

Chapter 2

Capacity Crisis After the 2001 Earthquake in Gujarat, India

Abstract The state of Gujarat in India faced a deadly earthquake in 2001, which killed over 13 thousand people, affected nearly 28 million, and damaged 1.2 million houses. In the worst-affected region of the state, Kutch district, over 90 % population was affected and 70 % buildings destroyed. While the world has witnessed even worst impacts from deadly earthquakes before, what makes this disaster different is the adoption of a massive government-led and donor-supported reconstruction and capacity building program after the earthquake. Although the country and the state were not at all prepared for such a disaster in 2001, enormous international and national attention after the earthquake led to fundamental changes in how disasters are managed across the country. The government of Gujarat acted swiftly in establishing a new state disaster management agency within a month. New state and national disaster management laws were passed in 2003 and 2005, respectively, defining federal, state, and district level institutional arrangements for disaster management. Most importantly, these laws provided dedicated funding not only for disaster response but also disaster risk mitigation. This chapter starts with an overview of the need to focus on Gujarat case along with an overview of disaster trends in India, Gujarat state, and Kutch district. A brief description of the 2001 earthquake in Gujarat is followed by capacity building efforts that were undertaken by the government and donors. Towards the end of the chapter, a crucial question is raised. More than a decade later, and with \$1.7 billion spent in targeted capacity building program, is the region any safer?

Keywords 2001 Earthquake of Gujarat • Disaster management • Donors • Gujarat Emergency Earthquake Reconstruction Project (GEERP) • Gujarat State Disaster Management Authority (GSDMA)

The state of Gujarat in India faced a deadly earthquake in 2001, killing over 13 thousand people, affecting 28 million, and damaging 1.2 million houses in a matter of minutes (Mishra 2004). In the worst-affected region of the state, Kutch district, over 90 % population was affected and 70 % buildings destroyed. While the world has witnessed even worst impacts from deadly earthquakes before, what makes this disaster different is the adoption of a massive government-led and donor-supported reconstruction and capacity building program after the earthquake. Although the country and the state was not at all prepared for such a disaster in 2001, enormous

international and national attention after the earthquake led to fundamental changes in how disasters are managed across the country. The government of Gujarat acted swiftly in establishing a new state disaster management agency within a month. New state and national disaster management laws were passed in 2003 and 2005, respectively, defining federal, state, and district level institutional arrangements for disaster management and most importantly providing dedicated funding not only for disaster response but also disaster risk mitigation.

This chapter starts with an overview of the need to focus on Gujarat case, along with an overview of disaster trends in India, Gujarat, and Kutch. A brief description of the 2001 earthquake in Gujarat is followed by capacity building efforts that were undertaken by the government and donors. Toward the end of the chapter, a crucial question is raised. More than a decade later, and with \$1.7 billion spent in targeted capacity building program, is the region any safer? How to assess whether the capacity building efforts were effective, especially in the absence of another earthquake? Should the people wait till the next earthquake to find out? A potential capability trap position is discussed in which local capacity for preventing and preparing for earthquake is either developing very slowly or is not being sustained effectively.

2.1 Why Focus on the 2001 Earthquake of Gujarat?

Many deadly earthquakes have occurred around the world after the 2001 earthquake of Gujarat. Why then focus on it? First, it happened in one of the most populous and disaster-prone countries of the world. India is highly prone to disasters, and with a growing population, even more people will be at risk in the future. Second, the quake happened in one of the most progressive states of the country whose economic and social development capacity can be considered relatively higher compared to other Indian states. Thus, the likelihood of success in capacity building program is higher. Third, it attracted massive international and national aid specifically for developing long-term capacity for disaster risk management. Compared to other cases where the focus is usually just on post-disaster reconstruction, this case focused specifically on long-term capacity building on disaster risk management. Fourth, and most importantly, more than a decade has passed after the capacity building program was adopted—which provides ample time for the results.

2.1.1 India: Increasing Population and Disaster Impacts

India is the second most populous country and one of the most disaster-prone countries in the world. The country with 1.2 billion population (as per 2011 census) ranks 9th on the Disaster Mortality Risk Index (UNISDR 2009)—second only to China in terms of number of disaster victims (NIDM 2009)—and has seen disaster losses and number of affected people increasing over the years (see Table 2.1). India

Table 2.1 Disaster impacts in India

| Period | Number of events | Total people affected | Damaged buildings |
|--------------|------------------|-----------------------|-------------------|
| 1965–1975 | 45 | 366,886,115 | 1,883,989 |
| 1976–1985 | 103 | 308,360,528 | 4,929,511 |
| 1986–1995 | 107 | 564,157,326 | 14,138,645 |
| 1996–2005 | 173 | 663,54,8072 | 23,594,614 |
| 2006–2013 | 121 | 107,122,392 | 13,446,247 |
| Total | 549 | 2,010,074,433 | 57,993,006 |

Source: Guha-Sapir et al. (2014)

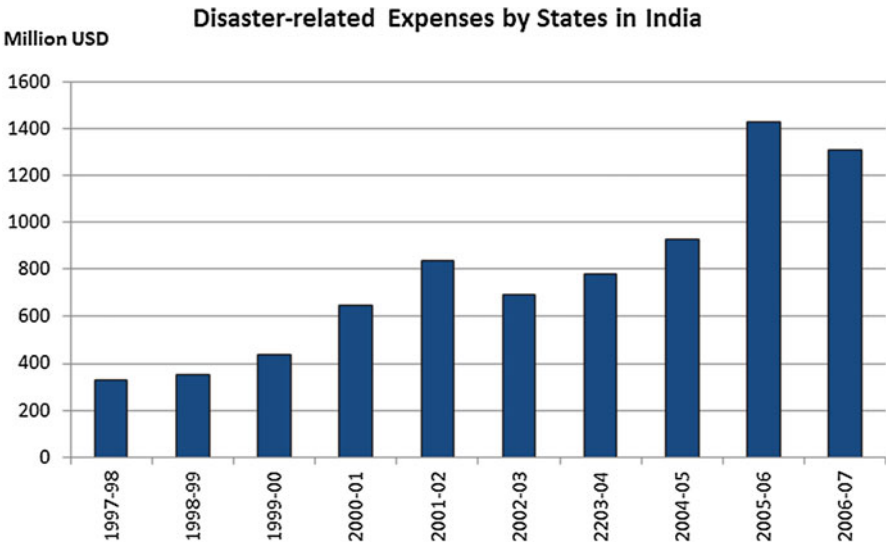


Fig. 2.1 Expenses incurred by states in India on natural disasters (Source: Data from NIDM (2009))

ranks 8th overall in international aid receipts over the last 20 years. Although the international aid is very small per capita (\$0.5), it is still very substantial given that it has been concentrated in specific areas after deadly disasters (e.g., 2001 Gujarat earthquake and Indian Ocean tsunami).

The country mostly followed an emergency response approach to disasters until the 2001 Gujarat earthquake. The federal government provides financial support while affected states manage relief and reconstruction works (World Bank 2009). However, over the years, state expenditure related to disaster response has grown outpacing planned budgets for emergencies under successive finance commissions—which recommends budgetary allocations from federal to state governments over a period of 5 years. Figure 2.1 above shows the growing expenditure on disaster response by states in India. From 1997 to 2007 alone, the states in India spent nearly US \$8 billion¹ on disaster response (NIDM 2009). With 55 % of its area exposed to earthquakes, 8 % to cyclones, and 5 % to floods and assuming even

¹ At a conversion rate of 1 USD to 60 Indian Rupees.

moderate impacts from climate change, the disaster losses are likely to grow even further in the future.

2.1.2 Gujarat: One of India's Most Progressive States

The state of Gujarat is situated in the western part of India and is the birth place of Mahatma Gandhi. Although it is a relatively small state accounting for 6 % of the India's area and 5 % of India's population, it is one of the most progressive states in the country. The population of Gujarat as per Census 2011 is 60 million of which 43 % live in 500 urban towns and cities and the remaining 57 % in over 18,000 villages. The per capita income of Gujarat is the fourth highest among the major Indian states at 1993–1994 prices. It is the second most industrialized state in the country accounting for over 10 % of working factories, 9 % of average daily employment, 14 % of the value of output, and 11 % of net value added of manufacturing sector in the country as a whole. It is also the third most urbanized state of the country and one of the most literate states of India with the literacy rate of 79 %.

Gujarat is highly prone to cyclones, drought, earthquakes, and floods. It has faced many disasters historically (see Table 2.2). Frequent disasters have had negative impact on the state's economy. However, for a long time systematic understanding and management of disasters didn't exist in the country and the state.

2.1.3 Kutch: Historically Prone to Earthquakes

Kutch is one of the 26 districts in the state of Gujarat. It is the largest district in India in terms of land area (45,652 km²) (Census of India 2011). It borders Pakistan in the north and northwest, the Arabian Sea in the west, and the Gulf of Kutch in the south. The Rann of Kutch separates the district from the mainland with the Great Rann in

Table 2.2 Major disasters in Gujarat

| Disaster | Years | Comments |
|---------------------------|--|---|
| Cyclone | 1817, 1850, 1881, 1893, 1896, 1897, 1903, 1920, 1933, 1947, 1948, 1961, 1964, 1975, 1976, 1978, 1981, 1982, 1983, 1990, 1993, 1996, 1998, 1999 | Very frequent hazard that is likely to increase with climate change |
| Drought/heat wave | 1985, 1986, 1987, 1998, 1999, 2000, 2001, 2002 | Good rains from 2002 to 2012 |
| Earthquake (magnitude >5) | 1668, 1819, 1821, 1845, 1856, 1864, 1864, 1903, 1927, 1940, 1956, 1970, 1982, 1991, 1995, 1996, 2001 | The state lies in zone V, with return period 20 years |
| Floods | 1980, 1989, 1991, 1993, 1994, 1996, 1997, 1998, 2003, 2004 | Floods have become more frequent with increase in the number of urban settlements |

Source: Compiled from various GSDMA publications

the north and the Little Rann in the east and southeast. The Rann is a shallow salt marshland that is submerged in water during the rainy season and becomes dry (salt flats) during other seasons. There are a number of islands in the Great Rann. The Kutch peninsula is generally dry with an annual average rainfall of 35 cm. It has a linear hill range running east–west with a number of small seasonal streams following the slopes to north and south. The northern edge of the landmass bordering with the Great Rann is a large swath of grassland known as Banni.

Kutch has a population of nearly two million as per 2011 Census (see Table 6.3). However, compared to national and state averages, the district has a very low density. Majority of the population live in rural areas and depend on seasonal farming and animal husbandry.

Kutch district is prone to earthquakes, cyclones, floods, and drought. The district is an active seismological area with a number of active faults. Kutch has witnessed many destructive earthquakes in the past, and the 2001 earthquake (magnitude of 6.9 on Richter scale) resulted in unprecedented deaths and destruction. The area has experienced aftershocks with such regularity that the people are now capable of understanding the differences in intensity.

2.1.4 The 2001 Earthquake in Gujarat

Every year, the Republic Day in India is celebrated on January 26 to mark the day when India's constitution came into effect. Morning is especially busy on this day with celebrations and parades in schools and government offices. In 2001, on Republic Day, a major earthquake of magnitude 6.9 on Richter scale occurred in the state of Gujarat in India at 8:46 am local time (Fig. 2.2). It lasted for 2 min. The epicenter was about 9 km south-southwest of the village of Chobari, Bhachau Taluka, of Kutch district.

More than 7,600 villages of 19 districts were partially or fully affected; 13,805 human lives were lost in the state and approximately 167,000 people suffered minor or severe injury. There was significant damage to the infrastructure with facilities such as hospitals, schools, the electric power grid, water systems, bridges, and roads damaged or destroyed. Over 1.2 million houses were damaged to varying degrees, and more than 200,000 of them collapsed completely. The related consequence of the phenomenon was the loss of livelihood of millions of people. More than 10,000 small and medium industrial units stopped production and livelihoods of more than 50,000 artisans were adversely affected (GSDMA 2001).

The immensity of destruction, human suffering, and media attention prompted a quick response within India. The national and state governments quickly provided assistance in many forms including cash, medical supplies, communication teams, shelters, food, clothing, transport, and relief workers. There were more than 185 nongovernment organizations (NGOs), mostly Indian charities, which undertook earthquake-relief and rehabilitation activities. Search and rescue teams soon arrived from several countries to help local rescue teams. Relief teams and supplies soon

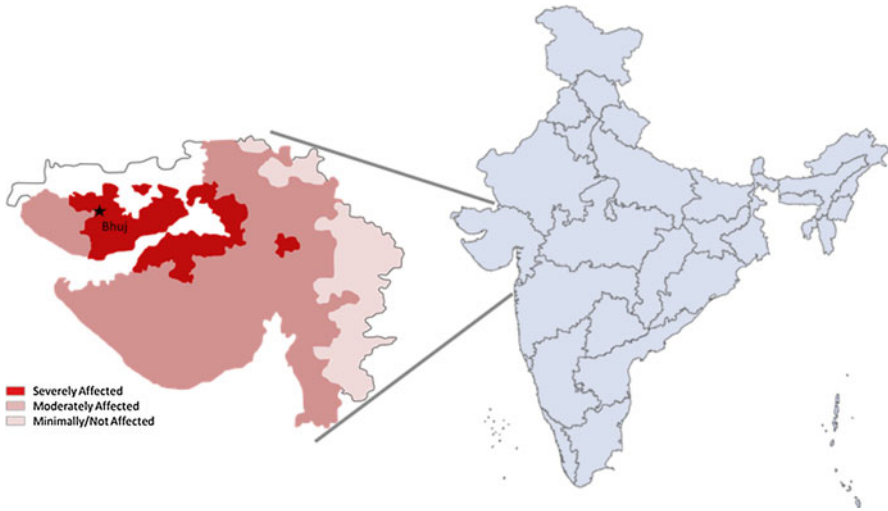


Fig. 2.2 Areas affected by the 2001 Gujarat earthquake (Source: Adapted from GSDMA (2001))

followed from 38 countries as well as United Nations agencies and many international NGOs such as the Red Cross. The national and state governments formed a group of special officers to handle the rescue, relief, and rehabilitation activities and mobilized funds for the same.

2.2 Capacity Crisis and Capacity Building After the 2001 Earthquake

2.2.1 *Government and Donor Responses*

Recognizing the need for coordination of government agencies, partners, and NGOs, the state government formed the Gujarat State Disaster Management Authority (GSDMA) in February 2001, just a month after the earthquake. The government also issued a preliminary report on earthquake damage assessment and invited donors to review the findings. Apart from physical impacts on buildings and infrastructure, the preliminary report mentioned the inadequate administrative structure to deal with relief and rescue work (Government of Gujarat 2001). As an initial response, the state government rushed in senior administrative officers to manage relief and rescue works. Later on, a stable higher-level administration was formed for longer-term relief, reconstruction, and repair by appointing additional collectors and additional district development officers (ADDOs) in the 16 worst-affected *talukas* (administrative divisions). These high-level officials were from an elite national Indian Administrative Service (IAS) cadre. At the apex level, a disaster management and mitigation authority, headed by the Chief Minister, and a

disaster management task force to advise the government on relief and reconstruction policies and measures were set up. The task force was headed by a retired senior officer of the government with broad experience in relief operations.

The World Bank and the Asian Development Bank took the government's preliminary assessment as key input into a more detailed joint assessment carried out through field trips and consultations with government officers and NGOs. The joint assessment, which was finalized in March 2001, estimated sectoral asset losses to be US \$2.1 billion for the same-standard replacement costs (including household assets) and US \$1.8 billion in improved-standard replacement costs, excluding household assets (World Bank & Asian Development Bank 2001). The report proposed a recovery and reconstruction strategy based on (a) empowering individuals and communities by ensuring that the majority of reconstruction efforts be undertaken by the community; (b) a clear, transparent, and participatory approach to assess wishes of villagers and cost of alternatives; and (c) communication and transparency through effective dialogue among the government, public, and partners. GSDMA capacity building needs were identified as (i) immediate needs, which included coordinating all agencies and stakeholders involved in reconstruction, providing the financial management of Gujarat Emergency Earthquake Reconstruction Project (GEERP), funding and monitoring progress of the overall program, and developing a comprehensive and sustainable disaster risk management program, and (ii) long-term disaster risk reduction needs, which included disaster risk mapping (building on the Vulnerability Atlas of India for Gujarat, 1997) for disaster scenarios and microzonation; risk reduction by reviewing existing preparedness measures at state, district, and community levels to identify gaps; and risk transfer through insurance schemes and access to quick finance during disasters.

2.2.2 Design of Capacity Development Project

A massive donor-supported comprehensive rehabilitation and reconstruction program—Gujarat Emergency Earthquake Reconstruction Project (GEERP)—costing US \$1,765 million was planned based on the government and donor assessments and launched by the government of Gujarat. This was funded jointly by the state government, the government of India, and bilateral and multilateral funding agencies such as the World Bank, the Asian Development Bank (ADB), the Netherlands government, the United States Agency for International Development (USAID), and the European Union (EU). The GEERP was designed as a comprehensive multi-sector program, aimed at rehabilitation of people through provision of housing, social amenities, infrastructure, and livelihood support based on a sustainable economy and environment and preparing them to face disasters through community participation and multi-hazard preparedness programs.

The government of Gujarat developed the GEERP as a comprehensive multi-sector program, aimed at rehabilitation of the people affected by the earthquake through provision of housing, social amenities, infrastructure, and livelihood

support and based on principles of sustainable economy and ecology (GSDMA 2001). The project had three phases with the short- and medium-term phases focusing on recovery and reconstruction and the long-term phase focusing on capacity building for disaster reduction. The overall objectives of the long-term phase were to implement a comprehensive disaster management program and improve the disaster preparedness and emergency response capacity of the government to deal with different types of disasters.

The strategic focus of GEERP is shown in Fig. 2.3. The project budget was US \$1.7 billion, out of which the state government secured a loan of US \$687.5 million from the World Bank, US \$350 million from the Asian Development Bank (ADB), and the rest from the national government and other state governments. The World Bank funding focused on housing, the social sector, infrastructure, community participation, and disaster management capacity building. The ADB funding focused on housing, urban/rural infrastructure, power, livelihood support, and disaster preparedness and mitigation. Other donors including the EU, USAID, Netherlands government, International Fund for Agricultural Development (IFAD), and World Food Program (WFP) also provided significant support by directly funding small activities.

The World Bank supported phase I of the project with a US \$261.6 million loan, approved in March 2001, aimed at immediate reconstruction of housing, dams and irrigation, roads and bridges, and public buildings and support for health, education, and community participation. The second phase of the World Bank-supported lending provided US \$442.8 million, approved in June 2002, for restoration of housing and public buildings, restoration of basic infrastructure such as the roads and irrigation sectors, and development of an institutional framework to allow better disaster mitigation and risk management for future natural disasters. One of the key objectives of the GEERP was to systematically enhance the capacity of government agencies and communities as well as to increase community involvement in managing reconstruction requirements and risk from future disasters (Mishra 2004; GSDMA 2006; World Bank 2009).

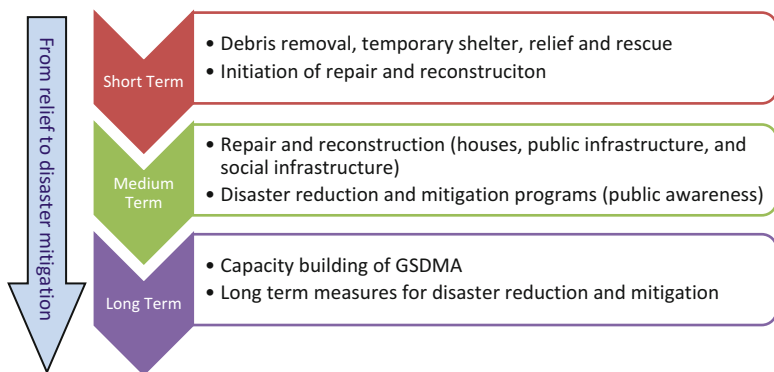


Fig. 2.3 Strategic focus of GEERP (Source: Adapted from Mishra (2004))

2.2.3 Policy and Institutional Changes After the 2001 Earthquake

Apart from the targeted program, GEERP, various policy, institutional, and funding changes occurred at the national and state level, providing needed legal backing and financing. The changes were especially welcomed by the donors and international aid agencies as it ensured sustainability of the results to be achieved under the GEERP.

2.2.3.1 National Level Changes

At a national level, National Disaster Act was passed in December 2005, 4 years after Gujarat earthquake and a year after Indian Ocean tsunami. The act paved a way for establishing National Disaster Management Authority (NDMA), responsible for preparing policies and plans for disaster management, and National Institute of Disaster Management (NIDM), responsible for research, training, and other capacity building activities. A National Executive Committee was formed under NDMA to implement policies and plans developed by NDMA.

A similar structure was suggested at state and district levels, with state and district disaster management authorities.

A National Disaster Response Fund (NDRF) and National Disaster Mitigation Fund (NDMF) were mandated by the 2005 Act, with similar funds at state and district levels.

2.2.3.2 Changes in Gujarat State

Within weeks after the 2001 earthquake, the state government in Gujarat set up a special body, the Gujarat State Disaster Management Authority (GSDMA), to deal with all aspects of relief and rehabilitation. Headed by an IAS officer, GSDMA worked with special officers at the district headquarters to coordinate relief activities in the early stages. This agency was conceived to be a permanent arrangement to handle natural disasters (see Sect. 5.1, subsection titled “Disaster management within the state administrative structure” for details about GSDMA). A Gujarat State Disaster Management Act was passed in 2003 to provide permanent status to GSDMA.

The Gujarat Institute of Disaster Management (GIDM) was established as a training and research wing of GSDMA on January 26, 2004, by the government of Gujarat with the aim of human resource development in the state. Its objectives include providing disaster management training, undertaking public education and community awareness, acting as a resource center and clearing house of information, and facilitating partnerships with private organizations and universities. Currently, GIDM offers a series of training courses to government officials and

other stakeholders. These courses are offered by experts in the field. Four area development authorities were established in the four affected towns of Kutch to develop, coordinate, and implement urban development plans. These area development authorities are now responsible for providing building code permission and enforcement. Many of these functions were with local municipalities before 2001.

2.2.4 Is Kutch Any Safer than in 2001?

More than a decade later and with \$1.7 billion spent in targeted capacity building program in Gujarat, primarily Kutch, is the region any safer? This question, although crucial, is very difficult to answer, especially in the absence of another earthquake. Should we wait till the next earthquake to find out?

At the “outside,” looking at the external form, a phenomenal change has happened in the state. New policies and institutional structures have been adopted, which were up and running in a very little time after the earthquake. The GSDMA was established a month after the earthquake and has received many prestigious awards for its functioning. District² Disaster Management Agency, District Emergency Operation Center (DEOC), and Taluka Emergency Operation Center (TEOC) are all established and functional.

If you look closely at the affected settlements, however, the story is a little different. A survey conducted in 2011 found that 40 % of the surveyed buildings had high vulnerability to earthquake (Powell 2011). Some people were still living in temporary shelters in 2012 or have developed extensions to their houses—which were not earthquake resistant. Additionally the quality of construction has not improved even with masons training program. Another citizen survey conducted in 2012, as a part of this research in Bhuj, found that a majority of people surveyed believe that the town’s capacity to deal with emergencies has improved but the next earthquake can have same impact as 2001, if not more (see Chap. 6). One reason for this belief was structural vulnerability of buildings in the city, which, along with the town’s increasing population, puts more people at risk. Population in Bhuj, the capital city of Kutch district, has increased 49 % after the earthquake (World Bank 2009; Census of India 2011), while the city area has doubled, in part due to the economic incentives provided after the earthquake—exposing more people and assets to potential future earthquakes.

What is missing to make the massive investment more effective at the ground level? Is this a capability trap situation or just a typical capacity development process? How to measure results of capacity building in disaster risk management? What are the indicators of capability trap situation? How to break it? The next part of the book focuses on these questions, exploring what capacity building in disaster risk management means. A conceptual model will be developed to understand the Gujarat case.

² Somewhat equivalent to a county in the USA.

A detailed discussion on Gujarat's post-earthquake recovery and reconstruction program provides a great opportunity to understand the capacity building process in many ways. First, before the earthquake, the local administration followed an ad hoc approach to disaster management and paid little attention to disaster risk reduction. Soon after the 2001 earthquake, the GEERP was launched to systematically enhance government's capacity to manage reconstruction requirements and risk from future disasters. Second, new state, local, and national agencies were created with specific functions of dealing with future disasters. Third, after the earthquake many community-based organizations became very active in raising community concerns regarding relocation programs and the government's overall response to reconstruction and recovery. Finally, 6 years have passed since the donor-supported programs were completed,³ giving adequate time to judge sustainability and effectiveness of the results achieved so far.

In assessing the success of the GEERP as a capacity development program, it is useful to envisage a potential failure situation. A capability trap may occur when even with organizations existing to deal with disasters, no real or relatively less capacity for preventing or preparing for disasters exists at the local level. Since one of the long-term goals of GEERP was capacity building for disaster reduction and mitigation, a capability trap situation would indicate an inability to achieve this goal.

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³World Bank-supported GEERP was initiated in November 2001 and ended in October 2008. The original closing date was 2005; which was later revised to 2008.

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