islands are particularly prone to this hazard. Areas surrounding the Himalayas are also exposed to avalanches and landslides.

The Kutch Earthquake in 2001 was one of the worst earthquakes experienced in India. The event devastated 7,633 villages in Gujarat, killed 13,805 people, injured 167,000 and caused $2.6 billion in economic damage .

Northeast India, including Bihar, Uttarakhand, Himachal Pradesh, Jammu and Kashmir and Gujarat, is prone to earthquakes, but the buildings are not resistant to seismic activities and can contribute to huge damages and casualties. Scientists advise that a severe earthquake can occur at anytime and can be detrimental to densely populated cities. Landslides in the Nilgiri Mountains are also common

due to melting icecaps and logging activities. The catastrophic events destroy settlements, agricultural fields, electricity lines, and public infrastructure.

ADAPTATION

Adaptation & The Government

The national institutional structure for disaster management is the National Disaster Management Authority (NDMA). The State Disaster Management Authorities (SDMA) is responsible for the coordination at the state level. The NDMA is responsible for drafting policies and guidelines on disaster management, to be enacted by different ministries. It published a set of guidelines for each specific disaster including regulatory and non-regulatory frameworks, policies and programs. The National Institute of Disaster Management (NIDM) was established in 2003 to undertake research, develop training modules, and organize conferences and lectures to raise awareness on disaster management.

For a long time, the government has been heavily focused on emergency response and few initiatives were taken on disaster preparedness. However, more recently, the government passed the Disaster Management Act 2005 to mainstream disaster risk reduction into development plans and projects to decrease vulnerability. Under the provisions of the Act, the NDMA is responsible for the use of the National Disaster Mitigation Fund on risk reduction projects. The government also launched a number of national mitigation projects to strengthen disaster readiness in hazard-prone areas by establishing building codes for earthquakes, managing land-use, fostering collaboration, and raising public awareness.

Since India is constantly affected by floods, the government created the Flood Management Programme, investing approximately $1.81 billion between 2007 and 2012 in improving river management, flood control and drainage systems. The Ministry of Agriculture is responsible for drought mitigation through educating communities about water management, using water conservation technologies, and constructing watersheds to store water. The state governments are responsible for providing employment, food security, and support for livestock when drought is declared .

NDMA has carried out emergency drills at different schools based on the disasters they are exposed to, and tried to assess the resources and response systems. In flood-prone areas like Bihar, Uttar Pradesh and a few other states, villagers are raising their houses and gardens above flood level by using earthen mounds to reduce flood risks . In the city of Pune in the state of Maharashtra – a flood-prone area, the government developed a new drainage map, widened streams, expanded bridges, and applied natural soil infiltration supplement. Furthermore, the municipal government provided tax incentives for households who recycle wastewater and use rainwater. These tactics have been extremely beneficial to the communities to mitigate risks and promote water management .

The government of India is also promoting the use of watersheds to deal with water resource deficiency in drought-prone areas. The Participatory Watershed Development (PWD) program, led by the Watershed Organization Trust (WOTR), includes the building of rainwater harvesting structures, soil erosion control activities (planting trees), capacity building, education, and community empowerment. WOTR is also leading the climate change adaptation project by working

in 53 villages in three states on water management techniques, weather report installations, crop diversification and environmental conservation .

Some challenges to disaster related programs are poor communication systems and a lack of awareness among community members. Additionally, there appears to be a wide gap of knowledge and expertise among government officials, NGOs, and civil society. Therefore, the success of disaster management efforts are contingent upon the capacity of actors at the state and local level.

INVESTMENT

The budgetary portion of disaster management is under the provisions of the Ministry of Finance. NDMA budgeted about $65 million for disaster mitigation projects (earthquake, landslide, cyclone, and flood), disaster management communication network, and other disaster management projects . As part of the Disaster Response Fund, the government has allocated a total of approximately $1.3 billion each year until 2015. The total budget is then redistributed to different states depending on their expenditure on relief operations within the last 10 years, their economic status, and vulnerability to disasters. The government of India partnered with UNDP to address the disaster risk reduction component in all 29 states with an international grant of $20 million from the UN for 2009-2012.

OPPORTUNITIES & RECOMMENDATIONS FOR INTERNATIONAL DONORS

India faces a wide range of threats, and international donors have many options to support community resilience efforts. Certainly all efforts at poverty reduction, anti-corruption, and environmental sustainability will play a part in disaster risk reduction. However, donors also have more direct ways to help communities adapt, including:

- Raising homes and gardens above flood level in vulnerable areas.
- Rainwater harvesting, water recycling systems, and other drought mitigation techniques.
- Environmental protection and restoration in key locations, such as mangrove forests and flash flood-prone areas.
- Investing in grain banks and other food security reserve systems
- Leverage technology to improve communication systems to build community awareness and knowledge.
- Advocacy and capacity building of local actors
- Disseminating knowledge of evacuation centers and warning systems to local communities

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