

Annex XII: HAZARD RISK MANAGEMENT

A. Background

1. All the tsunami-affected states are vulnerable to a range of hydro-meteorological hazards such as floods, cyclones and drought, and geophysical hazards like earthquakes, landslides and tsunamis. Depending on location, the risk of hydro-meteorological hazards ranges from moderate to high and that of geophysical hazards from low to moderate. Combined with a growing population, a large section of which remains dependent on climate-sensitive sectors like agriculture and fishing, and other vulnerability factors, this part of the country is categorized as moderate to high disaster risk.

(a) Tamil Nadu

2. Cyclone data over the Bay of Bengal since 1891 indicates that on average, a moderate to severe cyclone hits the Tamil Nadu coast every two years. A number of the state's river basins are prone to floods during the northeast monsoon. Some parts of the state fall in Zone III of the seismic map of India indicating a moderate level of seismicity. The state's hill districts (Nilgiri and Dindugal) are prone to landslides. High population density in the coastal belt, dependence of a large proportion on primary sectors, and inappropriate environmental management in the coastal areas and river deltas make Tamil Nadu a high disaster risk state.

(b) Pondicherry

3. The Pondicherry and Karaikal regions are exposed to cyclones and floods. Climate fluctuations and over-exploitation of ground water resources have exacerbated the recurrence of drought. Although two-thirds of the population is urban, the dependence on agriculture and fisheries remains high and so climate fluctuations and extreme events have great damage potential.

(c) Kerala

4. More than 22 per cent of the state is exposed to flood and more than 8 per cent is landslide prone. Increasingly, despite significant annual rainfall, parts of Kerala are becoming vulnerable to drought. In addition, coastal hazards such as erosion, accretion and possible sea level rise emanating from local environment management practices as well as global changes put a large part of Kerala's coastal population at risk.

(d) Andhra Pradesh

5. Andhra Pradesh is exposed to cyclones, storm surges, floods and droughts. A moderate to severe intensity cyclone can be expected to make landfall every two to three years. About 44 percent of the state is vulnerable to tropical storms and related hazards. Along the coast, the section between Nizampatnam and Machilipatnam is the most prone to storm surges. Traditionally, the flood problem had been confined to the flooding of smaller rivers. But the drainage problem in the coastal delta zones has worsened, multiplying the destructive potential of cyclones and increasing flood hazards. A critical factor is maintenance of irrigation systems. On several occasions, deaths have been caused by breaches in tanks and canals as well as over-flooding caused by silting and growth of weeds.

B. Existing Institutional Arrangements and Capacity Building Efforts

(a) Tamil Nadu

6. The government constituted a state disaster management authority headed by the chief secretary in 2003. The Special Commissioner & Commissioner of Revenue Administration, Disaster Management & Mitigation Department, acts as the Relief Commissioner. In the districts, the district collector heads disaster response operations, drawing upon the human and technical resources of the revenue department, police, fire service and health department. Although a comprehensive “Anti-Disaster Plan” was prepared in 1978, its implementation needs to be strengthened. Emergency response mechanisms at the block and panchayat levels need boosting, and there is an urgent need for integrating disaster reduction in development planning.

7. Six Tamil Nadu districts are covered in the ongoing Government of India-UNDP Disaster Risk Management (DRM) program, whose main objective is to establish sustainable mechanisms for community-based disaster preparedness. The GoI-UNDP Urban Earthquake Vulnerability Reduction Program (UEVRP) focuses on two seismic zone III (moderate risk) cities of Chennai and Coimbatore. The state is host to a range of academic and research institutions focusing on disaster risk management disciplines. It also has a very active civil society.

(b) Pondicherry

8. The Development Commissioner acts as the Relief and Rehabilitation Commissioner. At district and taluk levels, the arrangements mirror those of Tamil Nadu. The fire service is currently upgrading its communication infrastructure and personnel skills.

(c) Kerala

9. The state has recently created a disaster management department headed by a secretary-level officer, and is considering introducing legislation to establish a state disaster management authority. In 2001, it appointed five sub-committees to develop state disaster management plans. The reports of those on water and climate related hazards and on geological disasters have brought together very useful research material. Some districts have prepared district-level disaster management plans.

10. Under UEVRP, three seismic zone III cities with half-million-plus populations – Kozhikode, Kochi and Thiruvananthapuram – are undertaking earthquake vulnerability reduction activities. The natural disaster management faculty at the Institute of Land Management conducts regular training programs for government officials, and the state is host to a number of academic and research institutions that work on coastal environmental management and development issues.

11. Kerala has been a leader in devolving powers and resources to local self-government institutions. Nearly 40% of development funds are spent through village, block and district panchayats, municipalities and corporations. This is an opportunity to integrate risk management with local development.

(d) Andhra Pradesh

12. Systematic efforts to build disaster risk management capacities in the state go back to the early 1980s when the state finalized its first Cyclone Contingency Plan and developed manuals, coordination procedures and training programs, which helped reduce fatalities in subsequent cyclones. In the last decade, the state has undertaken a number of projects and steadily worked towards building disaster risk management capacities in the state.

C. Reconstruction Recommendations

Immediate and short term

13. The tsunami was a rare but high impact phenomenon which has also exposed the vulnerability of coastal populations to other natural hazards. The recovery and reconstruction program is an opportunity to rebuild at higher standards of safety. Disaster risk emanates not only from natural hazards but also from a range of underlying factors – physical, social, economic and cultural – that contribute to people’s vulnerability. In order to enable speedy recovery while reducing future risk, the following may be considered:

Comprehensive multi-hazard risk assessment

14. The affected areas are exposed to a range of frequent natural hazards whose cumulative impact exceeds that of the recent tsunami. A comprehensive multi-hazard risk assessment that identifies the exposed population and physical, economic and cultural assets should form an essential basis for reconstruction planning. A state-wide multi-hazard risk assessment, with tsunami-affected areas being the first priority and corroborated with local assessments, should inform reconstruction decisions and underpin future development plans. These assessments should link with environmental and coastal zone management plans. The affected states possess the technical and human resources to conduct such assessments. A number of institutions are already undertaking this exercise; there is need to establish clear institutional arrangements and mainstream these efforts into the reconstruction planning and implementation process.

Sector guidelines

15. While a multi-hazard risk assessment will guide the overall reconstruction plan, clear risk reduction guidelines should be established sector by sector. Tamil Nadu has already initiated the process of setting design and safety guidelines for the housing sector. Similar guidelines need to be developed for settlement planning, infrastructure, health and education facilities, water and sanitation, and livelihoods.

Community involvement

16. Reconstruction decisions should not only reduce future disaster risks but also meet the day to day social, economic, environmental and cultural needs of the affected communities. Appropriate mechanisms must be developed at the local level to enable the people to articulate their concerns and actively participate in decision making. In Tamil Nadu, the government has already begun collecting primary source information on community preferences about resettlement. As the reconstruction program proceeds, there will be need for much more intensive dialogue at the habitation level.

Partnerships between civil society organizations and local governments could facilitate this process. A comprehensive public awareness and information program is also desirable to develop wider understanding of risks and mitigation options.

Building synergies among different sectors to achieve risk reduction

17. The scale of the recovery and reconstruction effort necessitates a sectoral approach to reconstruction planning and implementation, but it is important that synergies between different sectors are explored to reduce future disaster risk. An integrated multi-sector and where possible area-based approach can help in addressing different dimensions of vulnerability. For example, a community-based approach to shelter reconstruction can help create jobs and diversify livelihood options in the short and medium term. At the same time, it can help propagate disaster resistant building technologies.

Information, communication and public awareness

18. Mechanisms will have to be established that provide timely and relevant information to the affected communities on different aspects of the reconstruction program including policies, plans, procedures and entitlements; and also enable the communities to voice concerns and provide feedback. The reconstruction program also presents an opportunity to raise awareness of other natural hazards and promote appropriate disaster risk management practices.

Medium term issues

Early Warning Systems

19. Efforts are underway at the national and regional levels to establish effective tsunami warning systems. But all the tsunami affected states are prone to a range of hazards that occur with much greater frequency than tsunamis. It is important, therefore, that at the local level the development of early warning systems be looked at in a multi-hazard context. The efforts to generate improved forecasts and warning need to be matched with equal (if not greater) emphasis on effective communication systems public awareness and social infrastructure at the community level so that the warnings can be acted on.

Community based disaster risk management

20. Experience with natural disasters indicates that some of the most effective risk management actions – both anticipatory (reducing future risks) and compensatory (preparedness to respond) – need to be taken at the local level. The reconstruction program presents an opportunity to provide greater impetus to local level risk management and to enhance the emergency response preparedness of the communities.

Cyclone shelters

21. Some cyclone shelters in Tamil Nadu were damaged by the tsunami while most were in a dilapidated condition anyway. A snapshot of Cuddalore district revealed that all 21 cyclone shelters there require significant repair. The total cost of such work in Cuddalore district is estimated to be

Rs. 0.43 crore (\$98,400³⁹). The recovery effort should be used as an opportunity to repair existing shelters, assess the need for additional ones, and create a community-based system to maintain them.

Strengthening emergency response capacities at all levels

22. Fire and rescue services at the district level expressed a need for investment in improving the basic emergency infrastructure, response equipment, and skills of personnel. The recovery and reconstruction effort provides an opportunity to systematically assess the current capacities of emergency services, establish minimum standards based on local hazard risks, and upgrade accordingly. The India Disaster Resource Network (IDRN), a federal database that provides an inventory of disaster response resources available in every district, proved to be of limited use at the district level. The system needs to be re-assessed and in high risk areas, the possibility of devolving it down to the block level may be explored.

Linkages with environment management issues

23. Comprehensive environmental, multi-hazard, coastal zone management and water management assessment and monitoring systems and strategies need to be developed in tandem. Coastal zone regulations and multi-hazard risk assessments form a basis for higher scale planning and implementation, while sound environment and disaster risk management require local actions. The capacities of local governments must be built so that they can play an effective role in this.

24. In the short and medium term \$17.3 million is the estimated requirement for capacity development support as indicated in the table below:

³⁹ For the purposes of currency conversion an exchange rate of Rs 43.5 / US\$ is used.

Table 1. Hazard Risk Management Needs (\$ million)

Components/ Projects	Tamil Nadu	Pondi-cherry	Kerala	Costs
Short term				
Multi-hazard risk assessment in the affected areas in the coastal areas with priority on affected <i>talukas</i>	1.65	0.20	0.30	2.15
Preparation of sectoral risk reduction guidelines (technical guidelines, suggested techno-legal arrangements, process guidance)				0.80
Community based reconstruction planning	1.86	0.16	0.20	2.22
Information, communication and public awareness	1.30	0.20	0.40	1.90
Mechanisms for dissemination of Early Warning Systems in the coastal districts	0.52	0.08	0.40	1.00
Sub Total	5.33	0.64	1.30	8.07
Medium term				
Multi-hazard risk assessment in unaffected but vulnerable Areas	0.85	0.10	0.65	1.60
Capacity Building at the village, block and district levels for Early Warning Systems in the coastal districts	0.68		0.12	0.80
Community based disaster risk management programs	1.50	0.10	0.65	2.25
Disaster risk information systems	1.50	0.10	0.65	2.25
Studies/ pilots on state specific studies on risk transfer mechanisms	1.50	0.10	0.65	2.25
Sub Total	6.03	0.40	2.72	9.15
TOTAL	11.36	1.04	4.02	17.22

25. Funding will also be required for disaster risk management related infrastructure (communication system for early warning system, construction of cyclone shelters and strengthening emergency services in coastal districts). Quantification of such funding will have to be made through detailed risk and vulnerability studies and other studies on coastal management which the assessment mission has recommended.

Long term issues

Strengthening institutional, techno-legal and techno-financial arrangements for disaster risk management systems in the affected states

26. The reconstruction and recovery effort is an opportunity to strengthen existing or establish new institutional, legislative and financial arrangements for comprehensive disaster risk management building on the progress made in India and especially in the affected states in the last five years.

Integrated climate risk management

27. Analyzing the risks of negative outcomes of natural fluctuations in the climate and weather systems over a variety of time scales will allow a linkage to be made between present-day concerns over the alarming increase in climate-related losses and more nebulous but real concerns about potential losses in the future when climatic averages are expected to have shifted. Strengthening national and local capacities to manage existing climate risks is key to developing capacities for adapting to future climate change.