

THE GUJARAT EARTHQUAKE 2001

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One of the two most deadly earthquakes to strike India in its recorded history was the Bhuj earthquake that shook the Indian Province of Gujarat on the morning of January 26, 2001 (Republic Day). The earthquake caused massive loss of life and injury. It left nearly a million families homeless, and destroyed much of the area's social infrastructure: from schools and village health clinics, to water supply systems, communications and power. The Kutch district of Gujarat is the worst affected; in many villages and several towns the destruction was nearly total.



Source: Government of India's official web site on the Gujarat earthquake <http://gujarat-earthquake.gov.in/final/bhuj.html>

One month after the earthquake official Government of India figures placed the death toll at 19,727 and the number of injured at 166,000. Indications are that 600,000 people were left homeless, with 348,000 houses destroyed and an additional 844,000 damaged. The Indian State Department estimates that the earthquake affected, directly or indirectly, 15.9 million people out of a total population of 37.8 million. More than 20,000 cattle are reported killed. Government



estimates place direct economic losses at \$1.3 billion. Other estimates indicate losses may be as high as \$5 billion.

The earthquake was followed by a large number of aftershocks. The Indian Metrology Department (IMD) recorded more than 500 aftershocks of magnitude 3.0 and above, which continued through the month of March. The state of Gujarat is the heartland of Indian industries like petroleum, power and steel. Indeed, this M7.9 earthquake is the first to hit metropolitan cities of the country in the recent times and the modern industrial constructions.



EARTHQUAKE INFORMATION AT A GLANCE

- Date and time of Occurrence of Earthquake: 26 January 2001 at 8:46 am
- Magnitude: 6.9 on the Richter scale with epicentre at 20 K.M. North East of Bhuj
- No of districts affected: 21 out of 25 districts
- Most affected areas: Kachchh, Ahmedabad, Jamnagar, Rajkot and Surendranagar.
- Death toll: 20,000 approx.
- Affected villages: 7904 villages affected in 182 talukas in 21 districts
- Affected population: 15.9 million (42.06%) affected out of total population of 37.8 million
- Damage:
 - Houses Fully Destroyed 1.87 lakh (Pucca), 1.67 lakh (Kachcha) & 0.16 lakh (huts)
 - Houses Partially Destroyed 5.01 lakh (Pucca), 3.87 lakh (Kachcha) & 0.34 lakh (huts)
 - Total estimated loss of damage Rs. 21262 crore

Source: The UNDP/DMT Response to the Gujarat Earthquake: Some of its Good Practices



DESCRIPTION OF INITIAL RESPONSE ACTIVITIES

The Government of Gujarat (GoG) had set up the Gujarat State Disaster Management Authority (GSDMA) that would implement the reconstruction and rehabilitation, with support from various other agencies in the quake-hit area. The GoG announced four packages amounting to almost US \$1 billion for reconstruction and economic rehabilitation for more than 300,000 families. The government had also announced US\$2.5 million package to revive small, medium and cottage industries.

Table 1 Central Assistance received for emergency relief, rescue and rehabilitation

Sr. No.	Details	Rs. in Crores
1	National Calamity Contingency Fund (NCCF)	500.00
2	Water supply (Rural and Urban)	100.00
3	Prompt Electricity Development (Restoration) Programme (Rs.96 crore for Kachchh)	109.63
4	Indira Avas Yojna	49.00
5	Prime Minister Gramodaya Yojna	21.05
6	Slum Development	19.07
7	Prime Minister Gram Sadak Yojna	53.86
8	Operation Black Board Yojna	30.00
	Total Rs.	882.61

The World Bank and the Asian Development Bank had announced loans worth \$300 million and \$500 million respectively. A number of other bilateral agencies including,

- European Union (EU)
- Department for International Development (DFID)
- United States Agency for International Development (USAID)
- Canadian International Development Agency (CIDA),

had also agreed to provide financial assistance for the rehabilitation program. The Housing and Urban Development Corporation (HUDCO) and the National Housing Bank (NHB), two major public sector institutions in India's housing sector, also offered to provide financial assistance of US\$400 million.

While there had been no major impact on industrial units owned by major corporate groups, the leading chambers - the Confederation of Indian Industries (CII) and the Federation of Indian Chambers of Commerce and Industries (FICCI) had offered to adopt clusters of quake-ravaged villages for relief and long-term rehabilitation. A number of business groups such as Reliance, VSNL, Larsen & Toubro, TATA Steel, Coca-Cola, ESSAR and Videocon had decided to contribute to the rehabilitation program. Public sector industries too provided huge donations for rehabilitation.



International assistance was forthcoming from,

• Australia	Disaster management experts and US\$550,000
• Bangladesh	20,000 tons of rice and 12-member medical team together with first aid supplies
• Belgium	US\$920,000 as emergency aid and reconstruction
• Canada	\$2 million in aid -- \$1.3 million to help furnish basic necessities to quake victims and \$660,000 to Canadian and Indian relief organizations and the Red Cross
• China	\$602,000 in disaster relief; separately, China's Red Cross offered \$50,000
• Greece	\$270,000 in financial aid relief supplies
• Israel	150 strong -emergency aid mission
• Italy	Team of experts and \$2.3 million for emergency equipment
• Kuwait	US\$250,000 in emergency relief from Kuwaiti Red Cross
• The Netherlands	US\$2.5 million through UNICEF and other aid agencies
• New Zealand	Grant of US\$200,000
• Pakistan	13 tons of relief material comprising of blankets and food material
• Syria	Medical and other relief supplies
• Taiwan	US\$100,000 through Red Cross
• UK	Total of £10 million apart from rescue team and other relief supplies including 1200 tents
• US	Relief supplies; USAID to send US\$ 5 million worth of aid supplies apart from 80 tons of relief material it has already sent
• UAE, Vietnam, Saudi Arabia	Relief materials and supplies

Source: High Commission of India, London, Press Release January 30, 2001, Gujarat Earthquake Relief Update



The American Red Cross of Central New Jersey had announced that the Infinity Foundation had established a matching grant program of \$10,000 with all proceeds to go to the American Red Cross Indian Earthquake Relief Fund.

CARE International responded immediately to assist people in need. Overall, 10,000 families received immediate relief such as materials for temporary shelter, clothing, cooking utensils, a kerosene cooker and water purification tablets. In co-ordination with the Indian Government, other international agencies and local partners, CARE targeted the worst hit blocks in the Kutch region for emergency relief to address immediate humanitarian needs and rehabilitation to re-establish livelihoods in the longer term.

HelpAge India's response focused on rural areas, where most people were affected. Working with four local partners - Kutch Vikas Trust (KVT), Shroff Foundation, Navjeevan Trust and Sadvichar Parivar - HelpAge India conducted rapid needs assessments. Basic relief items were delivered to 7,500 older people and their families. Mobile Medicare Units (MMUs) provided emergency medical care in villages in Kaachch, Rajkot and Surendranagar districts.

Oxfam had focused its response on the districts of Kachchh, Surendra Nagar and Rajkot as they were the most vulnerable and worst affected. The immediate relief phase of Oxfam's response work included food distributions to 5,000 families (approximately 25,000 people), shelter and non-food item distributions to 13,000 families (approximately 65,000 people) and clean water provision to 20,000 people, in conjunction with the state water board. In addition 1,030 temporary bathing facilities were constructed in Bhachau and Rapar, Kachchh District.

The Red Cross and Red Crescent Movement- Immediately after the disaster struck, the International Federation launched an appeal for £10 million to help 300,000 people for up to four months and support the Indian Red Cross' emergency relief activities. Due to the widespread devastation, the main objective was to provide people with essential shelter, safe water and medical assistance. Special units were flown in to the region to provide essential services, including a 350-bed hospital, water and sanitation units, a telecommunications team, a primary health care unit and a British Red Cross logistics team.

WHO responded rapidly to the earthquake by placing experts in emergency and humanitarian action in Ahmedabad and Bhuj on the morning after the earthquake. The World Health Organization mobilized approximately US \$ 1.2 Million through its own contribution, OFDA and DFID to meet immediate public health needs of the affected population in Kutch district of the state. Since several national and international agencies were taking care of immediate trauma and medical needs, focus of WHO input was to avoid duplication of efforts. WHO input was majorly on the following aspects in this direction:

- Redressal of immediate public health needs
- Post-earthquake Health Sector coordination



- Containment of disease outbreaks and enhancement of capacity/ capability of disease surveillance practices
- Water Quality Assurance

A large number of NGOs, national and international, participated in the relief operations. Many of these NGOs gradually withdrew after the relief phase closed, as they did not have sufficient resources to participate in the reconstruction program, or a long-term plan for local involvement. However, a number of larger NGOs continued and contributed to the rehabilitation program. The government actively sought for NGOs to adopt villages for rehabilitation. It had announced a contribution of 50 per cent of the cost of rehabilitation, if an NGO adopted a particular village for rehabilitation. The cost of reconstruction was funded through the following sources:

- From the Government of India and the Government of Gujarat
- Through grants and loans of bilateral agencies
- Through multilateral loan funding from the World Bank and the Asian Development Bank
- From the Prime Minister's and Chief Minister's Relief Funds
- From the corporate sector and NGOs
- From Insurance companies, banks and financial institutions



DESCRIPTION OF RECOVERY/ RECONSTRUCTION ACTIVITIES AND THEIR ASSESSMENT

The UN System through its response to previous disasters in the past tens years has acquired invaluable experience in disaster relief, recovery and coordination. These natural disasters include the Orissa Super Cyclone, the Latur Earthquake, the West Bengal Floods and the recurring drought crisis in several Indian states. The ongoing programmes of the UN Family have provided the organisations with an extensive presence and engagement in a broad variety of activities in India. Each UN organisation has built up networks of NGO partners with a strong field presence, trust and credibility in local communities.

The World Bank and the Asian Development Bank had estimated that improved reconstruction in the Indian state of Gujarat devastated by the January 26, 2001 earthquake would cost about Rs 10,600 crore (US\$2.3 billion). In their joint Gujarat Earthquake Recovery Program Assessment Report presented to the government of Gujarat, the two multilateral banks had put the total loss of assets, including private assets, at Rs 9,900 crore (US\$2.1 billion). The bulk of these losses were in the housing sector (Rs 5,200 crore /US\$1.1 billion). Among the other severely affected sectors were education, health, rural water supply, irrigation, transport, and public buildings and monuments. The impact on Gujarat's fiscal deficit was expected to be Rs 10,100 crore (US\$2.2 billion) over three years. The report represented the best assessment possible as of end-February 2001. It was based on field visits by a joint World Bank-ADB team to the affected areas in February.

Gujarat Emergency Earthquake Reconstruction Project (GEERP) was initiated by the Government of Gujarat, with the support of World Bank and ADB. Government of Gujarat reconstructed and repaired affected houses in record time of 2 years. It took 5 years for Japan to reconstruct 134,000 houses after Kobe earthquake and it took 2 years for Maharashtra to rebuild 8,702 houses after Latur earthquake. It is estimated that Turkey will take 6 years to reconstruct the damaged 14,000 houses and it took Mexico 2 years to complete 48,000 houses.

**REPAIR AND RECONSTRUCTION**

- Total houses to be restored by repair and reconstruction: 1,143,367
- Total houses restored till date: 996,167 (87%)
- Financial assistance distributed: Rs. 1,555 Crore

Repairs

- Total No. of eligible houses to be repaired : 929,682
- Houses repaired till date: 882,896(94%)

Reconstruction

- Total No. of Eligible houses to be reconstructed: 213,685
- Houses reconstructed till date: 113,271 (53 %)

MATERIAL BANKS

- Material banks established to supply subsidized cement: 1,082
- Cement bags distributed so far: 176 lakhs
- Total cement distributed: 8 lakh Ton

PUBLIC PRIVATE PARTNERSHIP PROGRAM

- (50% cost by NGOs & 50% by government)
- Number of villages adopted: 289
- Number of houses to be constructed: 37,673
- Houses completed: 27,432 (73%)
- Houses under construction: 10,241
- Villages adopted for infrastructure creation: 24 by CII, work already completed

RELOCATION OF VILLAGES**Full Relocation**

- Number of villages: 24
- Houses to be relocated: 5,225
- Houses already relocated: 3,936 (75%)

Partial Relocation

- Number of villages: 37
- Houses to be relocated: 10,299
- Houses already relocated: 6,614 (64%)

For its highly successful implementation of the programme, the GSDMA was awarded the UN SASAKAWA Award.



ASSESSMENT

- The rehabilitation/ reconstruction effort was the biggest ever housing program undertaken in the entire world in terms of numbers and geographic area
- Minimal relocation took place with no secondary displacement.
- Housing assistance packages announced in a record time with a choice of relocation or in-situ reconstruction to be taken by the village community.
- Owner driven housing construction facilitated by financial, material and technical assistance by government
- Multi-hazard resistant reconstruction made mandatory to resist cyclones, earthquake and other natural disasters
- Engineers were appointed in villages to supervise housing construction and provide technical guidance
- Payments were made in three installments for new construction to ensure multi-hazard resistant construction. The second and third installments were given only after verification and certification by engineers
- An important move was to exempt the excise duty for building materials produced in Kutch
- Nirdeshika I and II (guidelines) were prepared to guide people for construction and repair
- Four shake table demonstrations done for awareness generation and confidence building
- Two technical cassettes on construction and retrofitting houses shown in 2500 villages
- One cassette on safe construction using the medium of folk art Bhavai was prepared and screened in 2500 villages
- Audiocassette in the form of folk songs prepared giving messages on multi-hazard resistant construction and played in community gatherings and meetings etc.
- Full-page advertisements in leading local dailies given for awareness creation about proper methodologies of safe reconstruction and repair



- Displayed messages on the need for multi-hazard resistant construction on 600 state transport buses in the earthquake-affected areas
- 7 types of hoardings, at strategic locations in various places in the state regarding safe housing construction
- The need for safe housing construction and retrofitting was taken up as an agenda in the gram sabha in all the 18000 villages of Gujarat.
- Guidelines prepared and distributed for various issues related to housing reconstruction and repair. Special guidelines have been prepared for using local material and for local needs and designs of houses to make them multi-hazard resistance.
- Repair, reconstruction and retrofitting of masonry buildings was undertaken
- Masons training manual was prepared.
- Payments made directly in the bank accounts. More than 365000 bank accounts opened in a record time of 3 months.
- Quality audit: In order to exercise check and ensure quality, independent third party quality auditors have been appointed to check all the houses reconstructed and give independent feedback.
- Masons and Engineers trained for multi-hazard resistant housing reconstruction. Over 27000 masons and 6000 engineers trained.
- Massive information, education and communication activity undertaken to educate people on multi-hazard resistant construction
- Over one million pamphlets on safe housing repair and reconstruction distributed in earthquake-affected areas.
- All newly constructed houses are in joint ownership of husband and wife
- A remarkable feature about reconstruction is that all reconstructed houses are insured against fourteen types of natural and man-made disasters
- Committees at village - and district-levels have been constituted for grievance redressal and for strengthening the implementation program.
- District Judge is declared as the Ombudsman to enquire into any complaints and petitions received from people and direct the administration to do the needful.



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