



Introduction to Damage and Reconstruction Needs Assessment

Case Study

INDIA

Gujarat Earthquake Recovery Program

Soon after the 6.9 magnitude earthquake hit Gujarat on 26 January 2001, the Government of India requested the World Bank's urgent intervention to help address the unprecedented level of destruction. The Bank, along with the Asian Development Bank, immediately sent an assessment team to the devastated areas, and produced a joint damage and recovery assessment report in March 2001.¹

EXECUTIVE SUMMARY

India suffered a devastating earthquake on January 26, 2001. The loss of life and nearly all of the destruction of physical assets took place in western and central Gujarat, where around 20 million people live and work. At the time of finalizing this report, the death toll stands at over 20,000, and about 167,000 people have been injured. Nearly one million homes were damaged or destroyed. Small enterprises—especially single family artisans, shopkeepers and rural industries were also affected. Health and education infrastructure was severely damaged, with two district hospitals destroyed, and over 1,200 health clinics (mostly in rural areas), and over 11,600 schools destroyed or damaged.

There was similar destruction of both rural and urban water supply schemes. Over 240 earthen dams for small reservoirs providing water for irrigation, rural and urban domestic needs, and industry were also damaged. Other infrastructure services like electricity and telecommunications, were extensively damaged.

Although Gujarat is relatively richer and has grown faster than other Indian states, the area most severely affected by the earthquake is poor. It includes the district of Kutch (where over 90 percent of the deaths and 85 percent of asset losses occurred) and the districts of Jamnagar, Rajkot, and Surendranagar. It is a sparsely populated, resource poor, arid region, vulnerable not only to earthquakes but also to cyclones and drought.

The earthquake struck in the wake of two consecutive years of drought in 1999 and 2000. The main sources of employment are agriculture, animal husbandry, salt mining and refining, handicrafts, and trade. Kutch accounts for less than 2 percent of industrial employment in the state and there is little large-scale industry. Agriculture is largely rain-fed and there are few perennial crops. The agriculture and dairy sectors are extensive, with little mechanization and thus low levels of capital intensity. Although some households benefit from transfers from relatives working in Mumbai and abroad, poverty is higher and social indicators worse in the earthquake-affected areas than in the rest of the state. Kutch also has the largest proportion of scheduled caste people in Gujarat, 12 percent, compared with 7 percent in Gujarat as a whole.

Economic Impact

The economic impact of the earthquake includes: (a) asset losses (direct damage); (b) output losses (indirect damage); and (c) fiscal costs (secondary effects). Destruction

¹ Excerpt from WB and ADB Joint Assessment Report

of private assets in the affected districts has been massive. Of the estimated Rs. 9,900 crore (\$2.1 billion) total asset losses, Rs. 7,400 crore (\$1.6 billion) are private assets. While the impact of the earthquake on India's gross domestic product is insignificant, in the areas where it struck, the earthquake devastated lives, social infrastructure, and economic foundations.

(a) Preliminary estimates total Rs. 9,900 crore (\$2.1 billion) in asset losses and Rs. 10,600 crore (\$2.3 billion) in improved-standard reconstruction costs (see Table). The assessment team distinguished between same-standard replacement costs (i.e., the costs for restoring assets to the standard that existed before) and improved-standard reconstruction costs (i.e., the costs for rebuilding to a standard that responds to local conditions, including the risk of natural disaster). These totals are likely to be revised significantly as more detailed on-site damage assessments are completed by qualified experts in the coming weeks and months.

Preliminary Estimate of Asset Losses and Reconstruction Costs, as of February 23, 2001

Sector	Asset Losses		Reconstruction Costs 1/	
	(\$ million)	(crore Rs)	(\$ million)	(crore Rs)
Housing	1,111 /2	5,166 /2	1,107	5,148
Health	47	219	60	279
Education	144	670	180	837
<i>Subtotal: Social sectors</i>	1,302	6054	1,347	6,264
Irrigation	40	186	90	419
Rural water supply	50	233	97	451
Municipal infrastructure	30	140	45	209
Public buildings and monuments	73	339	95	442
Power	40	186	98	456
Transport /3	69	321	77	358
Ports	21	98	26	121
Telecommunications	11	51	26	121
<i>Subtotal: Infrastructure</i>	334	1,553	554	2,576
Agriculture and livestock *	117	544	74	344
Industry *	73	339	44	205
Services *	250	1,163	200	930
<i>Subtotal: Productive sectors</i>	440	2,046	318	1,479
<i>Subtotal: Environment /4</i>	55	256	55	256
Grand Total	2,131	9,909	2,274	10,575
<i>Of which public assets /5</i>	537	2,497	831	3,864
<i>Of which private assets /6</i>	1,594	7,412	1,443	6,710

/1 Replacement of immovable assets, with improved earthquake/cyclone resistance.

/2 Includes value of household contents such as consumer durables; reconstruction excludes replacement of these assets.

/3 Includes roads and bridges, railways, and airports.

/4 Includes costs of rubble removal in urban and rural areas.

/5 Public assets above include: health, 70 percent of education assets, irrigation, rural water supply, municipal infrastructure, public buildings and monuments, power, transport, ports, and telecommunications; plus the environment.

/6 Private assets above include housing, 30 percent of education assets, and production assets in agriculture and livestock, industry and services.

*Asset losses and reconstruction costs to agriculture, industry, and services, exclusive of sectors listed above.

Source: Government of Gujarat and Assessment Mission Estimates

The totals in each column above combine private sector and public sector asset losses. Asset losses to the private sector are estimated to total about Rs. 7,400 crore (\$1.6 billion), including losses of private housing and property (Rs. 5,200 crore or \$1.1 (billion); private schools

(Rs. 200 crore or \$43 million); and production assets in agriculture, livestock, industry, and services (Rs. 2,000 crore or \$440 million).

Losses in public sector assets are estimated to total Rs. 2,500 crore (\$0.5 billion), and include asset losses in health (Rs. 220 crore or \$47 million), education (excluding private schools, some 70 percent of the total, a loss of Rs. 470 crore or \$101 million), municipal infrastructure (Rs. 140 crore or \$30 million), public buildings and monuments (Rs. 339 crore or \$73 million), rural water supply (Rs 233 crore or \$50 million), irrigation (Rs. 186 crore or \$40 million), power (Rs. 186 crore or \$40 million), roads, bridges, railways, and airports (Rs. 321 crore or \$69 million), ports (Rs. 98 crore or \$21 million), and telecommunications (Rs. 51 crore or \$11 million). In addition to the public and private losses set out above, there are some \$55 million of identified damages to the environment. These consist of the cost of rubble removal in urban and rural areas, and further environmental impacts may later be identified. The costs of tackling these problems are likely to accrue to the public sector.

Estimates of reconstruction costs are preliminary, as specialists have only just begun to identify and cost out effective risk-reducing strategies for sectoral activities in the affected areas. Moreover, the definition of improved standards and the decision whether to rebuild to these standards can only be determined by assessing the exposure of the relevant asset to catastrophic losses, the economic and social impacts of these losses, and the affordability of reconstruction efforts.

(b) Loss of output due to the earthquake is estimated to be small, ranging between Rs. 2,300 to Rs. 3,000 crore (\$491 to \$655 million), or 2 to 3 percent of Gujarat's 1999-00 gross state domestic product in aggregate over three years. This is due to the fact that the area most affected by the earthquake is not a major contributor to overall state output. The output loss is likely to take place mostly in 2000-01, while in 2001-02 and 2002-03 reconstruction is likely to accelerate growth. These estimates are the upper bound for output losses and exclude the likely positive impact of reconstruction on output growth.

(c) The impact on the fiscal deficit is estimated to be as much as Rs. 10,100 crore (\$2,170 million) in aggregate over three years. The deterioration in the fiscal balance will be due mostly to increased expenditure pressures related to relief, reconstruction of public assets, and assistance to reconstruction of private assets (the largest component of which is assistance to reconstruction of housing). It is expected that much of the reconstruction expenditure will take place in 2001-02 and 2002-03. This can increase the fiscal deficit, currently at 5.1 of gross state domestic product, by as much as 2.5 percentage points in 2000-01, 3.3 percentage points in 2001-02, and 1.7 percentage points in 2002-03.

The extent to which the earthquake will have a negative impact on the state's overall balances in coming years depends on the: (a) terms on which the government obtains financing for earthquake-related expenditures; (b) extent to which it rationalizes expenditures and improves own revenue collections in nonearthquake affected areas; (c) standards used for reconstruction of housing and other assets; and (d) extent to which beneficiaries and the private sector share the costs of reconstruction. Public-good related considerations provide strong reasons to suggest that reconstruction costs in health, education, and infrastructure should be borne by the government.

The other areas are less clear. While, in principle, the private sector's losses can be left entirely for the private sector to bear, the poverty profile of the affected areas, along with the serious risk of a further increase in destitution, argue in favor of burden-sharing by the public sector, especially for the poorest.

The pressure for additional expenditures consequent to the earthquake also provides an opportunity for the government to rationalize public expenditure priorities and improve tax and nontax revenue collections in the nonaffected areas. Furthermore, a natural disaster is often

followed by recovery and reconstruction. The construction boom following the disaster can be a source of additional revenue inflows, which could improve revenue performance overall.

Social Impact

The social fabric of the earthquake-hit areas has been devastated by the large number of human deaths and injuries. In addition to the immediate suffering caused, it is likely that an equally large number of families have been torn by the death or serious disability of a member (though family-based data are not yet available). This will have long-term consequences on the well-being of other members, particularly widows, single parent children, orphans, and the elderly. Other social impacts of the earthquake include deep insecurity among those who have lost assets, including property, and increased vulnerability among them to poverty. The livelihoods of many families have been disrupted.

The loss of lives, and loss of or damage to homes, productive assets, and workplaces, has caused more severe disruption; while temporary disruption has occurred in the wake of the shock and fear caused by the earthquake, and of disruptions in financial services, markets, and distribution channels. About 19,000 handicraft artisans in the district of Kutch appear to be the most severely affected group. In addition, several thousand salt farmers are faced with the collapse of their brine wells, destruction of salt fields, and damage to their refineries. Another important source of livelihood in Kutch is cattle—about 20,000 cattle deaths have been reported. The Government of Gujarat, as well as a large number of nongovernmental organizations including philanthropic groups, development agencies and private businesses have stepped in to provide food, medical services, clothes, blankets, utensils, basic supplies, and tents.

Immediate Needs

The first and most urgent need is the provision of temporary shelter before the onset of the monsoon season in July. Simultaneously, the reconstruction of the devastated housing stock needs to be launched. An owner-driven, *in situ* housing reconstruction process is likely to lead to fast reconstruction and genuine acceptance by beneficiaries. Implementation should be decentralized, while the quality control of earthquake and cyclone resistant construction, financial management and procurement procedures, would be coordinated by the newly created Gujarat State Disaster Management Authority.

Essential to the success of reconstruction is the restoration of lost records of property rights to housing, commercial property, and land, with special efforts made to assist the poor, scheduled castes, and squatters, who may have greater difficulty demonstrating legitimate property rights. Appropriate levels of indemnity will need to be identified for different income groups.

Second, there is an urgent need to restore public services, including health, education, water supply, power, communications, municipal and environmental infrastructure, and state administration. Careful prioritization of this reconstruction will be necessary. Even with substantial external financing, rebuilding everything at once is unlikely to be affordable or necessarily desirable. Appropriate standards for reconstruction need to be identified, which take account of the area's natural hazards but are not over-specified.

Third, efforts will need to be made to secure the livelihoods of vulnerable people in the earthquake-affected areas. Such support will need to be rapid if it is to be effective. It will need to be well-targeted if it is to be affordable. It will need to be designed so as not to displace private enterprise and self-help if it is to be sustainable. Cash grants or wages in return for rubble removal, production of building materials such as bricks or concrete blocks, and reconstruction work would be options to consider.

An Approach to Recovery

Cross-country experience from other disaster-hit areas suggests that the following core principles should be followed in the approach to reconstruction:

1. **Revival of the economy:** There is an urgent need to restart the economy of the affected areas, which can be done in part by providing wage employment to local people for debris removal, construction, and the restoration of heritage sites. This type of program, if well designed, minimizes the potential for mis-targeting. Transfers to households, for consumption or investment purposes, could also be envisaged.
2. **Empowering individuals and communities:** While relief and charity are important in the immediate aftermath of a natural disaster, they should be replaced as soon as possible with efforts to foster ownership and involvement by the people. There are some instances encountered indicating that relief assistance is sometimes creating competition for handouts, community conflict, and dependency. Greater local participation and contributions to the reconstruction effort could reduce social tensions and lead to more sustainable development efforts. The majority of reconstruction efforts should be undertaken by the affected population themselves.
3. **Affordability, private sector participation, and equity:** Reconstruction of private and public property and efforts to revive the economy should take into account (a) potential impact on public finances; (b) use of available private sector participation and financing; and (c) relatively greater public assistance to those most in need. The impact of the earthquake will further strain Gujarat's public finances. It is important, therefore, for the Government to seek to rationalize expenditures and carefully evaluate standards at which reconstruction of both public and private buildings will take place. While it is the government's intention not to crowd out private sector and individual initiative, it is important that it continue to leave room for private initiatives on the part of the surviving victims themselves, as well as for businesses wishing to share their burden. Public assistance and reconstruction efforts should prioritize those in greater need, and it is important to ensure that public policies and the incidence of public expenditures is pro-poor.
4. **Decentralization:** Community-driven reconstruction must be at the heart of the state's recovery program. Therefore, the development of effective networks that facilitate a necessarily decentralized system for recovery will be key to the success of the program. Decisions to relocate or rebuild *in situ* destroyed villages, for instance, should follow a clear, transparent and participatory approach to assess the wishes of the villagers and discuss the costs of different options. Locally elected bodies, where these exist, should be given a significant role.
5. **Communication and transparency:** Communication and information dissemination are important to the successful and harmonious implementation of the earthquake recovery and reconstruction program. Policy initiatives, financial assistance, and technical know-how will not be effective without a system to convey their content swiftly and equitably to the public, to hear of and assess their suitability and sustainability within communities, and to make appropriate
6. adjustments based on community feedback. There is thus also a need for the Government to devise a communication strategy to support the recovery program and ensure effective dialogue between the government, the public and other partners.