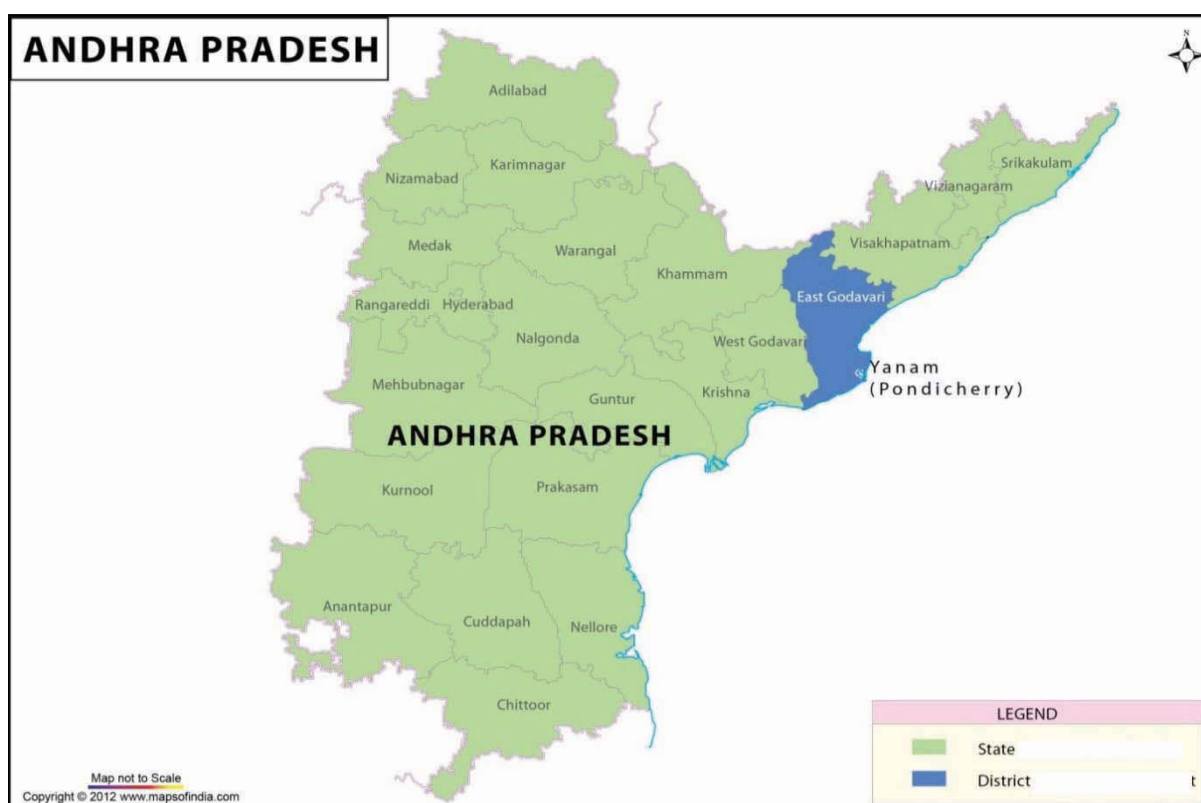


## Chapter – X: State/UT Specific Findings

### State: Andhra Pradesh

#### 1 Background

Andhra Pradesh with a 1030 km long coastline covers 274,000 sq km on the east coast of India and is the country's fifth largest state, accounting for 8.4 *per cent* of its total area. The state is vulnerable to major natural disasters like cyclones, floods and earthquakes, as well as to industrial and chemical hazards.



Map 10.1: Andhra Pradesh

**1.1 Vulnerability Profile of the state:** The major vulnerabilities to disasters in the state are categorized below:

**Cyclones and Floods:** About 44 *per cent* of its total territory is vulnerable to tropical storms and related hazards. The coastal region suffers repeated cyclones and floods.

**Earthquakes:** 34 *per cent* of the state falls in zone III<sup>1</sup>. Major urban centers of the state with mushrooming apartments and commercial complexes are Hyderabad (zone II), Visakhapatnam (zone II) and Vijayawada (zone III). Other important towns which fall in zone III are Tirupati, Nellore and Cuddapah.

<sup>1</sup> Source: Categorised as per Seismic Zone map of India given in the earthquake resistant design code of India [IS 1893 (Part 1) 2002]

**Droughts:** Eight districts in the state (out of total 23) are particularly vulnerable to drought viz., Anantapur, Chittoor, YSR (Kadapa) and Kurnool in Rayalaseema region; Rangareddy, Mahabubnagar and Nalgonda in Telangana region; and Prakasam in coastal areas.

The details of major disasters in the state in the last decade are given in **Annex-10.1**.

## 2 Institutional Arrangements in the state

The State Disaster Management Authority (SDMA) was constituted in the state in November 2007. The District Disaster Management Authorities (DDMAs) headed by the District Collector were also constituted in November 2007.

In Andhra Pradesh, Commissioner for Disaster Management and Ex-Officio Principal Secretary provides guidance and coordinates with other line departments for disaster preparedness work in accordance with the guidelines laid down by NDMA. The department is also responsible for preventive, relief and rehabilitation activities in the state. It is the nodal agency in planning and coordinating with other departments in prevention and relief measures for disaster management.

**East Godavari district was selected in the state to assess district level preparedness.**

## 3 Observations on Disaster Preparedness

- a. Though the state level and district level authorities were established in 2007, we noticed gaps in their functioning. There were only three meetings of SDMA, SEC and DDMA's in selected districts during the five years covered in audit.
- b. The state level plan was at the draft stage.
- c. We noticed irregularities in the management of State Disaster Response Fund. These included diversion of funds (₹ 3.29 crore), non remittance of fund (₹ 46.49 lakh), non reconciliation and non submission of utilisation certificates (₹ 4024.38 crore). (Para nos. 5.1.3, 5.1.4 and 5.1.5)
- d. No mapping of roads in vulnerable areas in the test checked district was done by the Roads and Building Department. Consequently, no measures were taken to identify vulnerable roads and alternative routes in the test checked district.
- e. The Master Plan of Kakinada town prepared in 1977 was required to be revised every 20 years. However, no revision had taken-place so far.
- f. In Hyderabad, 144 buildings were identified as dilapidated, of which only 5 were demolished. (Para no. 9.1.7.2)
- g. We found that out of 168 cyclone shelters constructed, 99 shelters were not in usable condition. (Para no. 9.3.6.5)

- h. Out of the 343 safety audit reports of Major Accident Hazard units for chemical safety due in the last five years, only 211 reports were received. Off-site emergency plans were prepared for only 11 out of the 23 districts. These off-site plans were also not updated since 2007. (Para no. 9.6.7.1)
- i. Fund utilisation ranged between 47 and 89 *per cent* during 2007-11 under 'Intensification of Forest Management'. The funds provided in 2011-12 were not at all utilized by the state. (Para no. 9.5.6)
- j. In drought affected areas substantial delays in providing funds were noticed during 2011-12. (Para no. 9.4.5.2)
- k. Funds amounting to ₹ 6 crore received from the Government of India towards capacity building were not utilised. We noted that mock drills for chemical safety for off-site emergency plans were conducted only in two districts. (Para no. 8.3.1)

### **On a positive note:**

- Individual action plans of the line departments were in place. The action plans were reviewed and updated regularly.
- The line departments at the district levels had formed their teams for relief operations.
- For recurring disasters in the state, the vulnerability profile was adequate.
- Periodical returns on physical and financial performance of various departments had been furnished by the District Authorities to the Commissioner for Disaster Management.

## State: Gujarat

### 1 Background

Gujarat is vulnerable to all major natural hazards (drought, flood, cyclone, earthquake, tsunami, etc.). Vulnerability to disasters/emergencies of chemical, radiological and nuclear origin also exist.



Map 10.2: Gujarat

**1.1 Vulnerability Profile of the state:** The major disaster vulnerabilities in the state were categorized as under:

**Earthquakes:** In the seismic zoning map of India, earthquake hazard levels in Gujarat varied from moderate to high i.e. zone III to V. The cities of Ahmedabad, Bharuch, Rajkot and Bhavnagar fell in severe intensity zone, while Bhuj and Jamnagar fell in very severe intensity zone.

**Tsunami:** Gujarat was prone to tsunami risk due to its long coastline and probability of occurrence of near and offshore submarine earthquakes in Arabian Sea. Tsunami prone areas in the state included coastal villages of Kutch, Jamnagar, Rajkot, Porbandar, Bhavnagar, Anand, Ahmedabad, Bharuch, Surat, Navsari and Valsad districts.

**Droughts:** Substantial portion of the state was arid and semi-arid. Large parts of North Gujarat and Saurashtra had no sources of alternate irrigation. Drought vulnerability was also

increasing due to over exploitation of ground water. Falling water tables had put added stress on crops and water supplies.

**Floods:** Large areas of Gujarat were prone to flood and river erosion.

**Chemical disasters:** There was constant threat of chemical disasters as 35 *per cent* of the total Major Accident Hazard units of the country were located mostly at Vapi, Hazira, Ankleshwar, Dahej, etc.

The details of major disasters occurred during the last decade are given in **Annex 10.2**.

## 2 Institutional Arrangements in the state

Gujarat State Disaster Management Authority (GSDMA) was constituted in February 2001. It is the apex body for disaster management in Gujarat. The Authority is responsible for disaster preparedness, mitigation and assessment work for all types of disasters, natural or man-made. However, post disaster management rested with the State Commissioner of Relief.

Gujarat was the first state in India to have enacted an Act to provide a legal and regulatory framework for disaster management. GSDMA formulated a 'Disaster Management Policy' in September 2002. The 'Gujarat State Disaster Management Act' came into force in May 2003. As per the State Act, the District Collector was notified as the Authority for planning, coordinating and implementing the Disaster Management activities at the district level. District Collectors were also designated as Joint Chief Executive Officers of GSDMA. They were vested with emergency powers to undertake all the activities pertaining to DM including monitoring and implementation of policy and plans.

**Bharuch, Jamnagar and Kutch districts were selected in Gujarat to assess district level preparedness.**

## 3 Observations on Disaster Preparedness

- a. We noted that only two meetings of SDMA were held in August 2007 and August 2010 during the last five years. The State Act came into force two years before the National Act; hence, it is not in conformity with it. No amendments were carried out to ensure compliance with the provisions of the National Act.
- b. The state formulated a draft State Disaster Management Plan, which was approved only in July 2012.
- c. Emergency operation groups to address the immediate impact of the incident were not created. Five Regional Emergency Response Centres (ERCs) were conceptualised at different location; however the construction for all ERCs buildings were incomplete except at Rajkot. We also noted that rescue equipment for ERCs

amounting to ₹ 97.70 crore were procured in 2008 and 2009 without completion of buildings.

- d. We noticed irregularities in the management of State Disaster Response Fund. These included inadmissible expenditure (₹ 236.95 crore), non investment of the unspent funds resulting in loss of interest amounting to ₹ 189.86 crore and delay of two to eight months in actual remittance of central share. (Para nos. 5.1.2, 5.1.3 and 5.1.5)
- e. Under NCRMP, GSDMA identified 175 shelters to be built in 12 selected districts. The construction work had not yet started. (Para no. 9.3.6.2)
- f. In the three selected districts, we noticed that there were 57 men-in-position against the sanctioned strength of 112 personnel in the Fire and Emergency Services wing of the Municipality. (Para no. 7.4.4)

### **On a positive note:**

- GSDMA formulated 'Disaster Management Policy' for Gujarat in September 2002 which was in force.
- Early warning systems and mechanisms were in place. The types of disasters, their frequency and intensities have been comprehensively identified. This was part of the Hazard Risk and Vulnerability Atlas (HRVA) of the state up to taluka level.
- During 2007-12, Gujarat Institute of Disaster Management conducted 152 training programmes covering 3808 participants.
- During last three years, mock-drills were carried out in 278 districts, 637 talukas, 2372 villages and 381 municipalities.

## State: Maharashtra

### 1 Background

Maharashtra has a coast line of 720 Km with 35 creeks. The state has to guard against coastal security threats, cyclones, floods and other related disasters.

Due to floods and torrential rain 1100 people died in Maharashtra during July and August 2005. Again in 2006 the state witnessed floods during monsoon in which more than 400 people died.



Map 10.3: Maharashtra

**1.1 Vulnerability Profile of the state:** The major vulnerabilities to disasters in the state were categorized as under:

**Earthquakes:** Most of Maharashtra is covered by the Deccan traps, which is a sequence of basalt flows<sup>2</sup> formed about 65 million years ago. Maharashtra and the adjoining regions are prone to earthquakes of moderate magnitude. Koyna region experienced the maximum number of tremors in Maharashtra. Excluding the Koyna region, and other regions of Killari, Khardi (Bhatsa) and Medhi (Surya), the districts of Beed, Raigad, Thane and Nanded periodically witnessed intermittent subterranean acoustic emissions.

<sup>2</sup> A flood basalt or trap basalt is the result of a giant volcanic eruption or series of eruptions that coats large stretches of land or the ocean floor with basalt lava.

**Cyclones:** The coastal areas were prone to cyclones risks and the state has a coastal belt of over 720 km between Gujarat and Goa. Thus the Konkan region including Mumbai is prone to cyclones. There are 386 marine fishing villages/hamlets with 17,918 boats, engaged in fishing in this coastal belt. In the Arabian Sea, during the period 1890-1995, 207 depressions/cyclonic storm/severe cyclonic storms were recorded of which 19 affected the Maharashtra-Goa coast. Mumbai being a coastal city faced many threats of cyclones in the recent past. It had faced peripheral cyclonic impact in 1982, 1988 and October 1996 and had been hit by cyclone on two occasions (1948 and June, 1996).

**Floods:** All districts of the state are flood prone. Ahmednagar, Beed, Solapur, Latur, Osmanabad, Jalna, Aurangabad, Buldhana are moderately flood prone. There were about 300 rivers having an aggregate length of about 19200 km with an almost equal aggregate length of very small rivers and defined nallas. Among them, Godavari, Wainganga, Krishna, Bhima, Tapti, Narmada are the major rivers/ tributaries. In Konkan, there were 22 main west flowing rivers which joined the Arabian Sea.

**Tsunami:** Mumbai had not experienced a major tsunami in recorded history. There is no historical data or scientific study indicating significant tsunami risk to Maharashtra. The tsunami event of 1945 which happened as a result of the great Makran earthquake could therefore be taken as the reference level for tsunami management planning. A two meter tsunami wave, if occurring during high tide, can result in very high waves due to the strong tidal action in Arabian Sea.

## 2 Institutional Arrangements in the state

SDMA was constituted in the state in May 2006. The State Government constituted DDMA's for 33 districts of the state in June 2006. Greater Mumbai Disaster Management Authority (GMDMA) for Mumbai City and Mumbai Suburbs was however, constituted only in January 2011.

The Revenue and Forest Department through its Relief and Rehabilitation (R & R) Division is responsible for overseeing the implementation of disaster management programme in the state. The line departments such as Public Health, Environment, Home, Agriculture department were designated as nodal departments for different types of disasters at the state level, which coordinated with the R & R Division for effective implementation of disaster management. R & R Division issued instructions to District Collectors through Divisional Commissioners, who were responsible for implementation of disaster management in the district. District Collector issued instructions to Tehsildars and other heads of line departments at taluka level for disaster management.

Sindhudurg district was selected by us for this audit. On 21 June 2012 there was a fire in the State Secretariat building at Mumbai while our audit was underway. As a result, the State Government could not provide many details relating to disaster preparedness. Our report therefore, does not contain information regarding the working of the SDMA. We focused on the District Authority of Sindhudurg and GMDMA to assess the district level preparedness.



### 3 Observations on Disaster Preparedness

- a. The State Government had prepared its Disaster Management Plan in 1998. However, the SDMP and DDMP of Sindhudurg district did not ensure incorporation of generic categorisation of disasters (L0, L1, L2 and L3 with increasing severity) nor specific plans by various departments to handle different disasters.
- b. We noticed irregularities in the management of State Disaster Response Fund. These included inadmissible expenditure (₹ 3.26 crore) and under utilisation of fund (₹ 20.29 crore). Sindhudurg district could utilise only ₹ 0.24 lakh out of ₹ 64.75 lakh for mitigation activities. The district had also not utilised the allotted funds under DRM and DRR activities. (Para no. 5.1.3)
- c. We noted that the Development Control Regulations, 1991 for Mumbai city was based on the erstwhile National Building Code. These were not updated on the lines of the National Building Code, 2005 to provide safeguards against natural hazards.
- d. In Sindhudurg district, Geographic Information System based emergency planning and response system did not exist and the Collectorate did not have a satellite phone. Lifeline structures, cyclone shelters, multipurpose evacuation centres, etc., were not identified to cope with emergency situations.
- e. There was no plan in the district to address the post disaster disease surveillance, networking with hospitals. (Para no. 7.5.7.1)
- f. The State Government under Modernisation of Police Force Programme of 2005-07, 2007-08 and 2008-09 sanctioned procurement of Total Containment Vehicle (₹ 6.24 crore), Robot (₹ 2.14 crore) and Bomb Suits (₹ 6.22 crore) to increase the operational efficiency of Bomb Detection and Disposal Squad in Mumbai. The equipment were however, not procured (August 2012).
- g. We noted that three mock drills were held in 2007-08, one in 2008-09 and no mock drill was conducted thereafter. No reports in this regard were sent to the State Government.

#### On a positive note:

- In May 2012, the Chief Minister chaired two meetings to review Mumbai city and Suburbs and district level Pre-monsoon preparedness meeting. These meetings were organized to coordinate the work of the state and Central organisations for monsoon preparedness.
- In Sindhudurg district Standard Operating Procedures (SOPs) were prepared for dealing with different disasters which contained action to be taken starting from receipt of early forecasts and warnings.

## State: Odisha

### 1 Background

Odisha a state on the eastern coast of India, in view of its geographical characteristics, encountered flood, cyclone, drought, etc., almost every year. The state was struck by a super cyclone in October 1999 in which over 8000 human lives were lost. Recurring floods cause a lot of damage to the state.



Map 10.4: Odisha

**1.1 Vulnerability Profile of the state:** The major vulnerabilities to disasters in the state are categorized as under:

**Tsunami:** The Sumatra fault zone and tectonic plate setting along the Andaman & Nicobar Islands and Burma Micro plate boundaries in the eastern part of the Bay of Bengal pose potential threats of tsunami for the coast of the state. According to assessments, 266 villages of different districts were vulnerable to tsunami.

**Floods:** The 482 km long coastline exposed the state to flood, cyclones and storm surges. Heavy rainfall during monsoon caused floods in the rivers. Rivers of the state and their many tributaries and branches posed serious flooding risks.

**Earthquakes:** A large portion of the state comes under earthquake risk zone-II. The Mahanadi and Brahmani graven, Mahanadi delta and parts of Balasore and Mayurbhanj district come under earthquake risk zone-III. 43 urban centers with a population of nearly 27 lakh fall under earthquake risk zone-III.

Major natural disasters that affected the state during 2007-12 are given in **Annex 10.3**.

## 2 Institutional Arrangements in the state

After the super cyclone of 1999, the State Government set up (December 1999) Odisha State Disaster Management Authority (OSDMA) as an autonomous body headed by Chief Secretary. After DM Act, SDMA was established in October 2010 with the Chief Minister as the Chairperson and DDMA's were established in November 2010 with the responsibility of prevention, mitigation and management of disasters. SEC was constituted in December 2010 to assist SDMA.

The office of the Special Relief Commissioner (SRC), Odisha under the Revenue and Disaster Management Department (RDMD), acted as the Secretariat of SDMA. The Special Relief Commissioner took decisions at the time of natural calamities.

**Baleswar, Bhadrak and Dhenkanal districts were selected in the state to assess district level preparedness.**

## 3 Observations on Disaster Preparedness

- a. SDMA, constituted in 2010, had not met since its inception. Further, SRC did not take any initiative to convene the meeting of SDMA.
- b. SDMP was not prepared even after lapse of more than six years of the DM Act. NDMA had also released ₹ 10.63 lakh to the state in January 2010 for this purpose. Despite the availability of sufficient funds, the state could not formulate its DMP as yet.
- c. State Disaster Management Policy formulated in March 2005 did not include man-made disasters. The Policy also lacked the following aspects of (i) adoption of safe construction practices, (ii) retrofitting of life line buildings, (iii) owner driven reconstruction practices, and, (iv) provision to generate temporary lively hood option for the affected community.
- d. The State Crisis Management Committee for dam safety under chairmanship of Chief Secretary had not been formed in the state.
- e. We noticed irregularities in the management of State Disaster Response Fund. These included inadmissible expenditure (₹ 53.83 crore), non investment of the unspent funds resulting in loss of interest amounting to ₹ 25.16 crore during the year 2008-09

to 2011-12 and non-submission of utilisation certificates for ₹ 526.42 crore by the agencies, departments, OSDMA etc. for the period ranging from one to five years (March 2012). (Para nos. 5.1.2, 5.1.3 and 5.1.5)

- f. SEOC and DEOCs were established but these had not been provided with exclusive manpower for their smooth operation.
- g. Risk Management Plan having early warning indicators had not been prepared by the state. Out of 220 Automated Weather Communication Systems (AWCS) planned, only 37 AWCS were set up. Of these, seven AWCS were not functioning properly.
- h. 15 Very High Frequency (VHF) sets placed at the District Emergency Operations Centre and blocks were not working.
- i. Government of India released grant of ₹ 66.91 lakh in March 2011 for strengthening of State Emergency Operation Centre and District Emergency Operations Centre. We noted that ₹ 43 lakh had been utilized for providing the required equipment and human resource support for state and district EOCs. Another ₹ 10 lakh had been provisioned for Video Conferencing facility. Stand-by SEOC could not be set up due to administrative delays.
- j. Odisha Disaster Rapid Action Force was not a composite unit including police, engineering and medical staff. It consisted only of personnel from the State Armed Force.
- k. We noted that adequate food grain reserves were not maintained and relief rice (meant for 10 days relief to BPL families) for the flood of September 2011 was supplied by Odisha State Civil Supply Corporation to flood affected districts only in March 2012. (Para no. 9.2.5.2)
- l. Rescue items at 114 cyclone centres were either non functional or passed their useful life. This included life buoys, the life jackets and fibre ropes which were not replaced till June 2012. Two satellite phones supplied to Jagatsinghpur and Cuttack districts remained out of order.
- m. We noted that adequate steps were not taken to amend the building bye-laws and regulation as a step to make urban areas disaster resilient. In the selected districts, no amendment had been made in their building regulations. (Para no. 9.1.7.3)
- n. The training on search and rescue was given to only 153 fire-service and police personnel during the period 2008-12 at the state level and 2775 local people at 111 Multipurpose Cyclone Shelter level during 2008-09. The other lead agencies like Home Guards, Medical, NCC, NSS, NYKS, and revenue personnel were not given any such training at the state or district level. During the year 2007-12, only five mock drills were conducted at four locations by the ODRAF personnel as a preparatory measure. (Para no. 8.3.2)

- o. No periodic joint inspections were conducted to monitor the conditions of equipment supplied to the cyclone shelters, flood shelters and DEOCs and availability of operators or trained personnel.
- p. The state had not prescribed Standard Operating Procedure with defined roles and responsibilities of each nodal agency to deal with particular disaster.

### **On a positive note:**

- After super cyclone of 1999, a number of measures were taken for strengthening the institutional framework considering lessons learnt from previous experiences.
- Disaster Management Information System was available with the management to analyze the risks. The state had established its own MIS for analyzing intensity of rainfall and areas of risk from the information received through the districts from 177 rain gauges stationed at different locations.
- 35 cyclone warning dissemination systems were installed in the coastal districts, 37 Automated Weather Systems for predicting weather related calamities, and 177 rain gauges stationed at different locations for predicting intensity of rainfall were installed.

## State: Rajasthan

### 1. Background

Rajasthan faced severe water scarcity, had poor rainfall, and was classified as an arid and semi-arid region. Geographically, deserts in the state constituted a large share of landmass. With 10.4 per cent of the country's area and 5.5 per cent of its population, Rajasthan had only about one per cent of the country's water resources. On the basis of climatic conditions and agricultural practices, Rajasthan was divided into 10 agro-climatic zones ranging from arid western to flood prone eastern.



Map 10.5: Rajasthan

**1.1 Vulnerability Profile of the state:** The major disaster vulnerabilities in the state were categorized as under:

**Droughts:** Low rainfall coupled with erratic behaviour of the monsoon in the state made Rajasthan most vulnerable to drought. Drought invariably had a direct and significant impact on food production and the overall economy of the state.

**Floods:** The state was generally deficit in rainfall, yet it also experienced flood in many areas during monsoon period due to its erratic behavior. The flash flood in Jaipur, Loonkransar and many other places caused heavy damage.

**Earthquakes:** Earthquake hazard in the state was moderate. The state fell under earthquake zone II (Low damage risk zone), III (Moderate damage risk zone) and IV (High damage risk zone). Some areas of districts of Jalore, Sirohi, Barmer and Alwar districts fall in zone IV whereas many parts of Bikaner, Jaisalmer, Barmer, Jodhpur, Pali, Sirohi, Dungarpur, Alwar and Banswara fall in zone III. The remaining districts come under zone II. Earthquakes of magnitudes ranging from 5 to 7 occurred within the state and close to its boundary in the past.

The details of major disasters or emergencies in the last decade are at **Annex-10.4**.

## 2 Institutional Arrangements in the state

State Disaster Management Authority was established in September 2007. DDMA's in all the districts of the state were established in September 2007. State Executive Committee was constituted in the state in October, 2007.

The Commissioner of Revenue Administration, Disaster Management and Mitigation (State Relief Commissioner) is responsible for preventive, relief and rehabilitation activities in the state. He acts as the nodal agency in planning and coordinating with other departments for disaster prevention and relief measures.

**Barmer and Jalore districts were selected in the state to assess district level preparedness. Both these districts fall under Multi Hazardous Zones and are vulnerable to drought, flood and earthquake.**

## 3 Observations on Disaster Preparedness

- a. The State Government had not provided separate staff and office building to SDMA to carry out its functions efficiently. The work of the authority was being executed through the staff of Disaster Management and Relief Department (DMRD) in the DMRD premises.
- b. Advisory Committee for SDMA was not constituted. SDMP had not been finalized and State Policy for Disaster Management was also at draft stage.
- c. The test checked DDMA's did not have their own establishment. The work of the authority was executed through the staff provided by the respective Collectors.
- d. District Advisory Committees had not been constituted till May 2012. District Disaster Management Plans for test checked districts were not approved.
- e. We noticed that state had not invested unspent State Disaster Response funds which resulted in potential loss of interest of ₹ 65.21 crore during 2008-10. (Para no. 5.1.2)

- f. We noted that the state EOCs are not working properly. EOC in Barmer district was operated by the staff of education department in the conference hall of the Collectorate premises. Similarly, the EOC in Jalore district was operated by the Collectorate staff in Collectorate premises.
- g. There was an approved budget of ₹ 65.47 lakh for the UNDP-DRR project. Out of this only ₹ 26.18 lakh was released in July 2010 and only ₹ 0.17 lakh was utilised by the state.
- h. We noted that various activities for institutional strengthening, capacity building and mainstreaming for development were not executed in the state for reduction of Disaster Risk.
- i. We noted that the communication and medical equipment purchased from CRF were not installed.
- j. In September 2009, 17 High Band Frequency (HBF) wireless sets of 20 watt and 7 sets of 2 watt were supplied to Superintendent of Police (SP), Barmer for easy and early communications in case of any disaster. Of these, 14 wireless sets of 20 watt and three 2 watt sets were lying uninstalled (May 2012). The SP stated in May 2012 that uninstalled wireless sets were lying in sub store, Barmer and process of their distribution would be started soon. Similarly, in April and May 2009, 18 HBF wireless sets of 20 watt and 7 sets of 2 watt were supplied to SP, Jalore. Of these 17 sets of 20 watt and 2 sets of 2 watt were lying uninstalled as of May 2012.
- k. No formal training programmes had been organised for the training of teachers in the state on school safety and disaster management. Central assistance released for capacity building for State Disaster Response Force was mis-classified to avoid lapse of funds during 2010-12. (Para no. 8.3.1)
- l. We noted that at DMRD, Barmer and Jalore, there were no annual progress reports/ periodical returns in respect of prevention, preparedness and mitigation of disasters activities executed in the district.

**On a positive note:**

- Hand books were prepared at district/divisional level giving information about early warning systems, area prone to flood/cyclone and relief centers.
- Necessary arrangements were made in advance for power supply restoration during disaster.
- Availability of drinking water and maintaining hygiene and sanitation was ensured by the Public Health Engineering Department of the districts.

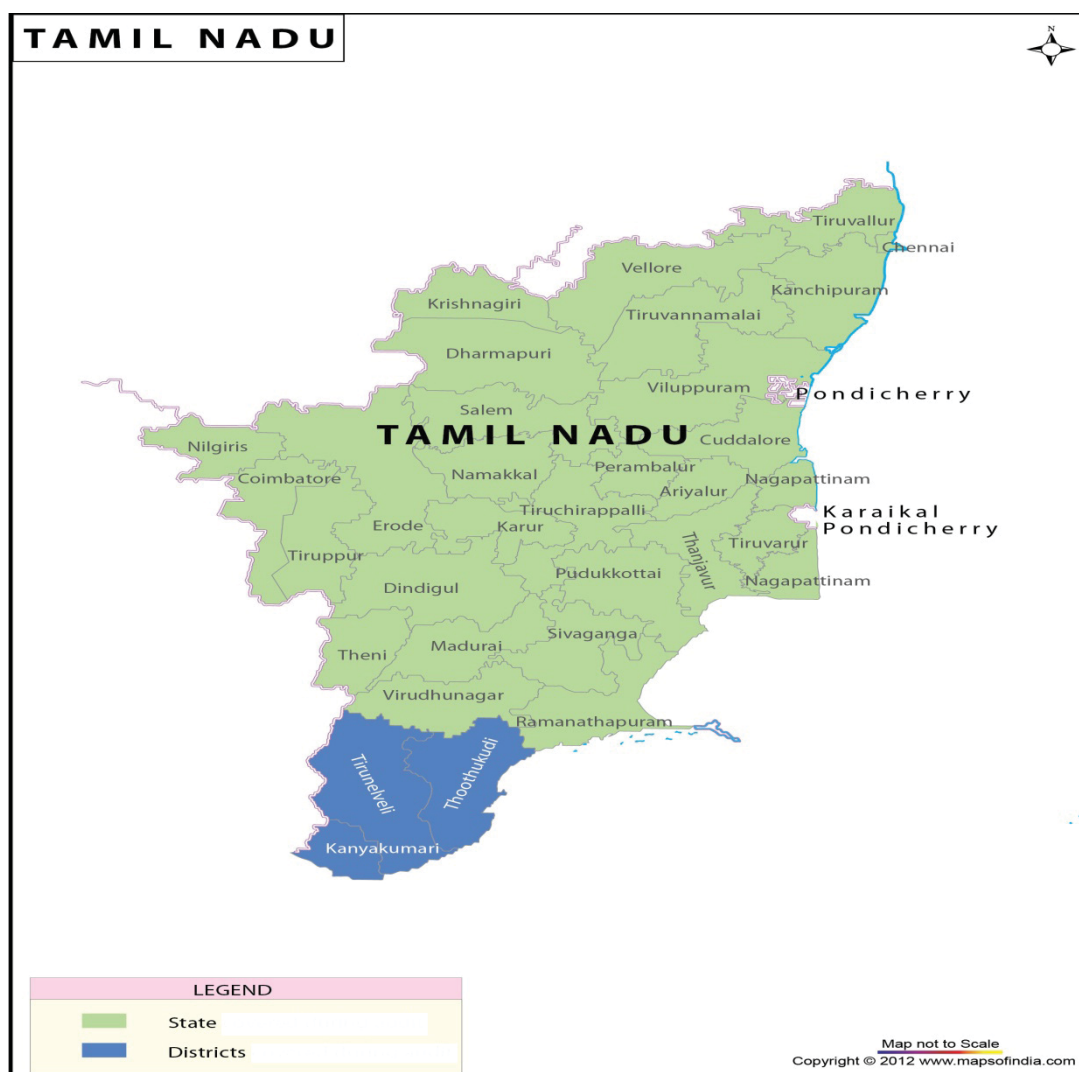


## State: Tamil Nadu

### 1 Background

Tamil Nadu has a long coastline of about 1076 km. Moderate to severe cyclones hit its coast during the north east monsoon period. A number of river basins are prone to floods during the monsoon. The state's hill districts (Nilgiris and Dindigul) are prone to landslides. High density of population in the coastal belt, dependence of a large proportion on primary sectors and environmental issues in the coastal areas and river deltas make the state a high disaster risk state.

Cyclone Nisha in November 2008, a major landslide in November 2009 and Cyclone Thane in December 2011 were the major disasters that occurred in the state in the recent time.



Map 10.6: Tamil Nadu

**1.1 Vulnerability Profile of the state:** The major disaster vulnerabilities in the state are categorized as under:

**Earthquakes:** Though not as seismically active as states in the northern and western parts of the country, small to moderate earthquakes occurred in Tamil Nadu. The State Capital, Chennai falls in seismic zone III.

**Cyclones:** The state was frequently subjected to devastation by natural calamities due to cyclonic storms and flooding due to its location in a highly vulnerable part of Peninsular India. During 1900-2009, 50 cyclonic storms of which 26 were very severe ones crossed the coast of Tamil Nadu. There are 13 districts situated in eastern coastal stretch of the state and there are 25 blocks situated at the coastal line. On an average, the state faces one or two severe cyclones in the Northeast monsoon period. Even during the non cyclonic phase, the state received copious rainfall as a result of formation of low pressure and depressions in the Bay of Bengal. The low pressure and depressions so formed, lasts for at least three to four days bringing intense rains causing large scale flooding and inundation in the vulnerable areas.

**Tsunami:** The state is also prone to tsunami and in 2004 tsunami affected the coastal areas of the state. The impact was severe as more than 10000 people died in the affected states with 7996 deaths in Tamil Nadu.

**Droughts:** There was severe drought in 2002-03 and in 2003-04 affecting most of the districts of the state.

**Landslides:** During North East monsoon 2009, the state received heavy rainfall and as a result, there were 899 landslides in Nilgiris district. During North east monsoon 2010, there was very heavy rainfall which led to heavy loss of life and property.

The details of major disasters or emergencies during last decade are in **Annex-10.5**.

## 2. Institutional Arrangements in the state

SDMA was constituted in September 2008 and DDMA's were established in January 2012. The Commissioner of Revenue Administration, Disaster Management and Mitigation Department who was also the State Relief Commissioner was responsible for preventive, relief and rehabilitation activities in the state. He acted as the nodal agency in planning and coordinating with other departments to take measures for relief, rescue and restoration before, after and during the period of disasters. The District Collector acted as the nodal agency at the district level.

**Thoothukudi, Tirunelveli and Kanyakumari districts were selected in the state to assess district level preparedness.**

## 3 Observations on Disaster Preparedness

- a. SDMA was constituted in September 2008 but it did not meet even once. SEC was constituted in January 2009 but it met only once in June 2009 and no meetings were

conducted during the years 2010-11 and 2011-12. DDMA's were constituted in January 2012, after a delay of six years but did not meet even once.

- b. Neither SDMP nor State Disaster Management Rules were prepared. The State Government also did not ensure preparation of disaster management plans by different departments of the states in accordance with the guidelines issued by NDMA.
- c. We noticed that in Tirunelveli district, interest earning of ₹ 22.85 lakh on unspent balance of relief for natural calamities during June 2008 to December 2011 was not remitted back into government account.
- d. No dedicated man power was sanctioned for EOCs at the selected districts. Communication from the district EOC to the state EOC was not possible through VHF communication and the only all weather reliable communication available was the micro wave communication of the police. A police man with VHF set was posted in the test checked districts only during October to December every year to receive phone calls.
- e. Tuticorin district with a coastal length of 163.5 km and about 21 fishing villages did not have a patrolling boat. There was no early warning system in any of the coastal villages.
- f. Approval for construction of 121 multipurpose evacuation shelters at a cost of ₹ 262.86 crore was given in December 2011. The construction of cyclone shelters was in progress as of September 2012. (Para no. 9.3.6.4)
- g. The State Government had not provided the state and District Disaster Management Authorities with adequate staff. The Disaster Management Cells in the test checked districts were manned by only one assistant each.
- h. Funds of ₹ 5 crore released to DM cell for capacity development meant for the year 2010-11 were neither utilised nor surrendered. Mock drills and community awareness for earth quake were not contemplated. (Para no. 8.3.2)

### **On a positive note:**

- 264 senior level officers of various departments of the State Government were imparted training at NIDM.
- As a part of public education and community awareness and in order to sensitize the people, puppet shows and street plays on disaster management were conducted in the state.
- Arrangements were made to keep adequate stock of relief material in the selected districts of Kanyakumari, Tuticorin and Tirunelveli. Directions to inspect dams, embankments, and other structural measures before monsoon were issued for flood preparedness.

## State: Uttarakhand

### 1 Background

Uttarakhand due to its complex terrain and ongoing tectonic activities is highly prone to hazards like earthquakes, landslides, cloud bursts, and flash floods. The state also experienced a large number of forest fires and road accidents every year.



Map 10.7: Uttarakhand

**1.1 Vulnerability Profile of the state:** The major disaster vulnerabilities in the state were categorized as under:

- **Earthquakes:** Earthquakes were the most devastating disaster in the mountains. Out of the 13 districts in the state, four districts fell completely and five partially in Zone V of the Earthquake Risk Map of India. The remaining parts of the state fell in Zone IV. However, no major earthquake after Chamoli (1999) was experienced in Uttarakhand. In the last five years (2007 onwards), Uttarakhand also experienced a series of landslides and cloud bursts.
- In the last five years, there was a loss of 653 human lives due to various disasters. Twenty seven *per cent* of these casualties were due to landslides, 21 *per cent* from hailstorm, storm and epidemics, 28 *per cent* from excessive rain, 18 *per cent* from earthquake and cloudburst, two *per cent* from avalanche and four *per cent* were from fire accidents.

The details of major disasters or emergencies during last five years are in **Annex-10.6**.

## **2 Institutional Arrangements in the state**

As envisaged in the DM Act, the State Disaster Management Authority (SDMA) headed by Chief Minister and eight other members, was constituted (October 2007). State Executive Committee (SEC) was formed in January 2008. The District Disaster Management Authorities were also set up in all the districts.

The Department of Disaster Management is the nodal department in the state, responsible for coordinating and implementing all disaster management related affairs. The department also had an autonomous institution namely Disaster Mitigation and Management Centre (DMMC) for undertaking disaster related studies and for providing technical support to the department. DMMC was also responsible for managing the State Emergency Operations Centre (SEOC), throughout the year.

**Nainital district was selected in the state to assess district level preparedness.**

## **3 Observations on Disaster Preparedness**

- a. In the state, the frequency and intensity of various disasters had not been identified.
- b. SDMA, although constituted in October 2007, had not formulated any rules, regulations, policies and guidelines. SEC was formed in January 2008 but never met since its creation. DDMA was constituted in Nainital in December 2007. Since inception, DDMA met only twice (April and May 2011). Thus, the state authorities were virtually non functional.
- c. The State Disaster Management Plan was under preparation and actionable programmes were not prepared for various disasters.
- d. We noticed irregularities in the management of State Disaster Response Fund. These included non investment of funds which resulted in potential loss of interest of ₹ 9.96 crore during 2007-2012. There were delays ranging from 80 days to 184 days in the release of the central share during 2007-11 and no funds were released in 2011-12 as the State Government did not submit utilisation certificates and Annual Report of Natural calamity. (Para nos. 5.1.2 and 5.1.5)
- e. No plan was prepared in the state for early warning. The communication system was inadequate. This resulted in delayed information to vulnerable population. (Para no. 6.3.3)
- f. Hazard Safety Cell of the State Government had so far identified 7374 buildings in three cities out of which 1109 buildings were found to be vulnerable to moderate earthquake. These buildings needed to be retrofitted, but no such measures were taken. (Para no. 9.1.7.5)

- g. Geological Survey of India in June 2008 identified only 101 villages as vulnerable out of 233 disaster affected villages. No measures were taken by the State Government for their rehabilitation, despite a lapse of four years after their identification.
- h. The State Government did not sanction any post for the State Disaster Management Authority which affected the establishment of the Management Information System. In DEOC (District Emergency Operation Centre) at district level, there was an acute shortage of manpower. In 13 districts, only 66 posts (56 *per cent*) were filled against sanctioned manpower of 117 (9 posts each in 13 districts).
- i. It was also noticed that no master trainers were trained to impart training to the staff at the district, block and village level engaged in the prevention and mitigation of disaster management. Medical personnel were also not trained in hospital preparedness for emergencies or mass casualty incident management. (Para no. 7.5.7.2)

### **On a positive note:**

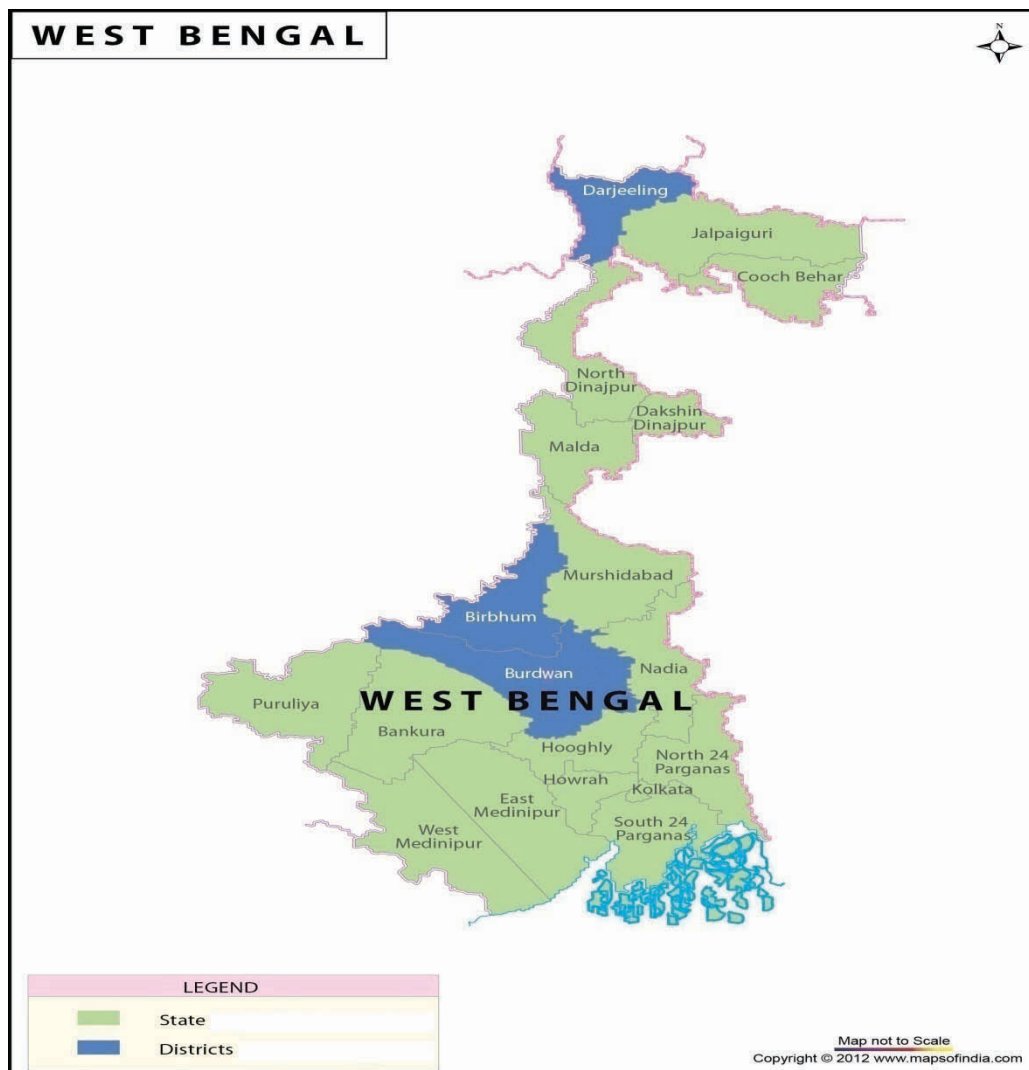
- Emergency Operations Centers were established at both state (July 2006) and district level (November 2009).
- Communication equipment such as satellite phones, police wireless, SMS network and video conferencing were established for disseminating post disaster information. Media was being regularly updated on disaster event and alerts through SMSs and study materials.
- For earthquake and landslide, GIS officials (project staff) at the state level were conducting detailed vulnerability assessment of eight major cities. GIS was in place for disaster management purposes and for developmental planning.
- Disaster management department trained 71474 government officials and non government officials through 546 different training programmes/workshops.

## State: West Bengal

### 1 Background

West Bengal, a part of the Bengal Delta, has a history of floods. This was because the landmass of the state was formed by the Ganga-Padma system of rivers through the delta building process of which flood is an adjunct being the main carrier of sediment. At present 42.30 *per cent* of total area of the state is susceptible to flood, spread over 110 blocks in 18 districts. The widest area affected by flood, as recorded in 1978, is about 30,607 sq km. About 23,970 sq km of area was devastated by flood in 2000.

In the state, all the districts are disaster prone. Disaster Management Report (2007-11) indicated that the state suffered a loss of ₹ 435.49 crore (in 598 blocks of 18 districts) and 164 lakh people were affected during the period.



Map 10.8: West Bengal

**1.1 Vulnerability Profile of the state:** The major disaster vulnerabilities in the state were categorized as under:

**Earthquakes:** In the seismic hazard zonation map, regions were divided in the seismic zones II–V. The lowest perceived hazard, zone II, was in the south-western part of West Bengal (Purulia), while the districts of Kolkata, Murshidabad, Birbhum, Burdwan, Hooghly, Howrah, Nadia, Bankura, Purba and Paschim Medinipur came under zone III. Zone IV covered the north and southeast of Kolkata, Darjeeling, North and South Dinajpur, parts of Jalpaiguri and Coochbehar, North and South 24-Parganas and Malda. Zone V was delineated on the eastern parts of Jalpaiguri and Coochbehar.

**Landslides:** The landslide hazard is prevalent mostly in the hilly terrains of Darjeeling district. Urbanization, especially in the hilly terrain, involving construction activities often trigger landslides.

**Floods:** Approximately 55.8 *per cent* of the state is susceptible to floods. The main rainfall season in the state is from June to September, i.e., the monsoon rain. Seventy five *per cent* of the total rainfall in a year takes place due to the south-western monsoonal wind-flow. According to the Irrigation Department, 37.6 lakh hectares of West Bengal (42.4 *per cent* of the geographical area and 69 *per cent* of its net cropped area) was flood prone. Floods are caused by Himalayan Rivers, Ganga-Padma-Bhagirathi river system, Western rivers and tidal rivers. Under the influence of these river systems, 15 districts were prone to floods with the risk ranging from medium to very high.

**Droughts:** The districts of Bankura, Purulia, Birbhum and parts of Paschim Medinipur are affected by drought at regular intervals, mainly due to deficient rainfall and adverse soil conditions.

**Cyclones:** Coastal areas of the state are prone to cyclone. Susceptible districts are Purba Medinipur, 24 Parganas-South, 24 Parganas-North, Howrah and Hooghly.

Details of disasters hit West Bengal in last decade are given in **Annex-10.7**.

## 2 Institutional Arrangements in the state

SDMA and DDMA in all the districts were notified by the State Government in August 2007. The Disaster Management Department (DMD) was headed by the Secretary and was assisted by a group of officers and employees working at the Secretariat, directorate, districts, sub-divisions and block levels. DMD was to co-ordinate with various departments responsible for different aspects of prevention, preparedness and mitigation of disasters.

**Darjeeling, Burdwan and Birbhum districts were selected in the state to assess district level preparedness.**



### 3 Observations on Disaster Preparedness

- a. Draft SDMP was prepared in 2008-09 and updated in 2009-10 but was not approved by SDMA. The state had not framed rules to guide the implementation of DM Act. Out of ₹ 10.63 lakh released by NDMA only ₹ 4.55 lakh (43 *per cent*) was utilised for preparation of SDMP for 2009-10 and 2011-12. DDMP were prepared during 2007-12 in the test checked districts but these plans were not approved by SDMA.
- b. SDMA met only once in September 2008 since its constitution. State Advisory Committee was constituted in April 2010 but it never met (September 2012).
- c. Three platoons of State Armed Police (SAP) were trained in disaster management and were stationed at Asansol, Barrackpur and Raiganj. Fourth platoon was proposed for disaster prone districts of North Bengal. This had not been achieved so far (September 2012).
- d. Kolkata Police, between May 2009 and March 2010 proposed setting up of different special groups-Disaster Management Group, Kolkata Disaster Relief Force and Kolkata Police Rescue Force to mitigate the effect of disasters. However, these proposals were not approved by the State Government. Specialised groups in disaster management would have improved disaster preparedness of the force.
- e. Civil Emergency Force under Civil Defence was constituted but adequate manpower and equipment were not provided. (Para no.7.4.1.2)
- f. We noticed irregularities in the management of State Disaster Response Fund. This included non investment of unutilised balance by the state for which it had to bear interest burden of ₹ 187.80 crore up to 2011-12. Inadmissible expenditure of ₹ 47.70 crore was also incurred. (Para nos. 5.1.2 and 5.1.3)
- g. SDMP made an attempt to identify blocks vulnerable to each type of disaster in terms of high, medium and low. However, vulnerability of blocks to earthquakes was not assessed. Further, the L0-L3 categorisation of disasters was also not done. (Para no. 9.1.7.4)
- h. We noted that in Darjeeling district, Singhamari Syndicate office building and the bus stand premises were declared as unsafe in November 2011. In spite of this, premises were used. (Para no. 9.1.7.4)
- i. SDMP proposed an ambitious central communication network for disaster management connecting State Emergency Operation Centre to District Emergency Operation Centres and District Emergency Operation Centres to Block Emergency Operation Centres through VSAT etc. However, no action had been taken in this direction. (Para no. 6.3.1)

- j. DEOCs were limited to control room operations during monsoons. No manpower was provided for EOC in Burdwan and Birbhum districts while four contingency workers had been employed in Darjeeling.
- k. We noticed irregularities in the scheme “Revamping of Civil Defence” as the state had not provided its share for one component of the scheme, there was diversion of funds and incorrect submission of Utilisation Certificates. (Para no. 7.4.1.1)
- l. The state did not conduct any assessment to measure the efficiency and effectiveness of disaster management tools and to improve the information system.
- m. The state failed to release requisite funds in time and lackadaisical approach of the executing agencies to execute work had resulted in non-completion of four flood shelters and non-creation of two flood shelters. (Para no. 9.3.6.6)
- n. No action was taken to include emergency casualty management in the medical curriculum. Emergency casualty management plans were not prepared and procedures for treatment of casualties by private hospitals during disasters were not laid down.
- o. In Birbhum district, school safety training was not conducted, while in Darjeeling, funds for capacity building were mentioned but no training was conducted. We also noted that training was not conducted for vulnerable sections of society like patients, students, fishermen and farmers in any of the three test checked districts. (Para no. 8.3.2)

### **On a positive note:**

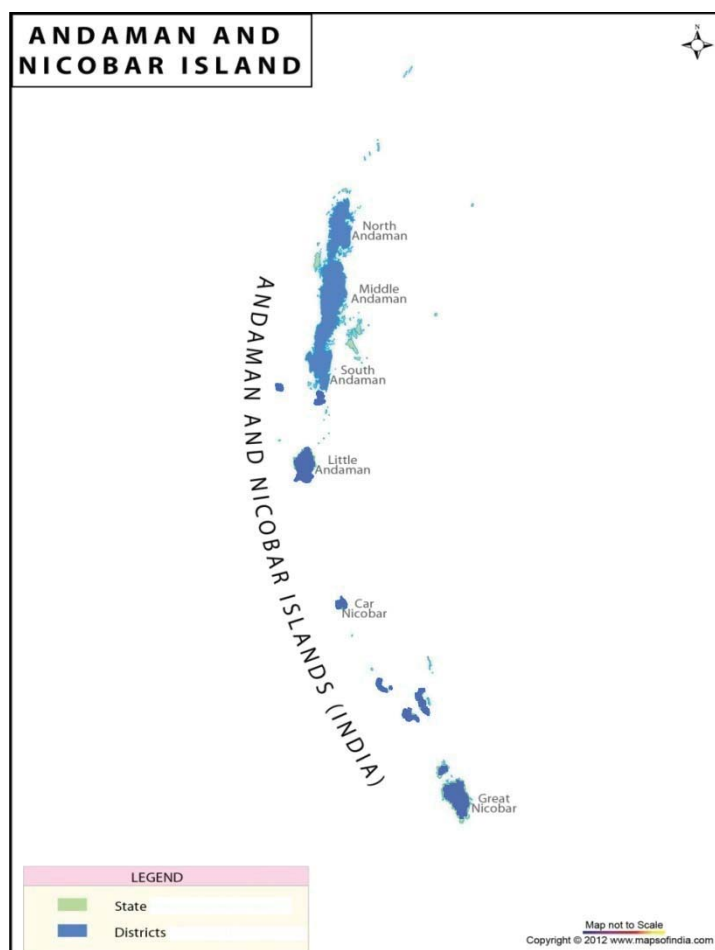
- The state published West Bengal Disaster Management Policy and Framework in December 2007.
- Cyclone warning dissemination sets were installed in vulnerable places along the coastline of the state.
- In Birbhum and Burdwan, 260 government officials and teachers were trained as targeted.
- In Darjeeling, Community Oriented Policing Service (COPS) trainings of 230 Civil Defence volunteers were conducted in two phases in February 2011 and March 2012. In Burdwan, mock drills / training on rescue and evacuation were conducted in all 31 blocks.

## Union Territory: Andaman & Nicobar Islands

### 1. Background

The Union Territory of Andaman & Nicobar Islands (ANI) is situated in the Bay of Bengal, midway between peninsular India and Myanmar. ANI is one of the multi hazard prone areas of India. The islands are in the Bay of Bengal, which is one of the five cyclone prone areas of the world.

On 26 December 2004, the coasts of ANI were devastated by a 10 m (33ft.) high tsunami following the Indian Ocean earthquake. More than 2,000 people were confirmed dead and a minimum of 40,000 people were rendered homeless. The worst affected in the Nicobar Islands were Katchal and Indira Point; the latter subsided 4.25 m and was partially submerged in the ocean. Teressa Island was said to have been split into two parts and Trinkat Island into three parts. Some estimates said that the islands were moved as much as 100 feet (30 m) by the earthquake and tilted.



Map 10.9: Andaman & Nicobar Islands

**1.1 Vulnerability Profile of ANI:** The major vulnerabilities to disasters in Andaman and Nicobar Islands are as under:

**Cyclones and Tsunami:** ANI is open from all the sides and is exposed to hydro-meteorological disasters like floods, cyclones, storm surges, cloud bursts and tornadoes. ANI also fall in cyclogenesis<sup>3</sup> zone and a significant number of cyclones striking the east coast of India and Bangladesh are generated every year from the Andaman Sea.

**Earthquakes:** ANI is also prone to various geological disaster risks. It is located in one of the most seismically active parts of the world. It runs parallel to the boundary separating the Australian and Eurasian plates in the Indian Ocean that are continuously jostling with each other. The Islands are susceptible to very high intensity of seismicity. As per the seismic zoning map of India, these Islands are classified in Seismic Zone-V.

No disasters occurred in the UT after the earthquake and tsunami of December 2004.

## 2. Institutional Arrangements in ANI

A Union Territory Disaster Management Cell was established in ANI which was re-designated as Union Territory Disaster Management Authority headed by the Chief Secretary and comprising 12 other members in July 2003. Subsequently, in August 2005, the Lt. Governor constituted island level, sub-divisional level and tehsil-level disaster management committees. According to the DM Act 2005, the Union Territory Disaster Management Authority (UTDMA) and the Union Territory Disaster Management Executive Committee (UTDMEC) were established in January 2008. In the three districts, viz. South Andaman, Nicobar and North and Middle Andaman the DDMA's were also setup in January 2008. Subsequently, in September 2008, the Administration established a Directorate of Disaster Management (DDM) as a nodal agency for implementation of Disaster Management Plan (DMP) and for disaster preparedness activities as well as inter-state and inter-district communication liaison.

**All the three districts of South Andaman, North & Middle Andaman and Nicobar were covered in audit with emphasis on the district level preparedness at Car Nicobar and Nancowry Islands.**

## 3. Observations on Disaster Preparedness

- a. Union Territory Disaster Management Authority constituted in January 2008, met only once in April 2012. The UT Executive Committee constituted in January 2008 had also met only once on December 2009. UT and District Authority had not made authorization to Departments or authority concerned for procurement under emergency situations in terms of the provisions of DM Act.
- b. UTDMP for ANI was finalized and approved only in April 2012. However, no separate district level Disaster Management Plans had been formulated. SOPs of line departments were not prepared for the North and Middle Andaman and South Andaman districts.

<sup>3</sup> Cyclogenesis is the development or strengthening of cyclonic circulation in the atmosphere.

- c. No UT and district disaster response and mitigation fund had been constituted in ANI. However, we found that an amount of ₹ 11.86 lakh was utilized for expenditure on items not related to disaster preparedness under the head “Relief on account of Natural Calamities” at North and Middle Andaman district.
- d. Identification of vulnerable areas of ANI had not been undertaken using GIS mapping. In all three districts of ANI, identification and mapping of most common disasters had not been made.
- e. The state control room had been established in the DDM but no regular staff had been deputed. The Administration decided in December 2011 to install tsunami sirens in every single inhabited island of ANI. 146 Tsunami sirens need to be purchased but these sirens have not yet procured. (Para no. 9.3.6.1)
- f. MHA directed (March 2011) the UT Administration of ANI to raise a State Disaster Response Force to deal with rescue and response situations in the event of disaster, by identifying and earmarking their battalions and companies to be trained as State Disaster Response Force. These companies were to be provided two categories of training-Training of Trainers (ToT), and company level training to the companies of State Disaster Response Force personnel. In December 2011, the Assistant Superintendent of Police, ANI proposed to train a company of Indian Reserved Battalion as State Disaster Response Force. Accordingly, ANI Administration requested NDMA to arrange for conducting the training of master trainers. However, no training was imparted to them so far. As such, in the absence of required training, State Disaster Response Force was yet to be established for ANI. The Department of Disaster Management stated (August 2012) that training of State Disaster Response Force was underway with the Police Department.
- g. Mobile search and rescue teams consisting of police, fire service, medical department and Andaman Public Works Department were yet to be constituted.
- h. We noted that evacuation routes<sup>4</sup> were constructed in only one out of thirteen inhabited islands of Nicobar district. No evacuation routes had been constructed in the other two districts, namely South Andaman and North and Middle Andaman.
- i. Union Territory Disaster Management Executive Committee decided in December 2009 that 25 buildings in various islands would be retrofitted to use them in any crisis situations. No work in this regard, though, was taken up as yet. (Para no. 9.1.7.1)
- j. Inspection of relief godowns was not carried out during the period 2007-08 to 2011-12. No information was available on the condition of relief material stored there. (Para no. 9.3.6.1)

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<sup>4</sup> Evacuation Routes to be installed and displayed along the sea shores

- k. During 2007-08 to 2011-12 only three doctors were trained in Management of Mass Casualty. No training programmes for paramedics, capacity building and trauma at UT or district level were conducted. (Para no. 7.5.7.2)
- l. MHA sanctioned ₹ 5.00 lakh to the Administration in March 2006 for project preparation activity relating to NCRMP. No project proposals were submitted by ANI.
- m. Emergency Action Plans (EAP) on dam's failures was not prepared. (Para no. 9.2.5.1)
- n. In Nicobar district, three EOCs were equipped only with STD and FAX facilities. EOC at Car Nicobar was not operational. Even the electrical connection to this EOC had not been provided till date.
- o. Order for 13 satellite phones costing ₹ 15.80 lakh was placed in October 2011. Although, DDM had paid royalty, licence fee and spectrum charges to DoT, the satellite phones were yet to be supplied. ISRO installed a V-SAT system (DMS Node) under DMS Programme at Port Blair in 2006. We noted that the system was not functional for several years. (Para no. 6.3.2)
- p. The School Safety Disaster Management Plan was approved in June 2011. Funds were awaited from NDMA.
- q. The proposal for requisite manpower which was assessed to be 67 for the districts was still pending with MHA since November 2010.
- r. A comprehensive annual training program to impart training to the officials and sections of society at the UT, District Division and Block level was not prepared by the Directorate. DDM had not prescribed any returns on physical and financial performance from the District Authorities. (Para no. 8.3.2)

**On a positive note:**

- Classification of disasters from L0 to L3 had been made in August 2005 and competent authorities to declare and deal with different level of disasters were identified.
- Tsunami affected area was mapped in South Andaman district.
- For last mile connectivity and control of the operations, the Administration linked up villages with Community based Disaster Management Plans through each district under a portable platform.
- The Disaster Management Cell in the Police Department imparts trainings on "Collapsed Structures Search and Rescue" and "Medical First Responder" to the officials of various departments, students and different NGOs.
- Mock drills were done at UT level and it was also conducted in Nicobar district and South Andaman district.