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## UNIT 15 DISASTER MANAGEMENT: CASE STUDIES\*

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### 15.0 OBJECTIVES

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After reading this Unit, you should be able to:

- Discuss a few case studies related to disaster management in the Indian context;
- Understand the impact of Odisha Super Cyclone and the establishment of OSDMA thereafter;
- Explain the impact of Bhuj Earthquake;
- Discuss the impact of Indian Ocean Tsunami and the resultant measures in terms of enactment of disaster related legislation and policy; and
- Examine the situation of Uttarakhand Floods and Cyclone Phailin.

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### 15.1 INTRODUCTION

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Lura Tcuk, the World Bank Vice-President for Sustainable Development, pointed out that “with significantly increased levels of population, urbanisation and built infrastructure, our cities and communities are more exposed to disaster risk. Looking at past disasters helps us to plan for a more resilient future”. Thus, as rightly pointed out by William Faulker, “the past is never dead. It’s not even the past”. Always the past disasters teach us on how to act and react to a disaster situation and in this context, case studies on past disasters serve as an important instrument to understand a disaster and also examine the measures taken in to deal with it and later reflect on the usefulness of such measures. Case studies of past disasters, thus, help us to learn from the past experiences and help us plan for a disaster resilient future (GFDRR, 2018).

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India has faced about 300 disasters which have claimed about 76,031 lives (Raj, 2017) in the last 17 years. Due to the geographical location of the country, India constantly gets hit by various disasters and it is a regular phenomenon. There was no proper institutional mechanism and policies for handling disasters. It was only after the Orissa cyclone in 1999 (since the name of Orissa has been changed to 'Odisha' in 2011, hereafter 'Orissa' is termed as 'Odisha'), Gujarat earthquake in 2001 and Indian Ocean tsunami in 2004, etc., significant measures in terms of policies and institution mechanisms were created in India for handling disasters. In this Unit, you are given insights on some of the landmark disaster events that had shaken India in the last two decades, which later helped India in framing useful legislation, policy, institutions and frameworks for disaster management.

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## **15.2 ODISHA SUPER CYCLONE, 1999**

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Odisha is one of the most disaster prone states in India and disasters such as cyclones and floods are constant phenomena in this state. Odisha is divided into 30 districts, 314 blocks, 6799 Gram Panchayats and 50,972 revenue villages (<http://odisha.gov.in/content/dist>). It has 1,55,707 square kilometres total area. About 87 per cent of the people live in rural areas and they depend on agriculture for their livelihood. On 29<sup>th</sup> October, 1999, a severe cyclone struck the coastal districts of Odisha. The life span of the cyclone was around six days. It had a wind speed of 300km/hour, with the tidal waves reaching a height of 7-10 metres which came into inlands 0-15kms and there was incessant rain for 48 hours. It affected about 97 blocks, 12 districts, causing devastation in about 1,200 kilometres. The super cyclone severely affected life and property. About 14,000 villages/wards and 16, 50,086 households were severely affected. More than 15 million people (about one third of state's population) got affected and it took a toll of 9,885 human lives and more than 0.4 million livestock and let another 7,507 persons injured. As per the estimate made by state government, about 7,000 lives were lost due to tidal surge; about 2,000 lives due to cyclonic flood and the rest falling objects and or being blown away due to high speed winds. Out of the human lives lost, 8,119 were from Jagatsinghpur district alone. A total of 3.7 million children were affected and 1,500 were orphaned (UNDMT, 1999).

The immediate response of the Odisha Government to the super cyclone was the provision of relief to the affected and prevention of epidemic in the affected area. The government began the urgent task of clearing the roads of debris so that the army, state government and NGOs could deliver relief material by trucks to thousands of affected villages. With corpses and animal carcasses laying all around and water sources being contaminated, the threat of diarrhea, dysentery and malarial fever was quite strong. Several NGOs and the army were engaged in the task of disposing the corpses and animal carcasses. They were also involved in the distribution of relief materials that included food, fresh drinking water and water purifying tablets, clothes and blankets, polythene rolls, medicine and first aid kits. The army also assisted in setting up community kitchens and rural hospitals, where medical personnel were brought in from national and international NGOs.

While there were measures taken immediately in the aftermath of the cyclone, there were also some long-term measures taken by the state. On one side, rehabilitation measures were taken to make the community return back to normalcy and on the other side, stringent measures were taken by the Odisha government by way of setting up the institutional structures so that future catastrophes can be handled in

an effective manner. One such measure was the constitution of the state disaster management authority.

### **Odisha State Disaster Management Authority (OSDMA)**

The Government of Odisha constituted the Orissa State Disaster Mitigation Authority under the Societies Registration Act, 1860. OSDMA was a Government owned autonomous body established in 1999, to have a systematic and planned approach to disaster management in the state with the objective of making the people of the state more disaster resilient. OSDMA was the first state level disaster management authority that was established in India. Chief Secretary is the chairman of the OSDMA. Later in 2000, the name of the authority was changed from Orissa State Disaster Mitigation Authority to Orissa State Disaster Management Authority.

The major task of OSDMA is to concentrate on disaster preparedness, management and social issues related to disaster management such as capacity building, awareness raising and public education, apart from promoting inter-organisational coordination. During normal time, 90% of its activities go for preparedness and 10% of its activities go for reconstruction. But if any disaster occurs, 90% of its activities go for reconstruction. OSDMA, thus, coordinates various activities of disaster mitigation in the state including capacity building of the community and disaster managers and strengthening of infrastructure, improvement in communication system, etc.

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## **15.3 BHUJ EARTHQUAKE, 2001**

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Gujarat is the one of the highly industrialised states in India. As per 2011 census, Gujarat has been divided into 33 districts and the actual population of the state is 60,383,628. Due to its geographic profile, the state is more vulnerable to all kinds of major disasters and it falls under Zone V. Gujarat witnessed a powerful earthquake with a magnitude of 6.9 on Richter Scale at Bhuj (Kutch Region) at 8.46 a.m. on 26<sup>th</sup> January, 2001. This earthquake was the most devastating in the past 50 years. Its impact was huge in terms of loss of lives and properties. Out of 33 districts, 21 districts got affected by this earthquake and around 16.04 million people suffered terrible loss. It made a large scale devastation in 18 towns, 182 talukas and 7,904 villages in the State. About 20,086 persons were killed and more than 20,717 were seriously injured. Majority people were killed due to the collapse of the buildings. Around 3, 70,000 houses were completely destroyed and over 1.2 million houses suffered extensive damage.

The earthquake spread upto 300km from the epicentre. Kutch district was one of the worst affected districts. The sadest part was around 450 villages were totally devastated and destroyed. Eventually it affected the districts of Rajkot, Jamnagar, Surendranagar, Patan and Ahmedabad. Gandhidham, Morvi, Rajkot and Jamnagar witnessed a major devastation due to its major structures, infrastructures and industrial facilities. Not only industries, but majority of the public buildings also collapsed during the earthquake. These included hospitals, monuments and museums. Bridges, roads and railways also faced minor damages and structural changes. Due to the severity of the earthquake, the entire network of the telecommunications was affected. Power and water supply services also got severely affected.

After the disaster, immediately the Union Cabinet as well as the National Crisis Management Committee (NCMC) under the chairmanship of the Cabinet Secretary held urgent meetings on 26th January itself for relief measures. An Empowered

Group of Ministers (EGoM), under the chairmanship of the Home Minister, was set up and the EGoM along with NCMC started monitoring the situation round-the-clock.

Immediately the restoration of communication services was undertaken on a war-footing and satellite phones, hotlines, HAM radios and mobile phones were pressed into service. The Government of India also provided immediate assistance from the NCCF (National Calamity Contingency Fund) and the PM's Relief Fund. The state government started the rescue and relief operations with the help of armed and Para-military forces. Apart from rescue measures, the state also focused on providing immediate relief to the survivors. Teams of officials were sent to the severely affected areas for a quick assessment of the requirements and for coordinating arrangements for ensuring food, shelter and health related supplies. The presence of some well-organised NGOs, which began operating community kitchens, was of considerable assistance. Apart from the central government and the NGOs, the state also received support from the corporate organisations and the international community (Sharma, 2001).

In the aftermath of the severe earthquake, on 8<sup>th</sup> February, 2001, the state had established the Gujarat State Disaster Management Authority under the Societies Registration Act and the Bombay Public Trust Act. The initial mandate of this institution was to implement and coordinate the recovery, rehabilitation and reconstruction activities in the earthquake affected areas. It also acted as a nodal agency for pre-disaster preparedness and mitigation activities. At the national level, Gujarat was the first state to formulate the state level disaster management policy in September 2002.

### **Check Your Progress 1**

**Note:** i) Use the space given below for your answers.

ii) Check your answers with those given at the end of the Unit.

1) Write a note on Odisha Super Cyclone and highlight the role of OSDMA.

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2) Discuss the immediate relief measures after Bhuj Earthquake.

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## 15.4 THE INDIAN OCEAN TSUNAMI (TAMIL NADU), 2004

On 26<sup>th</sup> December, 2004, India experienced the devastating effects of tsunami, caused by a series of earthquakes in the Bay of Bengal, which originated from the West Coast of Northern Sumatra in Indonesia. The magnitude and intensity of the huge and strongest marine earthquake was 9.0 on the Richter scale. First it was recorded around 6.29 AM IST in Indonesia and after three hours it attacked the west of Pulo Kunji Great Nicobar, India (7.3 on Richter scale). The earthquake set off giant tsunami tidal waves of 3 to 10 meters high that penetrated inland up to 3 kms (ADB, UN and WB, 2005). The Indian Ocean Tsunami of 2004 had caused devastating damages to the lives and property of many countries and it caused irreparable damages to the Indian coast as well. More than 20 countries experienced major casualties and damages and a total of about 2.2 million people got affected.

The Indian Ocean Tsunami had affected nearly 2,260 kilometres of the coastal areas, of India, which covered States namely Tamil Nadu, Kerala, Andhra Pradesh and the Union Territories of Puducherry, and the Andaman and Nicobar Islands. As per the Government of India Report, 12,405 people lost their lives; 6,913 people were injured and 6,47,59 people were displaced from their dwellings. About 100,000 houses were estimated to be damaged or destroyed. Approximately 2,000 kilometers of the Indian coastline was submerged up to a distance of two kilometers.

The Indian Ocean Tsunami had caused huge devastating impact on the 13 coastal districts of Tamil Nadu viz. Chennai, Tiruvallur, Kancheepuram, Villupuram, Cuddalore, Nagapattinam, Tiruvarur, Thanjavur, Pudukottai, Ramanathapuram, Thoothukudi, Tirunelveli and Kanyakumari. Three districts viz. Nagapattinam, Kanyakumari and Cuddalore were the worst affected of all districts, with a death toll of 6,065, 828 and 617 respectively (State Planning Commission, 2005). However, the response to the tsunami was swift and comprehensive and it included a combined effort of government bodies, non-governmental organisations (NGOs), and local community.

After the tsunami had struck, it was the local community members who came for immediate rescue, even before the government, NGOs and other players could provide response. Only in the subsequent phase of Tsunami, the Government and NGOs had rendered support. The Government provided relief material and coordinated the relief and rehabilitation programmes. The voluntary organisations and other NGOs were involved in the intervention programmes initiated, in the mitigation, response and recovery activities. In addition to this, even the global communities responded quickly to the tsunami by way of mobilising the resources, required in the disaster response efforts.

The relief measures were undertaken immediately which included search, rescue and evacuation; first aid; shelter; resumption of critical infrastructure; restoring transportation routes; communication lines and electricity; ensuring food and clean water distribution.

After the disaster, the Ministry of Home Affairs, Government of India, was nominated as the nodal agency at the national level for undertaking and co-ordinating relief measures in the affected states and the union territories. It was followed by the establishment of the National Crisis Management Committee (NCMC) in 2005 under the chairmanship of the Cabinet Secretary. The relief efforts were reviewed by the Cabinet Committee of Ministers under the chairmanship of the Prime Minister

together with secretaries of the relevant ministries/departments and chiefs of the armed forces. From the National Calamity Contingency Fund (NCCF), equivalent of US\$112 million was allocated to the disaster affected states and union territories. The Planning Commission played an important role in the phases of recovery and rehabilitation and the State Governments took the responsibility for implementation of recovery programmes (UN Country Team, 2005).

The Government of Tamil Nadu announced a relief amount of Rs. 4,000/- to each tsunami-affected household, followed by monthly allowance of Rs. 1,000/- per household for three months. Besides, as per the provisions of Government Order, each household was provided 60 kgs of rice, edible oil, 3 litres of kerosene, spices, etc., worth Rs. 2,000/- per household, in addition to germicidal spray three times a day. A relief assistance of Rs.1,00,000/- was provided for every death caused by the tsunami by the Central Government and Rs. 1,00,000/- by the State Government.

The collapsed structures everywhere had created hindrances in the search, rescue and relief operations. The Public Works Department with the help of local people removed the debris of collapsed buildings, roads, bridges and other structures, as well as uprooted trees, hoardings, etc. The resource persons from Tamil Nadu Agricultural University visited the agricultural lands and cleared the sea water and started the land reclamation process.

Damage assessment is a pre-requisite for all disaster management practices. Rapid damage assessment is required for emergency relief measures. For this purpose, the NGOs initiated Village Information Centres (VICs) in order to make an assessment of the damages. VICs coordinated with the government officials and community members and collected the information like severity of disaster, likelihood of the damages, loss of life and property damages and it passed on the information to the block and district authorities and people also approached the VICs to register their complaints or grievances.

The NGOs started the community kitchen in the shelter area. Some of the International Non-Governmental Organisations (INGOs) started the mineral water plant for the victims to distribute drinking water. The sanitation was very poor and people resorted to open defecation. Later, the NGOs, with the support of UNICEF, installed Eco sanitation toilets.

Coordination was the vital and immediate component needed in the response phase. A number of agencies at the local, regional, national and international level mushroomed up in the villages to provide various services to the victims. However, coordination and cooperation of various agencies became a challenging task in the initial phase. Later, the district administration had established coordination centre among the various stakeholders.

After witnessing the impact of tsunami in 2004, the Disaster Management Act was enacted in 2005 and later the National Disaster Management Policy also was formulated in 2009 (Kanal, 2013).

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## **15.5 UTTARAKHAND FLOODS, 2013**

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The state of Uttarakhand and the adjoining areas received heavy rainfall during 14<sup>th</sup> to 17<sup>th</sup> June, 2013, which was about 375 percent more than the benchmark rainfall in a normal monsoon. Out of 13 districts, 5 districts namely Bageshwar, Chamoli, Pithoragarh, Rudrapur and Uttarkashi were affected badly due to

flash floods. The major reason for the flash flood was extreme rainfall, melting of Chorabari Glacier and eruption of the Mandakini River. As per the Indian Meteorological Department (IMD), the rainfall in the State between 15 June and 18 June, 2013, was measured at 385.1 mm, against the normal rainfall of 71.3 mm, which was in excess by 440 per cent. As per state government, a total of 169 people died and 4021 people were reported missing (presumed to be dead) (NIDM, 2014).

The heavy rains, flash floods and massive landslides on 16 June, 2013, due to over flow of Gandhi sarovar (also known as Chourabari lake) just above Kedarnath temple caused washing away of area around Kedarnath temple, pilgrims shelters there and enroute, foot tracks and entire villages and settlements of Gaurikund and Ram Bada; the transition points to Kedarnath. The market of small town of Sonprayag also suffered heavy damage and loss of lives. Pilgrimage centres in the regions of Gangotri, Yamunotri, Kedarnath and Badrinath, the holy Hindu Chardham (four sites), Hemkund Sahib a pilgrimage centre for the Sikh community and its roadhead transit point at the Govindghat gurudwara are visited by thousands of devotees during May to October every year. Hence, it was the peak time of pilgrimage, when disaster had struck. Over 125,000 people were stuck up in various regions because of damaged or blocked roads. National Highway 58, an important artery connecting the region, was washed away near Joshimath and many other places. For more than three days, stranded pilgrims and tourists were without rations or survived on little food. The roads were seriously damaged at more than 450 places, resulting in huge traffic jams. The floods caused washing away of many cars and other vehicles. On June 18, more than 12,000 pilgrims were stranded at Badrinath, the popular pilgrimage centre located on the banks of the river Alaknanda. Rescuers at Haridwar on the river Ganga recovered bodies of 40 victims washed down by the flooded rivers as of June 21, 2013. Bodies of people washed away in Uttarakhand were found at distant places like Bijnor, Allahabad and Bulandshahr in Uttar Pradesh. Search for bodies of those who lost their lives during the extreme natural fury of June in Kedar valley continued for several months. Even as late as September 2013, about 166 bodies were found in highly decomposed state during fourth round of search operation. In a massive evacuation-cum-rescue operation, the Indo-Tibetan Border Police (ITBP), Air Force, Army, NDRF, and state administration evacuated more than 125,000 people from the flood ravaged area. The ITBP was the first to respond and to launch rescue and relief operation immediately after the disaster. About 1600 ITBP personnel were involved in rescue and relief operations in Uttarakhand (Eapen, 2016).

The following are the “major lessons learnt from this disaster:

- The need to have strict implementation of the Flood Plain Zoning Act which can regulate the constructions within the flood plain of a river.
- For clearance of all hydro-power and other mega projects in ecologically sensitive regions like Uttarakhand, the Disaster Impact Assessment (DIA) should also be made compulsory besides Environmental Impact Assessment (EIA).
- Landslide risk zonation mapping be completed on priority. Development and enforcement of guidelines, regulations and codes for landslides is critical.
- Effective stabilisation of slopes in shear and weak zones be undertaken using scientific techniques available at national/international levels.

**Disaster Management:  
Cross-cutting Issues**

- Blasting for developmental activities be avoided as it may destabilise the weak rocks in mountainous regions.
- The existing emergency communication system be reviewed regularly to ensure last mile connectivity during disasters.
- Investments in infrastructure development related to weather, glacial lakes, river flow monitoring, etc. are fundamental for improving the accuracy of risk mapping, thereby allowing more lead-time for warnings provided by IMD, CWC, GSI, NRSC, etc.
- Tourism related development should not be allowed along the river banks.
- An effective pilgrim control and regulatory body should be constituted for control and management of pilgrims/tourists” (NIDM, 2014).

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## **15.6 CYCLONE PHAILIN, 2013**

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As we already discussed in section 15.2, Odisha suffers frequent cyclones and floods. The Cyclone Phailin had crossed the coastline of Barhampur, Odisha, on 12<sup>th</sup> October, 2013. Due to the cyclone, the state faced continuous rainfall. Though the cyclone caused extensive damage on the infrastructure, fewer casualties were reported. As per Government of Odisha, the cyclone had affected the lives of 13 million people; 2,56,633 houses got damaged and extensively the crops also got severely affected. Surprisingly 45 people got killed. Here the significant factor is that compared to earlier cyclones, the loss of lives was very small.

During the period of cyclone, resources were deployed from Odisha Rapid Action Force (ODRAF), Andhra Pradesh State Disaster Response Force (APSDRF), National Disaster Response Force (NDRF), Indian Army, Indian Air Force, Fire Services and DG of Police for search and rescue operations. Mock drills were also conducted at the cyclone shelters to prepare the community in facing the situation. The Ministry of Home Affairs (MHA) and the National Disaster Management Authority (NDMA) were also requested to make necessary arrangements for deployment of the NDRF and IAF helicopters on short notice. The Government of Odisha was, thus, proactive and well prepared. The OSDMA had done a wide range of preparatory activities to face the furious cyclone with a zero casualty approach. Even the community members were equally prepared to face the disaster. Before the landfall of the cyclone, one million people were evacuated in 36 hours. It was one of the largest evacuation operations in the history of disaster management in India. It was possible because of the Odisha Disaster Rapid Action Force (ODRAF), National Disaster Response Force (NDRF), Central Reserve Police Force (CRPF), Odisha State Armed Police (OSAP) and the Indian Air Force (IAF). Proper coordination and the effective response action plan had reduced the human casualties (NIDM, 2014). Thus, cyclone Phailin was handled in an effective manner by almost all the stakeholders, including the community members, which contributed a great deal in reducing the vulnerability of people.

### **Check Your Progress 2**

**Note:** i) Use the space given below for your answers.

ii) Check your answers with that given at the end of the Unit.

1) Discuss the post-disaster institutional measures after Indian Ocean Tsunami.

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- 2) Highlight the major lessons learnt from Uttarakhand floods and Cyclone Phailin.

## 15.7 CONCLUSION

The Unit has discussed the case studies of some of the major disasters that made huge impacts in different parts of the country. There has been substantial loss of life and property in the last two decades. These disasters were also responsible for the creation of Disaster Management Act, National Disaster management Policy, institutional structure and framework, both at the national and state level. The case study of disasters such as Odisha Super Cyclone, 1999; Bhuj Earthquake, 2001; Indian Ocean Tsunami, 2004; Uttarakhand Floods, 2013; Cyclone Phailin, 2013; etc. have thus been briefly discussed in this Unit, to provide you a picture of how the disasters were handled in the during-disaster and post-disaster phases.

## 15.8 GLOSSARY

- Richer Scale** : The Richter magnitude scale was developed in 1935 by Charles F. Richter of the California Institute of Technology as a mathematical device to compare the size of earthquakes. The magnitude of an earthquake is determined from the logarithm of the amplitude of waves recorded by seismographs. Adjustments are included in the magnitude formula to compensate for the variation in the distance between the various seismographs and the epicentre of the earthquakes (<https://pubs.usgs.gov>).
- Glacier** : A slowly moving mass or river of ice formed by the accumulation and compaction of snow on mountains or near the poles (<https://en.oxforddictionaries.com>).

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## **15.10 ANSWERS TO CHECK YOUR PROGRESS EXERCISES**

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### **Check Your Progress 1**

- 1) Your answer should include the following points:
  - Effects of Odisha super cyclone
  - Odisha State Disaster Management Authority
- 2) Your answer should include the following points:
  - National Crisis Management Committee
  - Empowered Group of Ministers
  - Various immediate relief measures

### **Check Your Progress 2**

- 1) Your answer should include the following points:
  - National Crisis Management Committee
  - Cabinet Committee of Ministers
  - State Government Measures
  - NGOs and INGOs initiatives

2) Your answer should include the following points:

- Flood Plain Zoning Act
- Landslide risk zonation mapping
- Emergency communication system
- OSDMA measures



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