India Disaster

Report 2013

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Towards a disaster free India...

NATIONAL INSTITUTE OF DISASTER MANAGEMENT
Ministry of Home Affairs, Government of India

INDIA DISASTER REPORT 2013

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National Institute of Disaster Management
2014

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PREFACE

Research and Documentation in the field of disaster management is one of the main responsibilities of the National Institute of Disaster Management as entrusted by the Disaster Management Act of 2005.

Probably with the inevitable climate change, ongoing industrial development, and other anthropogenic activities, the frequency of disasters has also shown an upward trend. It is imperative that these disasters and the areas impacted by these disasters are documented in order to analyze and draw lessons to enhance preparedness for future. A data bank of disasters is fundamental to all the capacity building initiatives for efficient disaster management. In the backdrop of this important requirement, the NIDM commenced publication of India Disaster Report from the year 2011.

The India Disaster Report 2013 documents the major disasters of the year with focus on the Uttarakhand Flash Floods and the Cyclone Phailin. Other disasters like building collapse and stampede have also been covered besides the biological disaster (Japanese Encephalitis). The lessons learnt in these disasters provide us a bench-mark for further refining our approach to disaster management with an aim at creating a disaster resilient India.

A review of the disasters during the year reinforce the need for sustainable development as also the significance of the need for mainstreaming of disaster risk reduction in all developmental activities.

We are thankful to all the members of the NIDM who have contributed towards this effort. Special thanks to Prof. Chandan Ghosh, for providing inputs on Allahabad stampede following a personal visit to the accident site. Dr. Surya Parkash (Associate Professor) and Tapash Kr. Saha Roy (Consultant) for providing inputs on cyclone Phailin, Dr. Saurabh Dalal, (Jr. Consultant) for providing valuable inputs for chapter on Japanese Encephalitis, and Ms. Baljinder Kaur (Jr. Consultant) for proof reading.

We are hopeful that the India Disaster Report 2013 will be useful for all the stakeholders and disaster management practitioners working across the country and prove to be yet another milestone in capacity building and spreading awareness among the vulnerable population of our nation.

Editorial Team

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1. INTRODUCTION

The India Disaster Report (IDR), the concept of documenting the events of the respective year from January to December, was initiated in the year 2011. This report, as its name suggests, is a compilation of events, to learn from them so that we can build a resilient society. This report covers two major disasters, for which the respective states requisitioned the Central Government for supplementary support. The list of disasters in which 10 or more human lives were lost are annexed at the end of the report under two headings namely "Road Accidents", and 'Other Disasters'.

The year 2013 witnessed two major events, the Uttarakhand Flash Floods, mainly affecting the state of Uttarakhand and the Cyclone "Phailin" affecting two coastal states of Odisha and Andhra Pradesh. They were different from each other and all the stakeholders had lessons to learn from both these events. These events are covered in this report, in detail. In Uttarakhand disaster the response was good and the rehabilitation process is still continuing. In the cyclone Phailin, which was compared to Super Cyclone of 1999, the preparedness and response of all stakeholders was excellent and it received world-wide appreciation. These two events are discussed with a view to understand the causes, management, response, relief operations and to know the gaps, if any, for future planning. With the climate change, the natural hazards are expected to increase and it has to be taken as a wake up call. The frequency with which the cyclones have formed in the recent past, also indicates that the community needs to be prepared and the aim of all the stakeholders should be preparedness for good resilience. So both these events have lessons to teach us in their own way. Besides, the building collapse in the Maharashtra's Thane district, the stampede at Datia, during the Dusehra at Ratangarh temple and the stampede at Allahabad railway station during the Kumbh mela, are covered. Japanese encephalitis, which has been affecting people, every year, in several parts of the country, has also been included in the report as a special issue, as there is need to bring awareness among the disaster managers/administrators and community as a whole, with an aim to reduce its occurrence.

All the figures quoted in the text and tables, are mainly taken from the memorandum submitted by the respective state governments, and are provisional, as these figures were not supplied primarily for documentation and are only based on preliminary reports and enquiries. Other figures quoted are given as source of information, where ever possible.

As mentioned in our previous reports, the aim of this report is to document, mainly to analyse and learn. Hope this report will enlighten the readers with a lot of learning in the field of Disaster Management and help in creating a resilient community.

2. THE THANE BUILDING COLLAPSE

The Incident:

In 2013, in one of the worst urban disasters, a residential building collapse in Maharashtra took a heavy toll of life. The incident occurred in the Shil Phata area of the Mumbra suburb in the Thane district on 4 April 2013. It resulted in 74 deaths which included 33 men, 23 women and 18 children. Besides, 62 personnel were injured and several of them were hospitalized for treatment. Paradoxically, the three-acre plot on which the building existed was known as "Lucky Compound".

Rescue Operations at the Site

The incident once again brought to fore the issue of illegal housing and unsafe building construction practices prevalent in the country. The building was reportedly under illegal construction with no occupancy certificates issued to its residents , mainly the site construction workers and families. "The seven-storey building which was under construction in a forested area in Thane, collapsed due to poor construction quality. According to the Thane Municipal Corporation the builder had built the structure in about seven months without seeking any

approvals from the local authorities. The building just tilted a bit and collapsed like a pack of cards within three to four seconds, according to an eye witness. The rise in illegal construction by developers who use substandard materials and cheap methods is attributed to the shortage of cheap homes in the country. These homes are offered at very low rents to low-paid job holders".

The manner, in which the building was being constructed, in fact, presented a ready recipe for a disaster. As per the media inputs, the builder had allowed some poor families to live in the building while the construction for the eighth floor (slab work) was still in progress. Reportedly, the preliminary probe indicated that the laying of foundation of another building in the vicinity triggered the collapse.

The rescue operations were launched immediately. The Pune based National Disaster Response Force (NDRF) team was pressed into service besides the fire brigade and medical teams. Most critically injured people were taken to hospitals in Mumbai. Those with minor injuries were treated at local hospitals in Thane. Bulldozers, hydraulic jacks, sledgehammers and power saws were used to cut through steel and concrete to rescue the inhabitants trapped under tons of debris and to remove the dead bodies. Several persons were pulled out alive. Relentless rescue and clean-up operations continued for 40 hours, before they were finally called off. The rescuers had removed the debris and went eight feet below the ground level to locate victims of the crash. 134 persons, trapped inside the building were pulled out, of which 62 were rescued alive.

The subsequent investigations into the incident exposed a nefarious nexus of builders and municipal officials in the area, where developers bribed officials as they erected substandard and unauthorized constructions. As per the Thane police commissioner, K. P. Raghuvanshi, the builders of the structure that crumbled had paid off officials, "who abused their power for personal gain". The Thane police arrested nine persons, including the suspended Deputy Municipal Commissioner, two builders and municipal officials for the building collapse. Later they were charged for culpable homicide not amounting to murder, criminal conspiracy and dereliction of duty.

The Maharashtra Chief Minister Shri Prithiviraj Chavan visited the collapsed site. The State Government announced an amount of Rs. 2 lac to the next of kin of those killed and Rs. 50,000 to the seriously injured. Following the incident the Thane Municipal Corporation initiated a drive to demolish illegal buildings, with priority towards demolishing the dangerous ones first. It also established a call centre to receive complaints from the public about illegal and dangerous buildings.

Reasons for Cases of Building Collapse:

The need to construct buildings with structural integrity has been well acknowledged across the world. Structural integrity has been defined by Dr Steve Roberts (University of Oxford) as the science and technology of the margin between safety and disaster.

Structural integrity is the ability of a structure or a component to withstand a designed service load, resisting structural failure due to fracture, deformation, or fatigue. Structural integrity is a concept often used in engineering, to produce items (including construction of buildings) that will not only function adequately for their designed purposes, but also to function for a desired service life.

Structural failures in case of buildings can occur for a variety of reasons. Most of the structural failures can be traced to one or more of the five main causes.

- The first, whether due to size, shape, or the choice of material, is that the structure is not strong and tough enough to support the load. If the structure or component is not strong enough, catastrophic failure can occur when the over stressed construction reaches a critical stress level.

- The second is instability, whether due to geometry, design or material choice, causing the structure to fail from fatigue or corrosion.

- The third type of failure is caused by manufacturing errors. This may be due to improper selection of materials, incorrect sizing, improper heat treating, failing to adhere to the design, or shoddy workmanship. These types of failure can occur at any time, and are usually unpredictable.

- The fourth is also unpredictable, from the use of defective materials. The material may have been improperly manufactured, or may have been damaged from prior use.

- The fifth cause of failure is from lack of consideration of unexpected problems. Vandalism, sabotage, and natural disasters can overstress a structure to the point of failure. Improper training of those who use and maintain the construction can also overstress it, leading to potential failures.

As it gradually emerged through the media reports, the causes of this particular building collapse too turned out to be the familiar ones, which could be summarised as under :-

- Non adherence to relevant regulations and stipulated safety norms.
- It was an illegal construction.
- The building was constructed in very short time period.

- Use of poor quality of construction materials for larger profit margins by the builders.

- Construction by unskilled or improperly trained personnel.

- Poor families oblivious of the hazard were housed in the building while it was still under construction.

Comments:

Unfortunately the events like the Thane building collapse are a regular phenomenon in rapidly urbanizing cities of India. Such accidents often involve buildings in low-income, semi-formal and informal housing sectors. There are indeed gaps in the system that lead to poor construction which need to be addressed at various levels. Most of the illegally constructed buildings are, more often than not, likely to be substandard and dangerous. The buildings which are constructed without professional engineering protocols and usually with untrained construction workers are most vulnerable. Given India's current urbanization and the rising cost of land and tiny plots available for shelter, households are left with only one option: going vertical. All single storey homes are expanding and adding vertical load and densities. A five floor structure in urban areas made with zero engineering inputs will not be an anomaly.

The alarming rise in illegal construction and resultant building collapse incidences can essentially be attributed to the lack of affordable housing in general. There is need for greater focus for providing cheap and safe housing particularly to the poor, living in urban and semi urban environment. Construction of safe buildings should form the core of our efforts towards urban disaster risk reduction. It is heartening to note that the Central Government as well as several state governments are consistently focused on this important issue.

It is imperative that each of such accidents is thoroughly investigated and common masses are informed about the underlying causes. In this case the media generally attributed the accident to use of substandard construction material besides highlighting that the construction was illegal.

Undisputably, there is a need for holistic approach but enhancing awareness regarding safe building practices through a vigorous campaign will pay rich dividends. Besides the government efforts towards policy formulation and enforcing implementation of measures for safe building practices, the civil society and NGOs can also contribute meaningfully in this endeavour. "Agencies such as Aga Khan Planning and Building Services based in Mumbai that has been working in Kashmir post earthquake is investing in disaster preparedness by developing the appropriate R&D and training material. Similarly, the National

Society for Earthquake Technology (NSET) – Nepal, is working with municipalities to prepare disaster risk management plans and upgrade the skills of masons. In Brazil, interestingly, the national constitution makes 'access to technical assistance' a fundamental human right, similar to right to health, livelihoods and education. It incentivizes architects and engineers to work in settlements aiming for safety and better quality construction".

Usually, weak structure and quality compromise on material leads to building collapse. This is a regular phenomenon, when it comes to residential construction in India. One of the major reasons for this is increase in expenditure for quality goods. Due to price hike the builders aiming to construct residential colonies for poor people compromise on quality. Further, the municipal corporations passing such designs may have to be regulated. Implementation of National Building Code of India at the grassroots level will go a long way in reducing the risk of the building collapse disasters.

National Building Code of India 2005 (NBC 2005):

The National Building Code of India (NBC), a comprehensive building Code, is a national instrument providing guidelines for regulating the building construction activities across the country. It serves as a Model Code for adoption by all agencies involved in building construction works be they Public Works Departments, other government construction departments, local bodies or private construction agencies. The Code mainly contains administrative regulations, development control rules and general building requirements; fire safety requirements; stipulations regarding materials, structural design and construction (including safety); and building and plumbing services.

The Code was first published in 1970 at the instance of Planning Commission and then revised in 1983. Thereafter three major amendments were issued, two in 1987 and the third in 1997. Considering a series of further developments in the field of building construction including the lessons learnt in the aftermath of number of natural calamities like devastating earthquakes and super cyclones witnessed by the country, a project for comprehensive revision of NBC was taken up under the aegis of National Building Code Sectional Committee, CED 46 of BIS(Bureau of Indian Standards) and its 18 Expert Panels; involving as many as 400 experts and the National Building Code of India 2005 (NBC 2005) was evolved.

The NBC 2005 is a guide for all the builders to develop buildings in a safe manner. It covers all aspects of building construction which need to be taken care of before, during and after construction. The classification of buildings and types of construction that must be carried out has been provided in this book.

Moreover, it explains where and how should one design a kitchen, bathroom, its drainage, electricity lines, balconies, floorings that can be used, capacity of the building, etc. It is essential to bring this manual into consideration when designing a structure. The salient features of the Code are outlined in succeeding paragraph.

Salient Features of NBC 2005:

The salient features of the NBC include, apart from other changes made, the changes specially in regard to further enhancing the national response to meet the challenges posed by natural calamities and reflecting the state-of-the-art and contemporary applicable international practices. These are:-

● Inclusion of a complete philosophy and direction for successfully accomplishing the building projects through Integrated Multidisciplinary Approach right through conceptual stage to planning, designing, construction, operation and maintenance stages

● A series of reforms in building permit process

● Provisions to ensure and certification of safety of buildings against natural disasters by engineer and structural engineer

● Provision for two stage permit for high rise and special buildings

● Provision for periodic renewal certificate of occupied buildings from structural, fire and electrical safety point of view

● Provision for empowering engineers and architects for sanctioning plans of residential buildings up to 500 m^2

● Inclusion of detailed town planning norms for various amenities such as educational facilities, medical facilities, distribution services, police, civil defence and home guards and fire services

● Revision of parking requirements for metro and mega cities

● Updation of special requirements for low income housing for urban areas

● Inclusion of special requirements for low income housing rural habitat planning

● Inclusion of guidelines for development planning for hilly areas

● Revision of the provisions for buildings and facilities for physically challenged

● Fire safety norms completely revamped through detailed provisions on fire prevention, life safety and fire protection

- Inclusion of new categories of starred hotels, heritage structures and archaeological monuments for fire safety provisions

- Substitution of halon based fire extinguishers / fire fighting system

- Promotion to new/innovative building materials/technologies

- Inclusion of latest provisions for earthquake resistant design and construction

- Inclusion of details on multi - disaster prone districts

- Inclusion of new chapter on design and construction using bamboo

- Chapter on prefabricated and composite construction for speedier construction

- Updation of provision of safety in construction

- Complete revision of provision on building and plumbing services in line with applicable international practices

- Provisions on rain water harvesting

- Inclusion of new chapter to cover landscaping needs

Conclusion:

The prevalence of unsafe and illegal housing in India is due to lack of housing coupled with high population growth. Illegal buildings are attractive to lower-income people because of the low housing costs. The Ministry of Housing and Urban Poverty Alleviation reported that there are approximately 19 million families with inadequate housing. To meet the demands, there are many buildings constructed illegally. Checking illegal construction is a very difficult task for administration. Government of Maharashtra has already started working on it and has begun demolition drive in various districts of Maharashtra to avoid building collapse in future. Illegal construction is also due to prevailing corruption in the society. For a small token amount, many lives are staked. Stern rules and strictness in following them must be incorporated to keep a check on corruption. Following building codes laid by Bureau of Indian Standards is essential when constructing structures for safe and strong building. There must be some buyer's guidelines that can help buyers find a proper shelter for themselves. Awareness on the basic knowledge of building construction must also be popularized to educate about building safety before people invest their hard earned money in a building project. Speedy investigation is also required on such incidents, which will go a long way towards confidence building in masses and discourage unscrupulous builders against constructing substandard

buildings. Mainstreaming the disaster risk reduction in all development activities is likely to be the ultimate remedy for such avoidable man-made disasters in future.

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3. UTTARAKHAND FLASH FLOODS - JUNE 2013

The Disaster:

The State of Uttarakhand, being part of the Himalayan region, is extremely vulnerable to natural disasters. Natural hazards, like earthquakes, landslides, avalanches, cloudbursts, hailstorms, Glacial Lake Outburst Floods (GLOFs), flash floods, lightning, and forest fires, etc. have been a cause of major disasters in the State.

On 16 June 2013, the State suffered yet another mega disaster, one of the worst disasters in the living memory, causing widespread damage and destruction, besides heavy casualties. The entire State was hit by very heavy rainfall and flash floods. Though all the thirteen districts of the State were hit, five districts, namely Bageshwar, Chamoli, Pithoragarh, Rudraprayag and Uttarkashi were the worst affected. The disaster coincided with the peak tourist and pilgrimage season, significantly enhancing the number of the casualties and adversely affecting the rescue and relief operations.

The impact of disaster was most pronounced in the Mandakini valley of the Rudraprayag district. Torrential rains, coupled with the probable collapse of the Chorabari Lake, led to flooding at the Kedarnath Shrine and the adjacent areas of Rambara, Agastyamuni, Tilwara, and Guptkashi.

Other pilgrimage centers in the region, including Gangotri, Yamunotri and Badrinath, which are visited by thousands of devotees during the summer season, were also affected. People in important locations, such as the Harsil, Roopkund and Hemkund Sahib, were stranded for days together. Over one lakh people were stuck in various regions of the State due to damaged roads, landslides and flash flood-induced debris.

As per the latest report made available by the State Government on 09 May 2014, a total of 169 people died and 4021 people were reported missing (presumed to be dead).

Causes of the Disaster

The disaster essentially occurred due to wide spread heavy rains during the period 14-18 June, which resulted in flash floods in all the major river vallies in the State. Heavy rains triggered major landslide at numerous locations causing severe disruption in surface communications.

Extreme rainfall is not an uncommon phenomenon in the region. The historical record (figure 1) suggests that extreme precipitation in one or the other districts of Uttarakhand is quite frequent. The heavy rainfall in the region was the result of convergence of the southwest monsoon trough and westerly disturbances (Figure 2), which led to the formation of dense clouds over the Uttarakhand Himalaya (Figure 3).
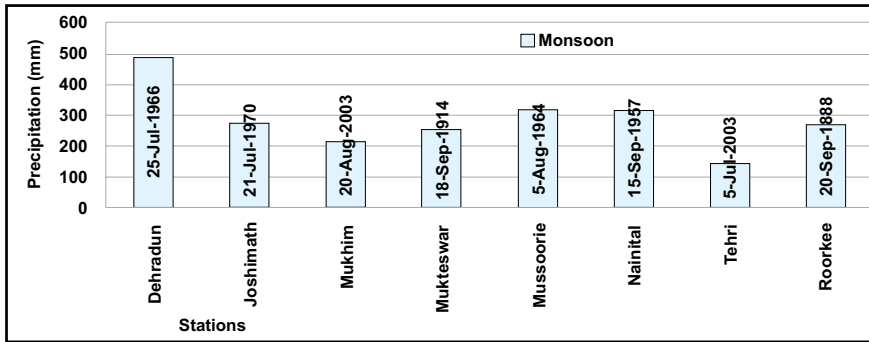

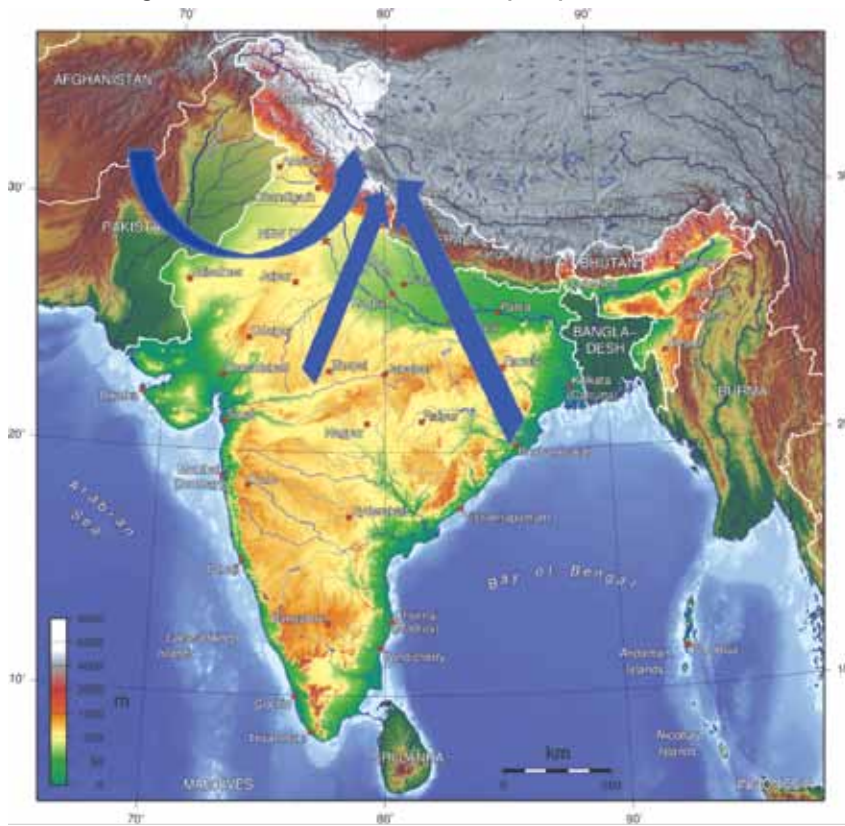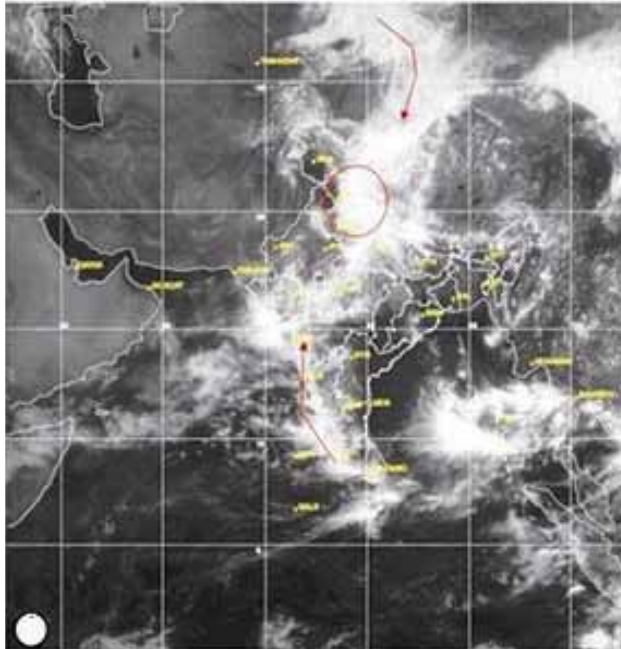**Figure 1: Historical record of extreme precipitation in Uttarakhand**

Figure 2: Map showing fusion of Westerlies and Monsoon clouds in June 2013

Figure 3: The Indian Meteorological Department image (17th June 2013) suggested heavy rainfall on the higher reaches of Uttarakhand, Himachal and Nepal Himalaya

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%. The cumulative rainfall from June 14-18 for all the IMD stations located in Uttarakhand is shown in Figure 4. Thus, it can be inferred that the disaster was the result of extra precipitation in a very short duration of time, which resulted in heavy water discharge in various rivers and streams.

The worst impact of the disaster on human settlements was in the Kedarnath shrine area (Gaurikund to Kedarnath), the Mandakini valley, the Alaknanda valley (at Gobindghat and upstream), the Pindar valley, and along the banks of the river Kali in Dharchula area.

The Kedarnath area in particular was impacted the most as it suffered unprecedented devastation with very heavy loss of life and property. Kedarnath Dham township is located at an altitude of 3583m on the banks of the river Mandakini, which originates from the Chaurabari glacier - about 4 kilometers upstream. It is connected by a motorable road from Rudraprayag up to Gaurikund (40 kms) and thereafter through a mule track (14 kms), running along the Mandakini river (Figure 5).
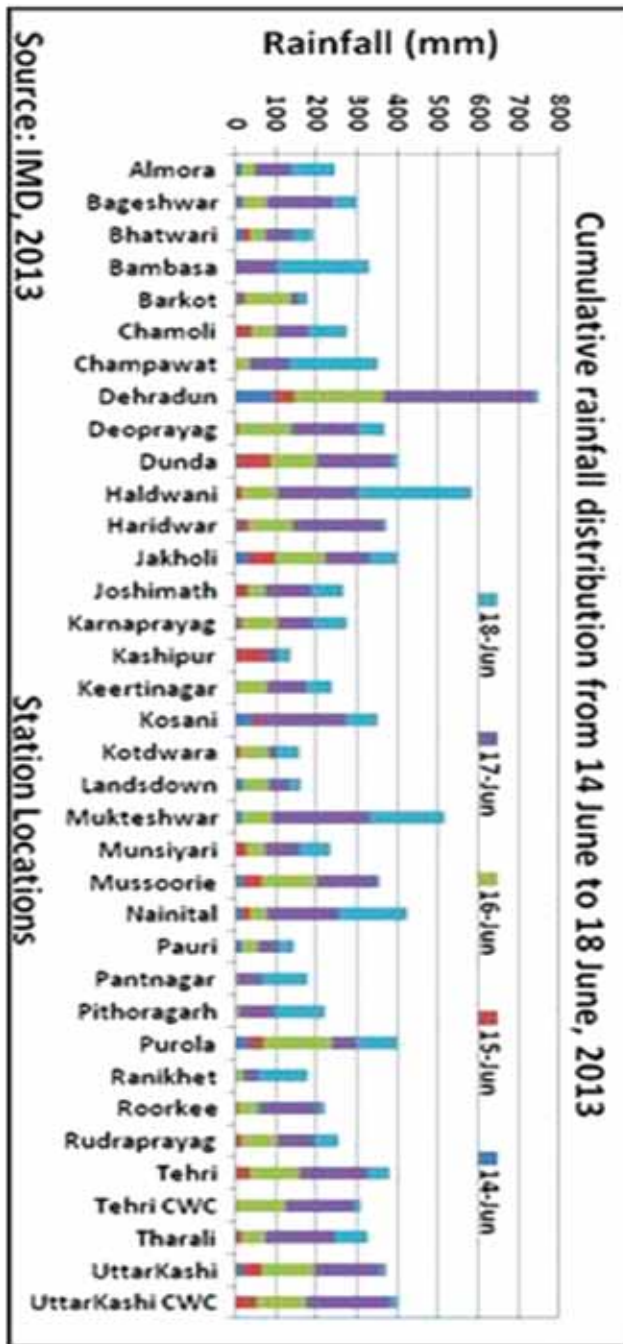
Figure 4: Station-wise accumulated rainfall from 14th to 18th June 2013

Figure 5: Track leading to Kedarnath along the Kedarnath area, Mandakini river.

A satellite view of the Kedarnath area, showing the Chorabari lake, drainage system and the township is given at Figure 6. The river Mandakini joins river Alaknanda at Rudraprayag.
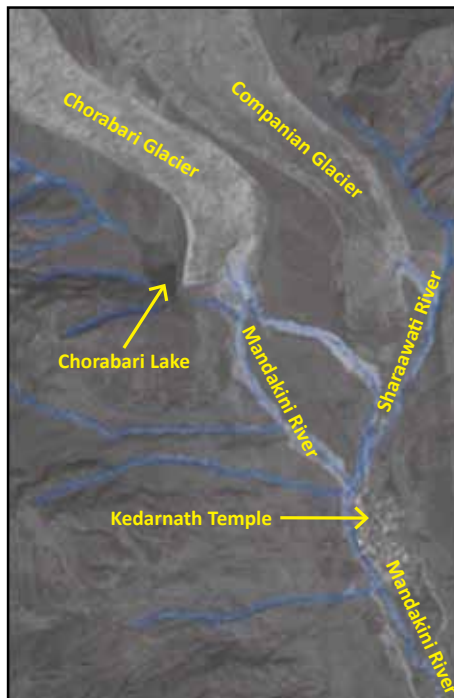

Figure 6: Satellite view of Kedarnath showing drainage system, glaciers, lake and township

The likely causes for the disaster in the area of Kedarnath have been a subject of several assessments.

As per the Geological Survey of India (GSI), heavy rainfall, which was about 375 per cent more than the benchmark rainfall during normal monsoon, caused the melting of Chorabari Glacier at the height of 3800 metres. This resulted into eruption of the Mandakini River causing heavy floods in the Rudraprayag district and adjacent areas. It was also observed that the heavy rains between 15 and 17 June resulted in exceptionally high rise in the river discharges. The rise in the river level was of the order of 5 - 7m, where the valley was wide and 10 – 12m where the valley was narrow. In the upper stretches of the Mandakini river the stream gradient is high and valley profile is mostly narrow. The gush of water running down from Kedarnath and Rambara areas brought mammoth sediment load which consisted of huge rock boulders with diameter ranging from 3 - 10m. The heavy sediment load along with big boulders acted as a tool of destruction and obliterated everything that came in its way. The enormous volume of water also induced toe erosion along all the river valleys, which in turn, triggered landslides at a number of places.

Presenting another view, Shri D. P. Dobhal and others affiliated to the Wadia Institute of Himalayan Geology, have maintained that the disaster in the Kedarnath area occured due to two distinct events which occurred around 5:15 in the evening on 16 June and around 6:45 next morning on 17 June 2013 respectively. These are described separately as under:-

● Event 1: Torrential rains on 15 and 16 June flooded the Saraswati River and Dudh Ganga catchment area, resulting in excessive flow across all the channels. (Meteorological stations near Chorabari glacier recorded 325 mm rainfall at the base of the glaciers on these two days.) The voluminous water studded with debris from the surrounding regions and glacial moraines struck the Kedarnath town in the evening on 16 June, washing off upper part of the city (Sankaracharya Samadhi, Jalnigam guest house, Bharat Seva Sangh Ashram, etc.) and leading to the biggest ever devastation seen in the region. Due to heavy downpour, the town of Rambara was also completely washed away in the evening on 16 June.

● Event 2 : The second event occurred on 17 June 2013 at 6:45 AM, after overflow and collapse of the Chorabari Lake which released large volume of water that caused another flash flood in the Kedarnath town leading to further devastation downstream (Gaurikund, Sonprayag, Phata, etc.). The moraine dammed lake collapsed essentially due to torrential rains resulting in accumulation of millions of gallons of water in the lake within a short span of three days.

Figure 7: Kedarnath before the flood   **Figure 8: Kedarnath after the flood**

In the overall context, the prolonged torrential rainfall was probably the main cause of the disaster in Uttarakhand. The loss of human life in the districts of Uttarakashi, Bageshwar, Chamoli and Pithoragarh was relatively less as compared to the Kedarnath valley. As per the eye witnesses and technical inputs received from various agencies, the possible causes of the disaster could be summarized as:-

1. Collision of western disturbances with monsoon easterlies.

2. Excessive precipitation in very short span of time.

3. Heavy erosion and the accumulation of large volume of water and sediment accumulation in major river beds due to excessive rainfall.

4. Run - off of loose debris, moraine and boulders with excessive force washing off all that came in its way.

Impact of the Disaster

The disaster caused heavy loss of precious lives and extensive damage to private properties and public infrastructure. More than nine million people were affected by the flash floods. The five districts namely, Bageshwar, Chamoli, Pithoragarh, Rudraprayag and Uttarkashi were the worst affected. As far as casualty to human lives is concerned, as informed by the State Government on 09 May 2014, a total of 169 people died and over 4,021 people were reported missing (presumed to be dead).

Out of total missing persons, 846 people were from the State of Uttarakhand and 3,175 from the other states. The highest number of people reported missing were largely from Uttar Pradesh followed by Uttarakhand and Madhya Pradesh, accounting for more than half of the total number of people reported missing (Table 1).

Table 1: State-wise list of missing persons

S. No	State	Number of missing person
1.	Uttar Pradesh	1150
2.	Uttarakhand	846
3.	Madhya Pradesh	542
4.	Rajasthan	511
5.	Delhi	216
6.	Maharashtra	163
7.	Gujarat	129
8.	Haryana	112
9.	Andhra Pradesh	86
10.	Bihar	58
11.	Jharkhand	40
12.	West Bengal	36
13.	Punjab	33
14.	Chhattisgarh	28
15.	Odisha	26
16.	Tamil Nadu	14
17.	Karnataka	14
18.	Meghalaya	6
19.	Chandigarh	4
20.	Jammu & Kashmir	3
21.	Kerala	2
22.	Puducherry	1
23.	Assam	1
	Total	**4021**

The suddenness of the flash floods coupled with the high velocity of flow laden with heavy sediment, including boulders washed away pilgrims and locals. Apart from flash floods, people were also reported to be killed by landslides, which buried them alive under huge debris and rock falls. The difficult terrain and

blockage of roads made it difficult to provide necessary relief to the survivors stranded at isolated locations. The harsh weather conditions i.e. continuous rainfall, chilling cold and non-availability of proper shelter/clothes contributed to the misery endured by the survivors of the disaster.

As per report made available by the State Government, a total of 4,200 villages were affected, 11,091 livestock were lost and 2,513 houses were fully damaged. More than 70,000 tourists and 1,00,000 local inhabitants were stranded in the difficult mountain terrain of the upper reaches of the Himalaya. The damage was so enormous and extensive that it was also termed as Himalayan Tsunami by the media. The extent of damage as reported by State Government is depicted in Table 2.

Table 2: The extent of damage as reported by the State Government

S. No	Item	Details
1.	Number of affected districts	13
3.	Number of dead and missing persons (Presumed to be dead)	(169 + 4021)
4.	**No. of houses damaged :-**	
	(i) Fully damaged pucca houses	2,119
	(ii) Severely damaged pucca houses	3,001
	(iii) Partially damaged pucca houses	11,759
	(iv) Fully damaged kuchha houses	394
	(v) Severely damaged kuchha houses	360
	(vi) Number of kuchha houses partially damaged	1,676
	(vii) Number of huts damaged	471
	(viii) Cowsheds damaged	361
5	**Animals lost :-**	
	(a) No. of big animals lost	3,280
	(b) No. of small animals lost	7,811

Emergency Rescue and Relief Operations: Highlights

Search, rescue and relief operations during Uttarakhand disaster were the most difficult operations carried out in the Indian history of disaster management. Various Central and State level government and non-government agencies played a significant role in making this operation successful, despite difficult terrain, adverse weather conditions, disrupted roads and lack of telecom connectivity. Several ministries/agencies of the Central Government, departments/agencies of the State Government, governments of other states, NGOs, and corporate sectors, all helped in the evacuation/relief operations. The efforts of the Indian Air Force, the Aviation Corps of the Indian Army and the civil helicopters engaged by the Civil Aviation Department of the State Government played a stellar role in the rescue operations. Without their dedicated service, the rescue efforts would not have succeeded in the manner that they did.

Government of India Initiatives

Ministry of Home Affairs, Government of India provided necessary support in managing the Uttarakhand Disaster in an effective and efficient manner. All the relevant Central ministries were mobilized as soon as the matter came to the notice. The National Disaster Response Force (NDRF) was asked to send their teams to Uttarakhand on June 16 itself. The Home Secretary, Government of India, convened meetings of senior officers of NDRF, ITBP, BRO, Ministry of Defence and other ministries during June 17-19 to review evacuation and relief operations.   The National Crisis Management Committee (NCMC) reviewed the situation in the State on day-to-day basis.

Government of India supported the State Government in carrying out its evacuation and relief operations by providing support of armed forces and para-military forces, including NDRF. The supply of Aviation Turbine Fuel (ATF) for the air operations was a challenge, which was successfully met by the combined efforts of the Indian Air Force and the Ministry of Petroleum and Natural Gas.

To restore the communication, 105 satellite phones were distributed by the Government of India to various Central and state agencies. Besides, the efforts of BSNL towards restoration of communication were closely monitored by the National Crisis Management Committee.

Government of Uttarakhand Initiatives

During the entire crisis period, the Uttarakhand Government did its best to manage the calamity notwithstanding the gigantic proportion of the disaster. Soon after the disaster struck, the State Government initiated massive rescue and evacuation operations with the help of various Central and State Government agencies.

The State Government requisitioned the services of the Army, Air Force and Central Paramilitary Forces (ITBP, NDRF) on June 16 itself. A Coordination Committee was formed under the leadership of the Chief Secretary for conducting daily reviews. The entire rescue and evacuation operation was a joint effort of both the Government of India agencies and the State Government.

Despite the most arduous and difficult terrain, inclement weather and lack of connectivity, approximately 1,20,000 persons stranded/ trapped in different locations (which included both pilgrims and local residents) were safely evacuated and taken to the relief camps. The pilgrims were thereafter helped to board trains, buses or take their private transport/taxies etc. to their home stations. The major part of the evacuation was accomplished in less than a fortnight making it one of the largest and swiftest rescue/evacuation operations by the civil administration.

All the essential supplies like food, drinking water, medicines, kerosene oil, solar lamps, etc. were continuously provided by air dropping as well as by surface means. A total of 69 relief camps were run, where 1,51,629 pilgrims/ local residents were looked after. Some camps continued operating beyond the emergency phase for the local residents. Approximately 900 trucks of relief material were received from other states and dispatched to the affected districts from a nodal/ relief centre, set up at Dehradun.

Forty-three medical teams comprising of 313 doctors and 4977 para-medical staff, were deployed and essential medicines, bleaching powder and chlorine were regularly supplied. The Health Department of the State coordinated the effort to prevent outbreak of any epidemic. As a result, there was no incidence of outbreak of any epidemic or infectious disease in the State, in spite of the mass cremation of dead bodies and disposal of animal carcasses, or breakdown of potable water supply in some areas.

The State Government established a Missing Persons Cell on June 27 at the Disaster Mitigation and Management Centre (DMMC) at Dehradun. The "missing persons" data was managed with the support of International Business Machines Corporation (IBM) professionals. Facebook and Twitter accounts were opened, where state-wise photographs and other accounts were posted which provided a very successful backup. Missing Persons Cell made nearly 43,000 calls using the mobile numbers provided by the Department of Telecommunications which they could collect using the call data between 14 June and 19 June 2013. State-wise lists of missing persons were sent to Chief Secretaries of the concerned

states and repeated follow up was made to validate the information. As a result, after sifting the information through multiple filters, the Missing Persons Cell provided name-wise information of missing persons, which became the basis of issuing death certificates, as per procedure prescribed.

Role of the Armed Forces

The Armed Forces carried out the rescue and relief operations with a remarkable sense of urgency and professionalism. While doing so, the most important task was to trudge every trail and comb the entire area of responsibility, find survivors, lift and assist the stranded and shift them to relief centres. Thereafter, arrangements were made to evacuate them safely.

Figure 6: Evacuation by Army Jawans

Rescue operations in Uttarakhand were a war against nature's fury that was inflicted on pilgrims and residents of the State who were unprepared and incapable to face it. An overwhelmingly large number of victims were people from the plains, who were unaccustomed to the physical stress of sustained walking or climbing in the mountains. The other daunting factor was the inclement weather itself that continued throughout the operations in long or short spells, disrupting the efforts.

The Indian Army Operations

Reconnaissance parties of Army were moved forward proactively to assess the situation. No headway could be made as the bridges had been washed away and the parties got stuck. This necessitated launching of additional parties. Bad weather did not allow flying of helicopters on reconnaissance missions either.

Figure 7: Aviation base for rescue and relief

The picture started becoming clearer by the afternoon of 17 June. In the evening, DM Rudraprayag requisitioned the local Army Formation/ Units in 'Aid to Civil Authorities'. The severity of the disaster was not known initially. By 17/18 June 2013, based upon available inputs regarding threat to human lives and damage to infrastucture, an adaptive planning process was put in place. Thereafter Operation Surya Hope was launched by the Army.

Figure 8:   Rescue operations by Indian Army across river in spate

At the commencement of operations, about 5600 troops were deployed. But seeing the magnitude of the problem two days later, the strength was reinforced to approximately 8,000 troops. On 21 Jun 2013, 150 Special Forces Paratroopers were deployed to undertake search and rescue operations in valleys, gorges and inaccessible areas.

Fourteen helicopters of Army Aviation were pressed into action, which flew 737 sorties and transported about 30 tons of relief material. Army aviation helicopters were also used to establish a helicopter bridge at Govindghat which fast tracked evacuation operation to Joshimath significantly.

Additional Engineer Task Forces were deployed along each axis to clear the landslides and breaches. The troops were tasked to construct ropeways, makeshift rope bridges and foot bridges.

Figure 9:   Army personnel opening mountain tracks

Twenty-four medical teams were deployed by the Army in the affected areas from Military Hospitals located in Dehradun / Uttarakhand. Two psychologists from Military Hospitals at Bareilly and Jabalpur were also deployed.

With a large footprint on the entire affected area, innovative employment of Special Forces personnel, continuous interaction between military commanders and civil administration and reassurances to the affected people, the loss of life was minimized significantly. The soldiers were able to bring back people stuck in valleys and gorges to safe areas. More than 45,500 people were rescued by the Army.

Figure 10: Medical camp for victims by Army   **Figure 11: First aid to animals**

The Indian Air Force Operations

The unprecedented magnitude of destruction caused by the flash floods in Uttarakhand called for an immediate and large scale relief and rescue effort. The IAF responded to this enormous challenge with characteristic speed, resolve and fortitude launching 'Operation Rahat'. IAF resources were marshalled from different corners of the country, and up to 45 helicopters and 13 transport aircraft were involved during the major part of the operations.

The entire IAF team, be it the men or women who flew the helicopters in a difficult environment marred by frequent spells of bad weather or the transport crew, pitched in with all the resolve. The C-130J Hercules transport aircraft provided innovative solution and was used as mobile weather platform as well as an Airborne Command Post. The Hercules was also used as an 'Air Bridge' to ferry fuel and rescue people from Dharasu to Delhi. Bridging equipment from distant locations was airlifted by AN-32 aircraft to Jolly Grant airfield to support BRO efforts.

Most of the helipads at Kedarnath, Badrinath and Guptkashi were washed away and operations had to be undertaken from make shift helipads. Here too, innovative solutions and sheer determination to ensure accomplishment of mission, allowed the IAF to deliver. At some locations, personnel were winched down, so that they could create some clear areas for landing. Once created, these makeshift landing sites were used, even though at

Figure 12: The Indian Air Force in action

certain sites carriage of pay load was restricted to 'Out of Ground Effect' (OGE) configuration. Further, most of the helipads could accommodate single helicopter only, forcing staggering of missions to the affected areas. Advanced Landing Ground (ALG) at Dharasu was unfit to undertake fixed wing operations due to thick vegetation along the edges of the runway and dispersal. IAF personnel mustered ITBP and BRO services to make it fit for C-130 J landing.

The sheer scale of rescue effort to save lives was compressed into a very tight timeframe whilst operating in difficult mountainous terrain and that too under some very hostile weather conditions. IAF flew 3702 sorties, evacuated/airlifted 24260 passengers and lifted 894.899 tons of valuable relief supplies - a Herculean effort indeed by any standards. This unprecedented and prompt response has already been recorded as the largest relief operation ever. This operation, above all, was a most effective demonstration of the core values and motto of the IAF 'People First, Mission Always' to the countrymen.

As the evacuation process completed, the IAF shifted gears and moved into Phase-II of the 'Operation Rahat'. With a different approach and new strategy, IAF stepped forward to support Government of Uttarakhand in rebuilding roads, communication links and shelters for the locals, resuscitating their sources of livelihood and sustenance.

The Indian Navy Operations

Two Marine Commandos (MARCOS) teams were deployed at Dehradun from 25 June 2013 onwards. The teams undertook search and rescue operations at Haridwar and along the Rudraprayag - Guptkashi axis in conjunction with NDRF and local authorities. On successful completion of tasks given by the Disaster Mitigation and Management Centre Uttarakhand, the teams were de-inducted on 04 July, 2013. Subsequently, as part of rehabilitation effort, a community kitchen was set up at Augustmuni, Rudraprayag catering for about 400-500 pilgrims daily by the Indian Navy Personnel.

Indo-Tibetan Border Police (ITBP)

The ITBP being the sentinel of the Himalayas are deployed all along the border and have been the first responder during several natural and anthropogenic disasters since its inception. On receipt of weather alerts from IMD, directions were issued to Sector Head Quarters (SHQ) and units under their command to take appropriate steps. Units were advised to keep wireless communication on listening watch, report any eventuality and establish lookouts at all vulnerable points. All units were directed to be in readiness for disaster response.

Figure 13: ITBP rescuing survivors of flash floods from risky mountain terrain.

The ITBP commenced its operations under guidance of the Inspector General, Northern Frontier in the Uttarkashi/Dehradun axis and the Tawaghat – Dharchula axis on June 16, on the Badrinath axis on June 17, on the Kedarnath axis on June 18, and on Ghagaria – Hemkund axis on June 19 onwards. It

deployed 1,600 personnel, 1,000 from Garhwal region and 600 from Kumaon region.

On the Joshimath-Govindghat-Badrinath axis, Govindghat-Hemkund axis and Niti axis the ITBP personnel evacuated about 24,056 stranded people. They also extended support and help for helicopter evacuation to 5,664 stranded people, provided medical treatment to 2,562 people and food and shelter to 1,952 people. On the Rudraprayag–Kedarnath axis, ITBP rescued 6,663 stranded people by surface and provided assistance for evacuation by helicopter to 3,038 affected people. They also provided medical treatment to 12 people and provided food and shelter to 1,245 affected people. Along Uttarkashi-Harsil-Gangotri & Uttarkashi-Dharasu-Yamnotri axis, ITBP evacuated 3,763 people by surface route and provided assistance for evacuation of 316 people by helicopters. Besides, they provided medical treatment to 387 sick people and food and shelter to 615 affected people.

In addition to above, ITBP provided 37 vehicles for evacuation of stranded pilgrims/locals from disaster affected area to Joshimath/Rishikesh. Ten ropeways/log bridges were made for evacuation of stranded pilgrims from disaster affected area. ITBP rescued 21 foreign nationals and recovered several bodies from the disaster affected areas.

National Disaster Response Force (NDRF)

National Disaster Response Force has been constituted for the purpose of specialist response to an impending disaster situation or disaster.

Ministry of Home Affairs, considering the fact that the NDRF as a specialized response force should be tasked with the primary responsibility of response in this disaster, decided to depute the force to Kedarnath valley. The valley was completely cut off from all land routes and the only mode of reaching the valley was through helicopters. The NDRF team was air dropped at Kedarnath. In extreme harsh weather conditions and with almost no support structure at Kedarnath, the NDRF personnel exhibited extreme dedication to duty. They carried out search and rescue operations in Kedarnath-Jungle Chatti, Gaurikund-Rambada-Bhairav Chatti, Guptkashi-Phata-Sonprayag-Gaurikund and Badrinath-Harshil/Sukhi top areas.

During its operations from June 18 to July 19, NDRF personnel successfully rescued 9,044 people from different affected areas of Kedarnath (1053), Jungle Chatti (907), Gaurikund (756), Guptkashi (1,281), Sonprayag (2,000), Sukhitop (120), and Badrinath (2,927). In addition, NDRF also rescued 14 foreigners of Singapore. The team provided medical aid to 881 pilgrims/tourists. The force also helped in setting up helipad and evacuation of stranded people from Jungle Chatti area.

Figure 14: NDRF providing basic amenities to survivors during emergency search and rescue operations

Rescue and Relief Operations–Overview

- NDRF deployed 14 teams for the operation and rescued more than 9,044 persons.

- ITBP had deployed about 1,600 personnel for the operation and rescued more than 33,000 persons.

- IAF had deployed about 45 helicopters for the operation and rescued more than 23,500 persons.

- Indian Army had deployed 8,000 personnel including 150 Special Forces Troops and rescued more than 38,500 persons. 12 army helicopters were also deployed.

- Twenty civil aircrafts were utilized by the State Government in the operations which evacuated approximately 12,000 persons.

- Nehru Institute of Mountaineering, Uttarkashi, formed five rescue teams of 20 instructors and local youth, and evacuated more than 6,500 stranded persons.

- More than 1,35,000 persons were evacuated from the affected areas in the shortest possible time, notwithstanding widespread destruction of roads, difficult terrain and extremely hostile weather.

- There may be overlapping in number of persons rescued by agencies mentioned above, as the same person could have been rescued by different agencies at various stages of rescue operation.

- As on October 11, DNA samples of 319 dead bodies and 11 of relatives had been sent for analysis.

UAVs (Unmanned Aerial Vehicles) were deployed to scan the whole area of Kedarnath, mainly to identify the possible presence of survivors in the inaccessible areas. Nearly fifty sorties were carried out by using UAVs, helping rescuers to locate stranded people in forests, hills, and other isolated areas far away from Badrinath and Kedarnath.

Supreme Sacrifice by the First responders

On June 25, an IAF helicopter (Russian-built Mi-17V5) crashed near Gaurikund due to bad weather, while dropping loads in the area. The chopper went down North of Gaurikund, at around 12.30 PM. All the 20 rescuers (05 from IAF, 06 from ITBP and 09 from NDRF), perished in the mishap. On the same day, a team of "GARUD" (The Indian Air Force Commandos) was deployed in the area which recovered the mortal remains of the personnel killed in the accident.

Figure 15: Homage to martyrs

Names of the martyrs who sacrificed their lives during the rescue operation are as follows:-

Indian Air Force

- Wing Commander Darryl Castelino, Pilot
- Flight Lieutenant K. Praveen, Co-Pilot
- Flight Lieutenant Tapan Kapoor
- Junior Warrant Officer Akhilesh Kumar Singh
- Sergeant Sudhakar Yadav

ITBP

- Sub Inspector Jayendra Prasad
- Constable Nand Kumar
- Constable Sarvesh Kumar
- Constable Jomon PG
- Constable Bibhuti Roy
- Constable Ajay Lal

NDRF

- Commandant Nitya Nand Gupta, Second-in-Command
- Inspector Bhim Singh

- Sub Inspector Satish Kumar
- Constable K Vinaygan
- Constable Basavaraj Yaragatti
- Constable Santosh Kumar Paswan
- Constable Sanjiva Kumar
- Constable Pawar Shashi Kant Ramesh
- Constable Ahir Rao Ganesh

Key Recommendations / Lessons Learnt

The Uttarakhand flash floods of 16 - 17 June 2013, were one of the worst disasters to strike Uttarakhand. Though the disaster essentially occurred due to natural hazards, the vulnerability to the disaster was enhanced manifold by anthropogenic activities. The disaster revealed several infirmities in our preparedness, which need to be rectified at the earliest. Some of the important lessons learnt and key recommendations are listed below:-

1. Flood Plain Zoning Act regulating construction within the flood plain of a river should be implemented strictly.

2. 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).

3. Landslide risk zonation mapping be completed on priority. Development and enforcement of guidelines, regulations and codes for landslides is critical.

4. Effective stabilization of slopes in shear and weak zones be undertaken using scientific techniques available at national/international levels.

5. Blasting for developmental activities be avoided as it may destabilize the weak rocks in mountainous regions.

6. A Special Central Programme be undertaken for construction of new roads and renovation of existing roads in a scientific manner.

7. Disaster management plans be regularly reviewed and updated to ensure a functional structure and accountability for all actions initiated by the State Government to enhance preparedness.

8. Emergency Support Organizations at state level viz SDRF/Civil Defense and Home-Guards be organized, trained and equipped to perform their roles more effectively in response operations.

9. The existing emergency communication system be reviewed regularly to ensure last mile connectivity during disasters.

10. 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.

11. Tourism related development should not be allowed along the river banks.

12. An effective pilgrim control and regulatory body should be constituted for control and management of pilgrims/tourists.

13. Sectoral training in various discipline of disaster management and capacity building at various levels including communities should be given due importance.

14. Stockpiling of essential items like food grains, blankets, medicines, etc. must be ensured at block/panchayat levels in designated areas for an emergency.

15. Supply of essential commodities by animal transport in remote disaster-prone areas should be examined on regular basis and included in relevant disaster management plans.

16. The community-based disaster management system at the local level must be given utmost importance and strengthened through appropriate training and awareness programmes.

17. The mechanism of Incident Response System be established at relevant levels and be dovetailed into the disaster management plans. State and district agencies should build their command and coordination structures to support the local command and coordination structures during an emergency.

18. Need to integrate the contributions of volunteers and non-governmental organizations in disaster response at the State level. This integration would be best achieved at the district and local levels. NGOs should be engaged in the planning process for their involvement in a joint response.

19. The aspect of psycho-social support should be integrated into the medical plans for the disaster affected people.

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4. CYCLONE "PHAILIN"

Introduction:

This write-up is based mainly on the documentation report submitted by Dr. Surya Parkash, Associate Professor, NIDM after the field visit to cyclone affected areas (Parkash, 2013), National Workshop on Phailin Cyclone 2013: Lessons Learnt, organized on 30 May 2014 by NIDM (Parkash and Saha Roy, 2014) and supplemented by information from other sources including memorandums submitted by Government of Odisha.

About 8% of the area in the country is prone to cyclone-related disasters. Recurring cyclones account for large number of deaths, loss of livelihood opportunities, loss of public and private property and severe damage to infrastructure, thus seriously reversing developmental gains at regular intervals.

The eastern coast of India occupied by large population is very vulnerable to cyclones. Although the coastline of Odisha is only about 17% of the Indian east coast, it has been affected by nearly 35% of all cyclonic and severe cyclonic storms that have crossed the east coast and associated storm surges and have often inundated large tracts of coastal districts.

About 10% of all tropical cyclones in the world are formed in the Bay of Bengal area, with return periods of 2-3 years for moderate to severe intensity cyclones. During the year 1971, cyclone near Paradip, Odisha killed about 10,000 people. The Andhra Pradesh Cyclone in 1977 hit Divi Seema, which generated winds exceeding 250 km/hr and killed 10,000 people. The super cyclone of October 1999 generated a wind speed of 252 km/hr with a surge of 7–9 m near Paradip in Odisha which caused unprecedented inland inundation up to 35 km from the coastline and killed about 9,893 people.

Tropical cyclones are characterized by destructive winds, storm surges and very heavy rainfall, and each of them have their impacts on human, livestock and infrastructures. Storm Surges alone are responsible for 90% of the loss of lives associated with cyclone disaster. Tropical cyclone has been very common in the east coast. The eastern coast of India is located at a vulnerable location

where most of the cyclonic storms originate due to low pressure systems over warm tropical waters with temperatures greater than or equal to 26.5ºC. More than 85% of all cyclones originate in the north Indian Ocean, affecting the coastal states of Andhra and Odisha. The physical structures make it even more susceptible to cyclones as they have wide openings with large catchment areas and deltas in the region (Mahanadi delta, Krishna delta, Godavari delta). The rivers here have a large number of distributaries and large catchment areas making them vulnerable to heavy rainfall and storm surges by cyclones.

Formation of Cyclone *'Phailin'*

A Very Severe Cyclonic Storm (VSCS) *'Phailin'* originated from a remnant cyclonic circulation from the South China Sea and formed as a low pressure area over Tenasserim coast on 6th October 2013. On 7th October, it formed a low pressure area over north Andaman Sea. Further, on 8th October, it concentrated into a depression over the same region (Latitude 12°00' N and Longitude 96°00' E). It started moving towards West-Northwest directions and then, it intensified into a deep depression on 9th October morning and it turned into Cyclonic Storm (CS), *'Phailin'* the same day in the evening. It started moving Northwestwards, and further intensified into a Severe Cyclonic Storm (SCS) in the morning of 10th October 2013. By forenoon of 10th October, it turned into a VSCS over East Central Bay of Bengal. On 11th October, very rapid intensification occurred due to continuous organization of eye (It is the centre of a cyclone where the wind rotates in a counter-clockwise direction. In the centre of eye the wind is calm or slight and rainfall and cloudiness is nil or light) and spiral bands (Radiating outward from the eye wall is the banded structure within the clouds. These clouds are called either spiral rain bands or spiral bands). The VSCS, *'Phailin'* continued to move Northwest direction and crossed Odisha and adjoining north Andhra Pradesh coast. Ultimately, on 12th October 2013, at 22:30 hrs IST, the landfall took place near Gopalpur, Ganjam District of Odisha with a wind speed of approximately 220 km/hr.

On 12th October 2013, Cyclone *'Phailin'* crossed the coastline between 8.30 pm and 9.30 pm (local time), in south of the city of Brahmapur, Odisha. The mean wind speeds measured by satellite observations were about 120 kt (222 km/hr). Satellite imagery and Doppler Weather Radar Imagery of the VSCS are depicted in figure 1.
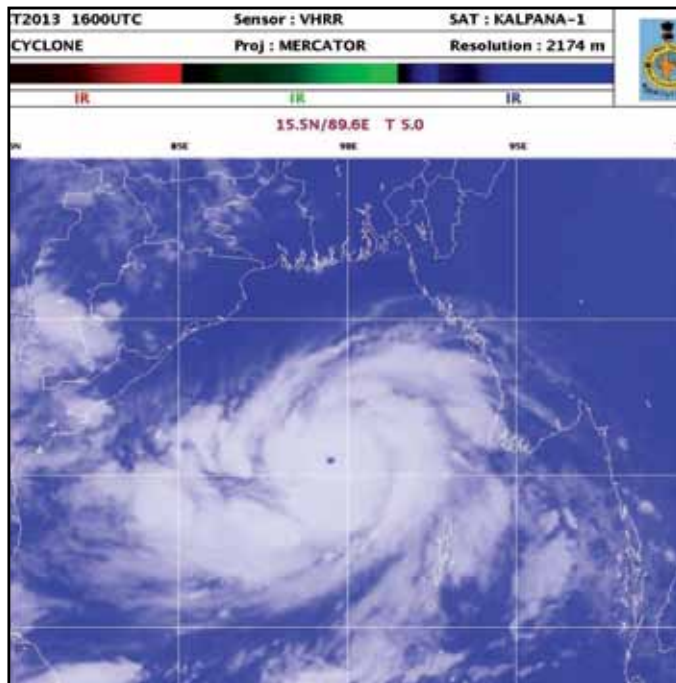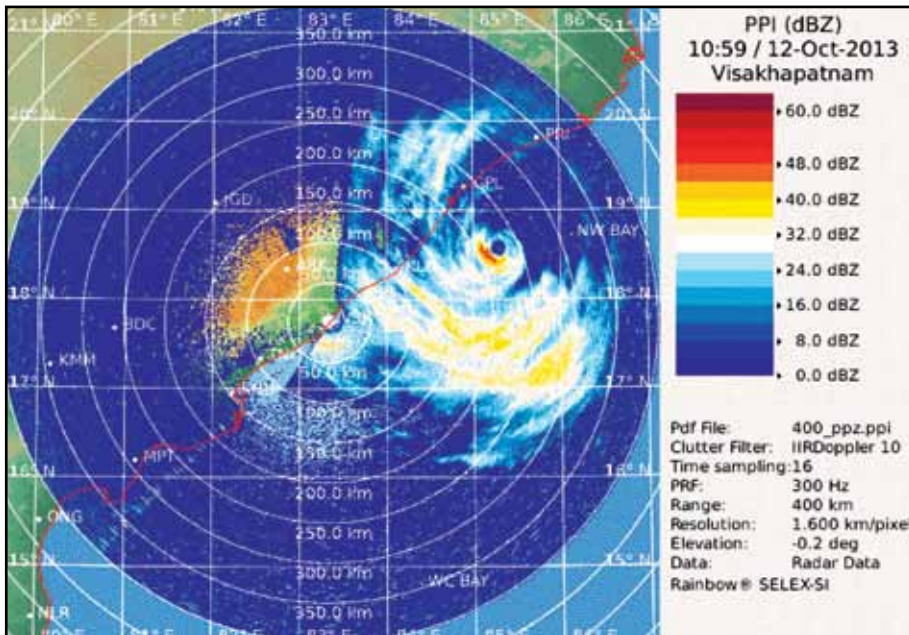
**Figure 1: Satellite Imagery and Doppler Weather Radar Imagery of
Very Severe Cyclonic Storm (VSCS) Phailin**

The data on wind speed received from IMD during the cyclone is mentioned in the table 1.

Table 1: Showing Wind Velocity at Different Places on 12th October 2013 during Landfall

Sl No	Places	Date	Velocity of wind in Km/hr
1.	Gopalpur	12.10.2013	214
2.	Puri	12.10.2013	223
3.	Paradeep	12.10.2013	121
4.	Bhubaneswar	12.10.2013	112
5.	Chandbali	12.10.2013	112
6.	Balasore	12.10.2013	84

Cyclone Tracking by IMD

On 8th October, the India Meteorological Department (IMD) reported about the formation of a depression over North Andaman Sea. The forecast and tracking of Cyclone Phailin by the IMD is shown in Table 2 and Figure 2.

Table 2: Tracking of the Very Severe Cyclonic Storm "PHAILIN"

Date	Time	Watch/Observation
08.10.2013	8.30 AM	Tracking of PHAILIN started: IMD indicated depression, at 1450 km east-southeast of Paradip
08.10.2013	11.30 AM	Depression, about 1350 km east-southeast of Paradip
08.10.2013	5.30 PM	Depression, about 1250 km east-southeast of Paradip
09.10.2013	5.30 AM	Depression, about 1100 km east-southeast of Paradip
09.10.2013	5.30 PM	Deep depression became cyclonic Storm Phailin, about 950 km south-east of Paradip
10.10.2013	8.30 AM	Intensified into severe cyclonic storm Phailin at 820 km south-east of Paradip coast
10.10.2013	11.30 AM	800 km south-east from Paradip coast
10.10.2013	8.30 PM	Intensified into very severe cyclonic storm Phailin at 650 km south-east of Paradip coast and 700 km from Gopalpur
11.10.2013	5.30 AM	520 km south south-east of Paradip coast and 530 km south-east of Gopalpur

11.10.2013	11.30 AM	500 km south south-east of Paradip coast and 490 km south-east of Gopalpur
11.10.2013	5.30 PM	400 km south south-east of Paradip coast and 400 km south-east of Gopalpur
11.10.2013	11.30 PM	375 km south south-east of Paradip coast and 345 km south-east of Gopalpur
12.10.2013	2.30 AM	355 km south south-east of Paradip coast and 320 km south-east of Gopalpur
12.10.2013	8.30 AM	200 km south-east of Gopalpur and 280 km from south south-east of Paradip coast
12.10.2013	11.30 AM	150 km south-east of Gopalpur and 260 km from south south-east of Paradip coast
12.10.2013	2.30 PM	90 km south-east of Gopalpur
12.10.2013	8.30 PM	Landfall process started
12.10.2013	8.30 PM to 9.30 PM	Landfall near Gopalpur with wind speed of 200-220 km/hr

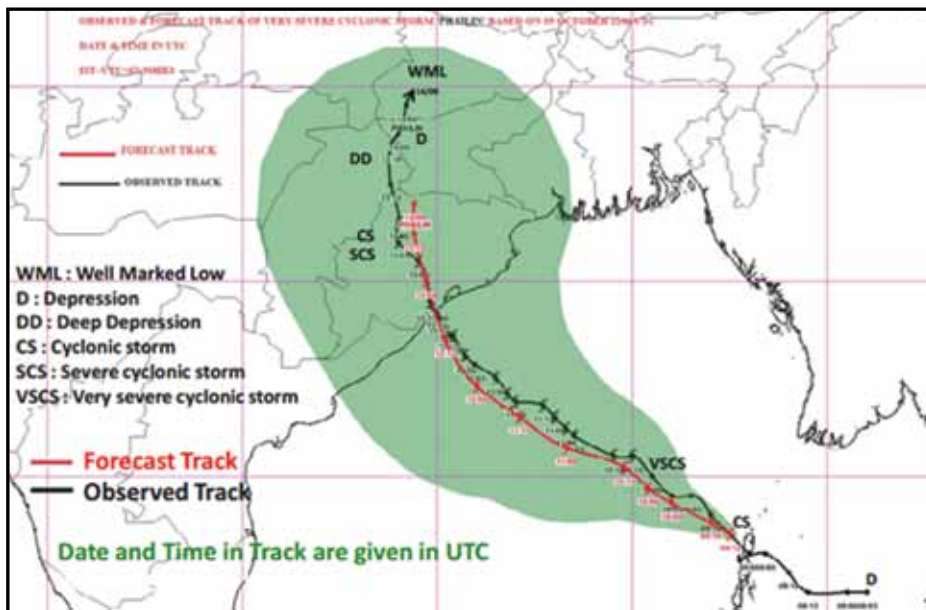
Figure 2: Forecast track along with cone of uncertainty (issued on 9th October 2013)

The VSCS, Phailin caused very heavy to extremely heavy rainfall over Andaman and Nicobar Islands, Odisha and isolated heavy to very heavy rainfall over North Coastal Andhra Pradesh, West Bengal, Jharkhand, Chhattisgarh and Sikkim. The cyclone generated a storm surge up to 3.5 m above normal, and inundated

large low lying areas in the coastal districts of Ganjam, Puri, Khurdha, and around the Chilika lagoon of Odisha.

Torrential Rains

Due to the effect of cyclonic storm, the State of Odisha faced torrential rainfall from 9th to 14th October 2013. The Ganjam district of Odisha was severely affected by Cyclone Phailin and the cumulative amount of rainfall (between 9th and 14th October 2013) was recorded as 241.1 mm (Table 3). The highest rainfall during the period from 9th to 14th October 2013 was recorded in Khurdha district (273.3 mm) of Odisha. The rainfall recorded at various districts is given in table 3 and graphically represented in figure 3

Table 3: Showing the distribution of rainfall from 9th October to 14th October 2013

Sl No	District	Rainfall in mm						Total Rainfall (mm
		9th Oct	10th Oct	11th Oct	12th Oct	13th Oct	14th Oct	
1.	Angul	13.3	16.1	0.4	4.7	101.1	8.7	144.2
2.	Balasore	32.5	18.5	0.0	25.4	125.4	34.9	236.7
3.	Bhadrak	23.3	9.9	0.0	49.5	99.3	22.8	204.8
4.	Bolangir	1.4	4.0	0.6	4.9	38.4	13.6	62.9
5.	Cuttack	14.8	13.4	0.0	24.2	124.2	26.8	203.4
6.	Gajapati	5.8	14.5	1.1	10.0	120.2	0.2	151.8
7.	Ganjam	4.6	25.0	4.1	24.4	183.0	0.0	241.1
8.	Jagatsinghpur	19.4	9.4	0.0	62.5	88.8	9.6	189.7
9.	Jajpur	23.3	5.8	0.0	36.9	129.7	44.3	240
10.	Kandhamal	16.8	9.0	0.8	9.3	153.2	9.0	198.1
11.	Kendrapada	43.3	9.2	0.0	29.8	95.7	11.4	189.4
12.	Keonjhar	24.0	19.8	0.0	13.1	125.4	33.4	215.7
13.	Khurdha	12.8	28.8	0.0	42.2	185.2	4.3	273.3
14.	Koraput	8.2	12.3	4.8	0.7	13.9	3.3	43.2
15.	Mayurbhanj	25.9	10.8	0.1	15.8	159.8	55.9	268.3
16.	Nayagarh	2.0	21.9	0.6	35.0	201.5	0.8	261.8
17.	Puri	15.7	13.0	10.5	55.3	106.5	20.6	221.6
18.	Deogarh	2.2	20.8	0.0	0.0	60.0	17.1	100.1
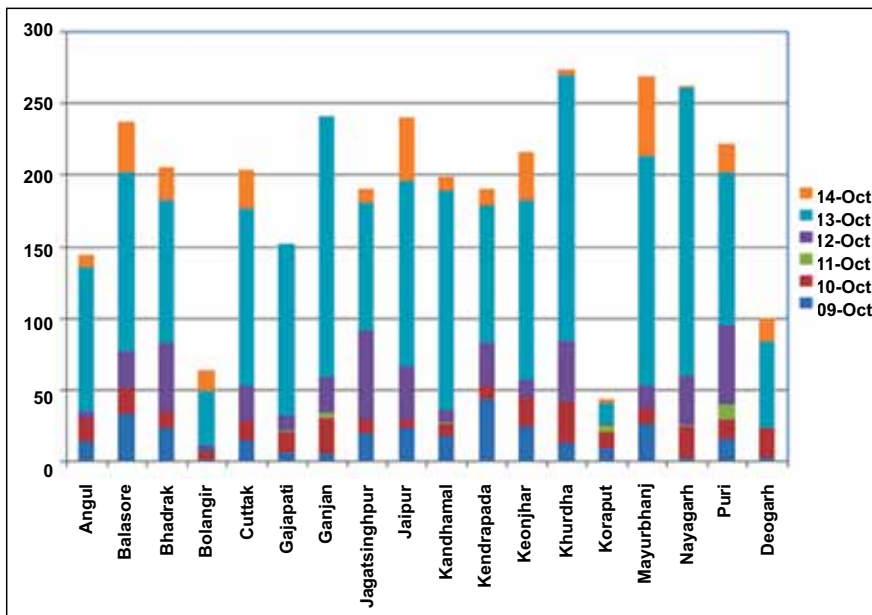
Figure 3: District wise distribution of rainfall during 9th – 14th October 2013

Due to heavy rainfall from 12th to 14th October 2013, number of rivers such as Baitarani, Budhabalanga, Rusikulya, Subarnarekha and Jalaka witnessed floods/flash floods and inundated the downstream areas of Bhadrak, Keonjhar, Balasore, Mayurbhanj, Ganjam and Jajpur districts.

Impact:

Cyclone Phailin caused extensive damage to infrastructure though there were a few casualties reported. As reported by the Government of Odisha the disaster affected 13 million lives and 2,56,633 houses were damaged. An accumulated land size of 0.78 mha of crop was lost, of which 0.56 mha was severely affected in Ganjam, Puri and Khardha districts. Phailin caused widespread disruption of power and water supply infrastructure. Main highways were affected by uprooted trees, eroded streets and congestion. The railway infrastructure also suffered severe damages.

A total of 45 people were reported killed (44 in Odisha and 1 in Andhra Pradesh), which is significant but small number, compared to similar events in the past. Due to one of the largest pre-disaster evacuations in the Indian history, the storm event did not cause major fatalities. The IMD continuously tracked the

cyclone and issued warnings days ahead of Phailin's landfall. More than 1.5 million people were brought to safe locations in Odisha and Andhra Pradesh. Following the cyclone, due to heavy rainfall, Baitarani, Budhabalanga, Rusikulya, Subarnarekha and Jalaka rivers witnessed floods/flash floods affecting the downstream areas of mainly Mayurbhanj, Balasore, Bhadrak, Keonjhar, Jajpur and Ganjam districts.

Odisha was more severely affected than Andhra Pradesh. In Odisha, eighteen districts (Angul, Balasore, Bhadrak, Bolangir, Cuttack, Deogarh, Gajapati, Ganjam, Jagatsinghpur,Jajpur, Kandhamal, Kendrapada, Keonjhar, Koraput, Khurda, Mayurbhanj, Nayagarh, and Puri) were affected (Figure 4). A total of 44 people were killed and a total population of 1,32,35,981 was affected. The extent of damage incurred during the Cyclone in the Odisha State is indicated in the table 4.

Table 4: Extent of Damage by Cyclone Phailin in Odisha

Item	Details
Total number of Districts in the state	30
Number and names of Districts affected	18 (Angul, Balasore, Bhadrak, Bolangir, Cuttack, Deogarh, Gajapati, Ganjam, Jagatsinghpur,Jajpur, Kandhamal, Kendrapada, Keonjhar, Koraput, Khurda, Mayurbhanj, Nayagarh, and Puri)
Number of villages affected	18,374
Population affected (in lakh)	13,235,981
Total cropped area affected	1,100,501
Estimated loss to crops	2,300 crore
Area in ha. (Where crop damage was more than 50%)	651,590
Number of houses damaged	541,200
Fully Damaged pucca houses	430
Fully damaged kutcha houses	121,246
Severely damaged pucca houses	7,174
Severely damaged kutcha houses	80,406

Partly damaged houses	180,628
Number of huts damaged	52,161
Number of cowshed damaged	99,155
Estimated value of damage to houses (Rs in Lakh)	222,147
Number of human lives lost	44
Number of persons with grievous injuries	28
Number of persons with minor injuries	53
Damage to public properties (in physical terms)	Length of state roads damaged: 1947.35 km Length of district roads: 8099 km Length of village roads: 17637.30 km Number of bridges/culverts damaged: 253 Number of school buildings damaged: 5825 Number of community assets damaged: 4199 Length of river embankment damaged: 874.48 km Length of canal embankment damaged: 765.81 km Number of minor irrigation projects damaged: 1269 Number of lift irrigation projects damaged: 641 Length of drainage channels damaged: 700.67 km
Estimated value of the damage to public properties (in Rs)	9,582 crore
Estimated total damage to houses, crops and public properties (in Rs)	14,373.47 crore
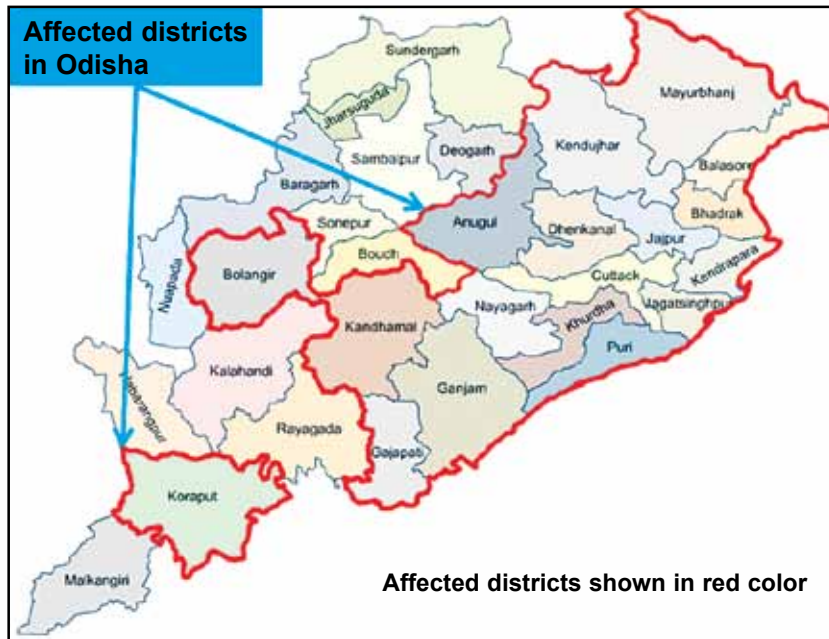
Figure 4: Map showing the affected districts of Odisha

The percentage of affected villages in the 18 districts is presented in figure 5 and affected population is indicated in the figure 6. The number of villages in Ganjam district were most affected followed by Jajpur district. Population in the Khurda district were the worst affected (16.8%) whereas, in the Ganjam district only 11.4% people were affected (Figure 6).
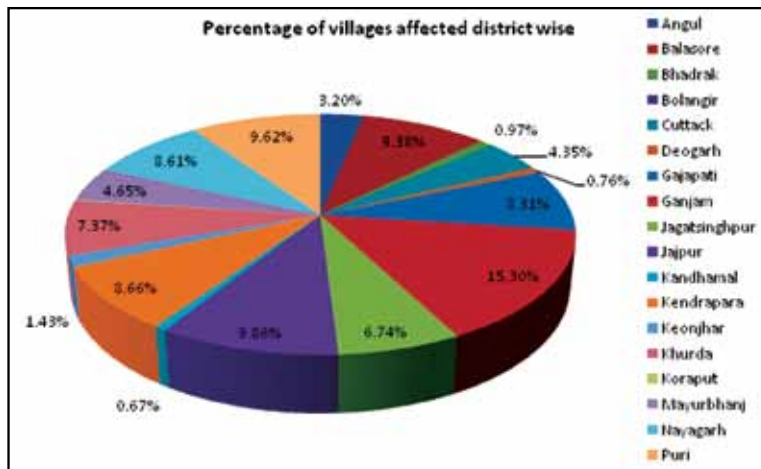
Figure 5: Villages affected district wise
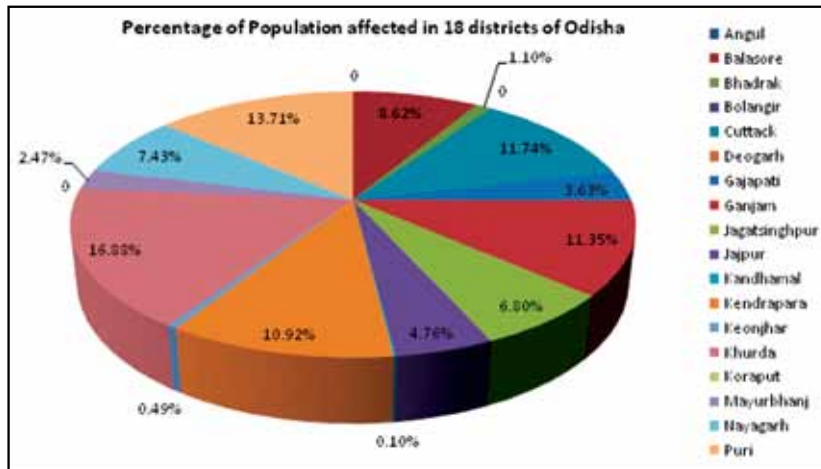
Figure 5: Population affected district wise in Odisha

The Cyclone caused a significant impact on the livestock in the State adversely affecting the food security of the affected households. The total number of livestock that were affected in the fourteen districts due to the cyclone and floods were reported as 7.05 million, which is about 16.7% of the total livestock population (Table 5, Figure 7). In addition, large number of livestock perished during the disaster in the State. These included 1,835 large animals (Cow/ Buffalo/Bullocks), 4,809 small animals (Goat/Sheep) and 1,72,874 poultry.

Table 5: Livestock affected district-wise in Odisha

District	Livestock (Large)	Livestock (small)	Poultry	Total
Balasore	301302	145018	0	446320
Bhadrak	170195	41530	72110	283835
Cuttack	525000	300000	325000	1150000
Dhenkanal	11	0	3000	3011
Gajapati	30000	12000	8000	50000
Ganjam	632000	253500	1110000	1995500
Jagatsinghpur	314256	117374	157987	589617
Jajpur	539827	196516	156652	892995
Kendrapada	20684	2378	32920	55982
Keonjhar	42247	18913	18359	79519
Khurda	2693	624	30	3347
Mayubhanj	40205	54277	111992	206474
Nayagarh	191809	106718	372815	671342
Puri	440581	190180	0	630761
Total	3250810	1439028	2368865	7058703
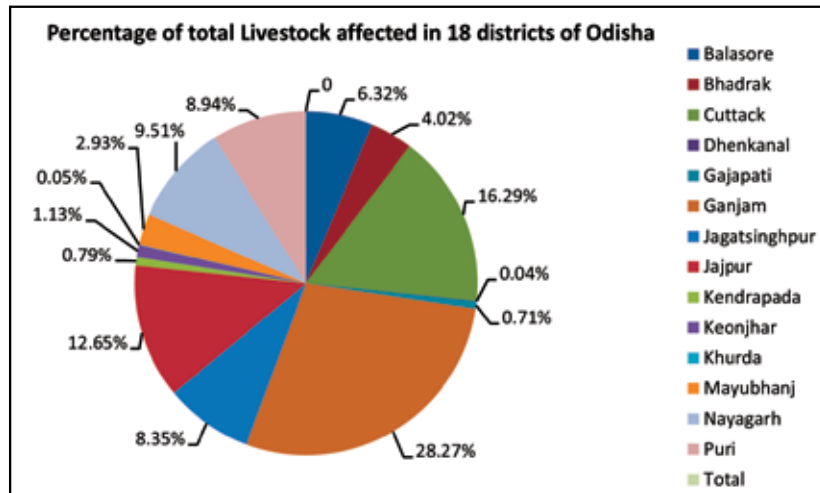
Figure 7: Distribution of Livestock affected District wise

Damage to Infrastructure

Massive damage was caused to public properties like canal / river embankments, roads, bridges, culverts, drains, water works, tube wells, lift irrigation (LI) points, electrical installations, telecommunications infrastructure, government buildings etc. 2,727 number of pucca houses and 55,269 kutcha houses were fully/severely damaged due to the cyclone and the flood thereafter. Besides 68,795 number of pucca houses and 1,29,842 kutcha houses were partially damaged. In total, 2,56,633 houses were either partially or fully/severely damaged (Figure 8).

Figure 8: Damaged houses in Odisha

A total of 12,811 number of public buildings were damaged, of which 12,296 were non-residential and 515 residential buildings. A large number of monuments (more than 3,000) were affected, damaged and brought to dilapidated condition. The roads were also badly damaged due to cyclone and floods. Damages to the embankments, road shoulders and the pavement were caused by rain cuts and inundation. A total of 1,936.36 km of major roads and 8,099 km of rural roads were damaged (Figure 9). Besides damaging the water supply network, the floods had also washed away or destroyed about 245 km of urban roads and 66.6 km of roadside drains (Figure 10). The cyclone followed by heavy rains caused floods, which severely affected the existing rural infrastructure and paralyzed access to basic services, particularly water and sanitation in 18,374 habitations located in 18 districts. A total of 3,040 piped water supply systems and 162,170 number of tube/bore wells were damaged.

Figure 9: Damaged and flooded road   Figure 10: Damaged infrastructure

Response:

Response, rescue and relief operations during the Phailin cyclone was exemplary and a landmark in the history of disaster management of the country. The timely action by different agencies and coordination among different stakeholders proved very effective and resulted into saving precious human lives.

Among various stakeholders, four agencies played important roles in the disaster management process, the local government, the State Government, the Central Government and other private organizations. After the IMD issued the first warnings on the 8th of October, collectors of all the cyclone-prone districts were alerted about the cyclone and were instructed to take immediate steps to ensure preparedness for public safety.

The respective state response organizations like the 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 were kept on alert for eventual deployment of resources for search and rescue operations. There were also mock drills being conducted at the cyclone shelters and the equipment were tested and it was ensured that everything was working properly. 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 proactive and well prepared to deal with the disastrous cyclone Phailin. In additions to the updates and warnings from IMD, the path, intensity and magnitude of the cyclone were continuously monitored at Odisha State Disaster Management Authority (OSDMA) and a wide range of preparatory activities were launched to face the furious cyclone with a zero casualty approach.

The Government of Odisha and OSDMA had commenced preparatory activities by immediately dispatching emergency assistance and evacuating people. Over one million people were evacuated within 36 hours preceding the landfall of the Cyclone, which was one of the largest emergency evacuations, ever carried out in the history of Disaster Management in India. These efforts were made in close collaboration with 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). The minimum human casualties achieved through the efficient and effective response action plan. About 185 medical teams were mobilized and 338 medical relief centres were opened. About 30 NGOs were also engaged in various vulnerable blocks of the coastal and flood-prone districts.

Immediately after receiving Cyclone warning by IMD, Government of Andhra Pradesh launched rescue operations with the help of APDRAF, 19 teams of National Disaster Response Force (NDRF) provided by the NDMA, 5 Columns of Army, 6 teams of Navy and two helicopters and 150 fire personnel were positioned in Srikakulam district.

In Andhra Pradesh, 149 cyclone relief camps were organized and 1,30,426 people were evacuated from low lying areas and accommodated in safe relief

camps by the respective District Administration for the calamity period. District-wise camps were organized as follows.

- Srikakulam: 52 relief camps were organized and 90,326 people were accommodated.

- Vizianagaram: 20,100 people were accommodated in 43 relief camps.

- Visakhapatnam: 24,000 people were accommodated in 30 relief camps.

Relief:

A total 10 units of ODRAF, 28 units of NDRF, 12 units of CRPF and 10 platoons of OSAP were pre-positioned at strategic and vulnerable places for search and rescue operations. Apart from these, 300 personnel of Indian Army divided into 4 groups were deployed at strategic locations of Ganjam, Puri and Cuttack districts for search, rescue and relief operations. More than 350 teams, mostly consisting of fire service personnel with some Home Guards, Civil Defence, and volunteers, were formed for various tasks to be performed in the pre and post-cyclone period. These response forces and teams were equipped with disaster response equipment like power saws, power boats, inflatable tower lights, cutters, and other handy tools. The teams assisted the local administration in evacuating people from low lying areas and moving them to cyclone shelters and relief camps. Besides every district being provided a satellite phone, a dedicated VHF network was also set up covering all districts and blocks.

In view of the extensive devastation, an emergency relief was sanctioned for a period of 7-15 days for the people of the cyclone and flood affected districts. The Indian Air Force used its helicopters for airdropping of food packets in the inaccessible and marooned areas. 5.7 MT of dry food was air dropped through 4 helicopters. 5.41 lakh families were provided polythene sheets for temporary shelters, since houses were damaged either fully or severely. Road connectivity was restored within two days at block levels, using heavy equipment to clear the roads.

In total 9,83,642 people were evacuated due to the cyclone and 1,71,083 people evacuated due to subsequent flooding. Over 0.5 million families were provided with temporary shelter and elaborate arrangements were made for safe drinking water and power supply. Medical teams and sanitation kits were also deployed to all affected areas. The State Government opened 4,197 free kitchens centres from 11 October 2013 onward that served food to more than two million affected people.

Relief measures taken up in the Cyclone affected areas by the Government of Andhra Pradesh included-

- Ex-gratia of Rs.1.50 lakh to the kin of the deceased.

- 1,45,100 food packets and 4,80,500 water packets were distributed in the relief camps.

- 3 lakh food and water packets were distributed outside the relief camps.

- 71 medical teams were formed and deployed.

- 127 paramedical personnel deployed.

- 164 medical camps were organized.

- Free distribution of 10 Kg of rice per family distributed to 34,805 Marine fishermen families.

Loss of livelihood

Due to cyclone and subsequent floods, 3,455 traditional craftsmen of 19 districts were affected due to damage to their equipment and raw materials. 767 number of handloom weavers were affected. Similarly, 11,111 number of sericulture farmers were also affected due to disaster.

In Andhra Pradesh, only three districts i.e. Srikakulam, Vizainagaram and Viskhapatnam were adversely affected due to cyclone Phailin. In total, there were 294 villages affected by the cyclone with only one casualty reported and 6,192 ha of paddy crop inundated. A total of 1,34,426 people were evacuated from the three districts of the state.

Lessons Learnt:

The effective management of Phailin cyclone set-up an example in the history of disaster management in the country. This exemplary way of managing the disaster with minimum damage, especially to human lives, taught number of lessons which may be successfully used in future for disaster management.

Some of the lessons learnt from management of Phailin cyclone are listed below:

- Timely and accurate forecasting and dissemination of information to stakeholders plays an important role in successful risk reduction.

- Effective coordination among different stakeholders plays an important role for successfully managing disaster risk.

- Implementation of Incident Response System (IRS) proved to be effective in efficiently managing the disaster.

- Mitigation of cyclone risk through bio-shield arrangement may be helpful in reducing the risk from cyclones to a great extent.

- Towers and buildings should be properly designed, tested and erected so as to withstand high wind speed.

- There is a need to design guidelines/IS code for design of cyclone shelters, house shelters and roof-top towers in areas vulnerable to cyclones.

- Need for development and implementation of Early Warning Systems for all hydro-meteorological disasters at local community levels is inescapable.

- Need to develop permanent structures/plans for communication systems (Telephone/mobile towers, TV/Radio channel, etc.) for improving dissemination of warnings before, during and after cyclones.

- There is a need for establishment of cyclone wind monitoring stations at the coastal region.

- There is a need for investment in advanced technology in various aspects, especially observational systems, data communications, management and delivery systems, models and software.

- Need to strengthen the health services, both for human and cattle in the cyclone and flood prone areas.

- Need to construct cyclones shelters at strategic locations is important for limiting casualties.

- Need for underground cabling of power lines in cyclone prone areas.

- Need to build disaster proof and resilient power system, infrastructure and buildings in future.

- Need to formulate Standard Operating Procedure (SoP) in terms of defining/ developing systems, processes, responsibility matrix, damage estimate, data-based decision support, etc.

- Need to strengthen institutional mechanisms and capacity building across the sector and stakeholders.

- Need to constant monitoring of critical infrastructures for safety standards in consonance with worldwide safety benchmarks and strengthen, where deficient.

Conclusion

Both the states of Odisha and Andhra Pradesh are highly vulnerable to cyclones due to their locational and morphological settings. Better early warnings, effective mitigation programmes and ground level educational enhancement/ awareness, effective planning and efficient management helped the State Government and others, in reducing the vulnerability of the population. Better education and awareness at grassroots level also helped in reducing the impact of the disaster. Pre-disaster response operation such as early evacuation of people from the risky areas helped in managing the disaster successfully.

Managing a disaster is itself a complex system which involves various specializations and organizations (scientists, government, media, and public) to work together to detect an impending disaster and enable the decision makers to take right decision during the event and to mitigate the disaster. Cyclone cannot be fully prevented but its impacts can significantly be reduced through mitigation measures, adaptations and preparedness.

A great appreciation for efforts like efficient early warning systems, tracking of cyclone, dissemination of information to respective authorities, quick actions on IMD warnings by State Government, deployment of personnel and resources at strategic locations helped in reducing loss of human lives. Rapid evacuation measures, initiated by national and state governments enabled evacuation of over 1.3 million people within short period of time. People in the region were more aware about cyclones and adopted measures to reduce their exposure. Many international organizations were bewildered about the evacuation and preparatory measures taken jointly by the Central Government and State Government prior the landfall of Phailin cyclone. The efforts of preparedness initiated by the State Government long back in 1999 cyclone ultimately helped them to respond quickly and effectively and in an efficient manner. The State Government deserves appreciation for their improved preparedness and successful management of the disaster.

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5. STAMPEDE (DATIA, MADHYA PRADESH AND ALLAHABAD, UTTAR PRADESH)

Introduction

Stampedes occur commonly due to unexpected overcrowding, lack of preparedness and inadequate crowd control at the incident site. In the year 2013 India experienced two major stampedes in February and December respectively. These stampedes occurred in Allahabad district of Uttar Pradesh and Datia district of Madhya Pradesh. It is worth noting that both the stampedes occurred during religious festivities and due to huge crowd gathering in the area. These two human induced disasters are explained below separately.

Stampede in Datia, Madhya Pradesh

Stampede site near Ratangarh temple in Datia district of Madhya Pradesh.

Datia is one of the important districts of Madhya Pradesh. The district has an area of 2,038 km² and population of 627,818 (2011 Census). Datia is bounded by Bhind district to the North, Gwalior district in the West, Shivpuri to the South and Jhansi district of Uttar Pradesh in the East. During Dussehra, the Durga temple of Ratangarh in Datia district is crowded with devotees. Every year thousands of people gather in Datia for navaratra festival. In October 2013, on the eve of Dussehra, more than 5,00,000 pilgrims were in the district.

The stampede occurred on a bridge that leads to the temple. At about 9 AM on 13 October 2013, around 25,000 people were reported to be on the bridge. A section of the bridge's railing was reported to have broken, which led to a possible rumor that the bridge was about to collapse. This led in turn to panic and disorder in the crowd and people started pushing each other in a bid to get off the bridge. In the ensuing melee several people got trampled and many got pushed over the bridge into the Sindh River. Also, some people drowned after jumping off the bridge to avoid the stampede. Most of the victims were women and children.

There have been many conflicting news reports about the stampede. One report said that the rumor was due to the bridge's imminent collapse that began when a section of the railing broke, but another mentioned that the bridge had been hit by a tractor before the stampede. Some reports also mentioned that a group of visiting pilgrims intentionally spread the rumor in order to jump the queue. Onlookers also mentioned that the stampede actually started when the police started mopping the crowd with canes, which was denied by the administration.

Impact

As per media reports 111 people were killed in the incident that included 47 women and 33 children. Also, several people were injured.

Rescue and Relief:

The rescue operations were hampered due to a long traffic jam on the only road connecting the temple. Owing to the delay in rescue, the relatives of the bereaved families were agitated leading to deterioration of the situation. In order to tackle the enraged public and temper down people, additional police personnel were deployed.

The Datia Police Control Room also extended services of a helpline for enquiries and other important details to family members of the victims. Moreover the state authorities had taken special permission to airlift severely injured.

The local population and police played an important role in rushing injured people to the nearby hospital for immediate aid. The dead bodies were sent for post mortem and the area was cleared expeditiously.

The Government of India announced ex-gratia amount of Rs. 5 lac for the deceased. The State Government of Madhya Pradesh also announced Rs. 50,000 each for seriously injured people.

Stampede at Allahabad during Kumbh Mela

On 10th February 2013, a stampede took place during the Kumbh Mela at Allahabad Railway Station, especially on the foot over bridge. Kumbh Mela is an auspicious festivity, celebrated, once in twelve years and hence millions of pilgrims visit Allahabad during the Mela. The preparation in terms of medical aid, crowd control, facilities for food, water and shelter is well taken care of by the Government of Uttar Pradesh during this event. The number of trains on this route is usually increased during this period

Overly crowded Allahabad railway station during Kumbh Mela 2013

and all the safety measures are checked in advance, but even with these arrangements, the crowd at the station was unexpected, which led to the tragedy. According to some eyewitnesses, the stampede triggered when police begun charging at the crowd to control it. But some reported that the reason for stampede was collapse of railing on a footbridge of the station. The stampede occurred in the evening at around 7 PM when platform No 5 and 6 were packed with thousands of passengers. Eyewitnesses also reported that the stampede at Platform No 6 was triggered near a foot over bridge when hundreds of passengers rushed to board a train whose arrival was being announced on a public address system. A police officer said that an estimated 4,000 people were present at one single point at the site, where the stampede occurred.

Impact

Mainly women and elderly men became victims of this disaster. In the stampede, the fatalities were recorded to be 36 dead and almost 39 injured. Amongst the deceased, 26 were women, nine men and an eight year old girl. An official from the railway division said that 10 people died at the station itself, while 12 succumbed to injuries on way to hospital.

Rescue and Relief:

Platform No 6 was sealed by authorities and rescue operations were immediately begun at the tragedy site. UP Government was prompt in taking necessary action and ordered an inquiry into the incident and requested the Railways division to make proper arrangements to clear rush of devotees. The government also sanctioned an ex-gratia of Rs. five laces to each of the deceased. The Central Government was also quick to respond as the Prime Minister directed Railway Ministry to provide all necessary assistance to the affected persons and also assured that the Central government would extend all possible help to the state government in relief operations. He also assured financial assistance to the families of those killed and to the injured.

Comments:

The incident has triggered a discussion on proper management of heavy crowd during such events. Even though Datia is the district headquarters, there is need for further development in the area. Ratangarh temple is crowded during Navratri every year, hence the disaster response force needs to be deployed there as a precautionary measure. The crowd management is another important aspect that the district administration needs to look into. It is important to have different entry and exit, which can ensure that such incidents do not happen in future. The zigzag road to the temple can help in crowd management. It calls for the need of hospitals near the temple which are sufficient enough to provide first aid in such situations. The stampede was caused mainly on the bridge which was over crowded and there was no way out to escape easily, which calls for alternate route to the temple or proper arrangement to manage the passage. A system should be developed and followed to stop crowd at various points before they can reach the temple, so as to avoid stampede like situations.

In case of Kumbh Mela, the situation was not much different. Even though the district was well prepared for any such event at the river bank, coordination with the railway authorities was possibly insufficient. Looking at the incident, it becomes necessary that the railway stations are also taken as a part of the holistic crowd management strategy. For this purpose more police force and volunteers may be deployed to help clearing the crowd swiftly. It is also necessary that the railway division knows the expected footfall, so as to be prepared for all contingencies. It is important that capacity development of the railway staff in the basic skills of disaster management is ensured to meet such situations.

There have been many cases of stampede in India, every year at an average there is at least one stampede incident in the country. It is important to find

solutions to reduce such incidences. It is noteworthy that mostly stampedes happen during the religious gatherings. For instance, the Sabri Mala temple stampede and the Kumbh Mela stampede in the past are some examples. It is significantly felt that there is need for mock drills and proper planning for the religious events. The administration can learn a lesson from all the stampedes and come up with a workable disaster management plan, with adequate crowd control and medical facilities. The approach to religious shrines should be clear and wide. It is important that there are different routes to enter and exit the temple premises which will lead to a free flow of the crowd. There must also be some rest houses and stopping points all through the way to temple premises. This will reduce the foot fall of the people in the temple premises, and minimize the likelihood of stampede like situations. Necessary repairs must be carried out to roads, bridges, culverts, and footpaths well in advance before major religious events, where large number of people are expected.

Besides, it is important to educate the masses to be careful and take due precautions while visiting the crowded areas in their day to day life. Some do's and don'ts are listed below:-

- One must be very alert to the fact that some pilgrims come in bunches and groups and push their way through. One should not get into their way or try to stop them as one could get harmed in the process. It will be more sensible to avoid their path and wait till they get out.
- It is advisable to move in groups from the camps with the assistance of the controlling authority or group leader or police person.
- Do not try to go against the direction of the crowd. Move with the crowd.
- Do not lose temper and do not fight with others.
- Understand the evacuation routes, emergency exits and layout of the place of event.
- Keep calm. Do not panic.
- In case of emergency do not run.
- Think before you do. Do not just blindly follow others.
- Open area is safer. On exit try to get away in diverse directions.
- Follow instructions given by the authorities, public address system etc.
- Do not spread rumors.
- Assist and collaborate with the organizers, authorities, fire services, police, etc.
- Try to help others to the best of your ability.
- Try to get people move in zigzag directions.

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6. BIOLOGICAL DISASTER: JAPANESE ENCEPHALITIS (JE) – AN OVERVIEW

Japanese Encephalitis (JE) or Brain Fever along with Acute Encephalitis Syndrome (AES) is a common term and has become a commonly prevalent disease in India, as it claims several lives especially of young children in Northeastern and Eastern India. Roughly 70 per cent of children with JE either die or suffer from disabilities that will affect them for the rest of their lives, including intellectual, behavioral, or neurological problems such as paralysis, recurrent seizures, or the inability to speak. The disease is predominantly found in rural and suburban settings.

The disease is also known as Japanese B Encephalitis, Arbovirus B Encephalitis, Mosquito-Borne Encephalitis, Russian Autumnal Encephalitis, Brain Fever or Summer Encephalitis in different regions of the world. The majority of cases of transmission to humans occur in rural settings, particularly those in which agricultural practices along with poultry practices increase the potential for breeding of vectors or infection of vertebrate hosts. In urban settings, the potential for an outbreak of JE is low, although transmission from rural areas can occur.

Who is at risk?

Japanese encephalitis is a mosquito-borne viral disease that occurs in temperate and tropical regions of Asia. While adults can get JE, children younger than 15 years old are at higher risk. After that age, most people are immune due to past exposure to the JE virus.

Because mosquitoes that spread JE, live in rice fields and other pools of water common in the countryside, people who live in rural areas are most at risk. In addition, animals such as pigs and wading birds that are part of the JE transmission cycle are common in rural areas. People who live in cities, where mosquitoes that spread JE breed in standing puddles, open sewers, and fish ponds, can also get JE.

JE virus infection occurs throughout the temperate and tropical regions of Asia. Although initially prevalent in Japan in the late 1800's, control methods (vaccination and pesticides) have reduced the incidence of the disease in that

country. Currently, the disease occurs in China, India, Nepal, Philippines, Sri Lanka and Northern Thailand. Occasionally sporadic cases of disease occur in Indonesia and northern Australia. An estimated 50,000 cases of JE occur globally each year with 10,000 deaths and nearly 15,000 disabled. The disease has not occurred in the rest of the world.

In recent decades, JE outbreaks have occurred in areas previously non-endemic for the disease. The high case fatality rate (20%–30%) and frequent residual neuropsychiatric damage in survivors (50%–70%) make JE a major public health problem. Encephalitis has claimed thousands of young lives in Gorakhpur, (U.P.) in last 30 years, with almost an annual occurrence that locals call "monsoon of death", as most number of deaths occur between July and October.

The Indian Scenario

In India – 330 million live in endemic areas in 15 States/UT's. 135 districts are affected by AES including JE. JE is reported mainly from Assam, Bihar, Karnataka, Tamil Nadu and Uttar Pradesh which contributes approximately 80% of cases and deaths respectively with a case fatality rate ranging from 20 to 25%.

JE ENDEMIC AREAS IN INDIA

JE affected areas
- *Andhra Pradesh*
- *Assam*
- *Bihar*
- *Haryana*
- *Kerala*
- *Karnataka*
- *Maharashtra*
- *Manipur*
- *Nagaland*
- *Tamil Nadu*
- *Uttar Pradesh*
- *West Bengal*

JE affected Districts in State-wise

*Number of endemic districts: 135;
Population: 330 million*
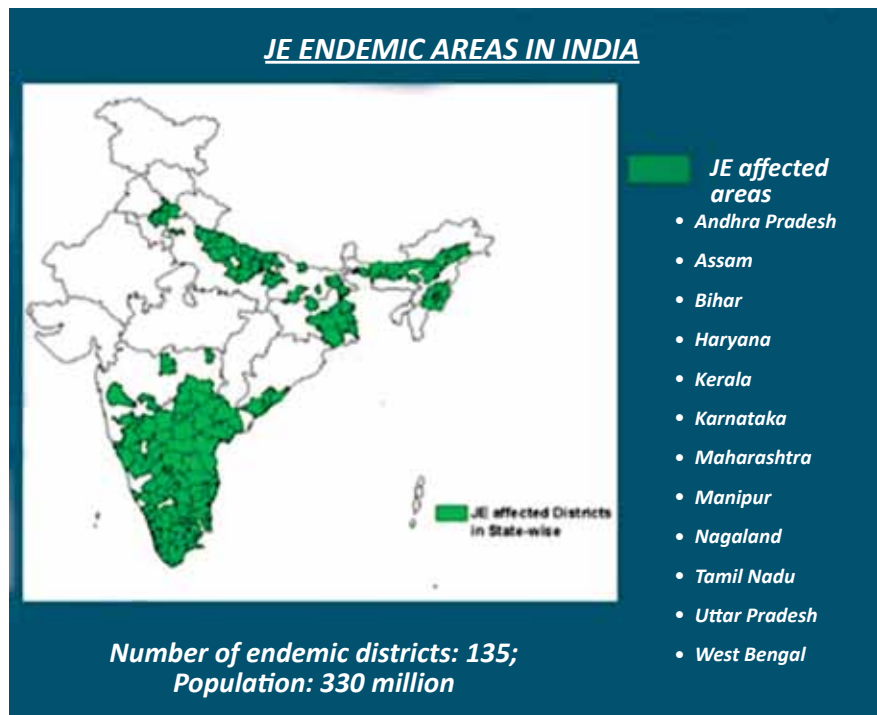
The following data chart shows the number of deaths due to JE/AES in India during 2008-2013 in Uttar Pradesh, Assam, Tamil nadu, West Bengal and Bihar.

The table suggests that the number of cases are increasing, More awareness and education regarding the same is only key for early detection and control of this vector borne disease.

Directorate of National Vector Borne Disease Control Programme- Delhi
Details of AES/JE Cases and Deaths from 2008-2013

| No.	UTs	2008				2009				2010				2011				2012				2013			
		AES Cases	Deaths	JE Cases	Deaths	AES Cases	Deaths	JE Cases	Deaths	AES Cases	Deaths	JE Cases	Deaths	AES Cases	Deaths	JE Cases	Deaths	AES Cases	Deaths	JE Cases	Deaths	AES Cases	Deaths	JE Cases	Deaths
1	Andhra Pradesh	22	0	16	0	49	0	35	0	139	7	7	5	73	1	4	1	64	0	3	0	5	0	0	0
2	Assam	319	99	157	33	462	92	218	46	469	117	142	40	1319	250	489	113	1343	229	463	100	1388	272	495	134
3	Bihar	203	45	0	0	325	95	0	0	50	7	0	0	821	197	145	18	745	275	8	0	417	143	14	0
4	Delhi	0	0	0	0	0	0	0	0	0	0	0	0	9	0	9	0	0	0	0	0	0	0	0	0
5	Goa	39	0	3	0	66	3	1	0	80	0	9	0	91	1	1	0	84	0	9	0	35	1	3	1
6	Haryana	13	3	0	0	12	10	1	0	1	1	1	0	90	14	12	3	5	0	3	0	2	0	2	0
7	Jharkhand	0	0	0	0	0	0	0	0	18	2	2	2	303	19	101	5	16	0	1	0	211	5	82	5
8	Karnataka	3	0	0	0	246	8	7	0	143	1	3	0	397	0	23	0	189	1	1	0	162	0	2	0
9	Kerala	2	0	0	0	3	0	0	0	19	5	0	0	88	6	37	3	29	6	2	0	46	6	1	0
10	Maharashtra	24	0	0	0	5	0	4	0	34	17	0	0	35	9	6	0	37	20	3	0	0	0	0	0
11	Manipur	4	0	0	0	6	0	1	0	118	15	45	5	11	0	9	0	2	0	0	0	1	0	0	0
12	Nagaland	0	0	0	0	9	2	9	2	11	6	2	0	44	6	29	5	21	2	0	0	20	0	4	0
13	Punjab	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
14	Tamil Nadu	144	0	7	0	265	8	18	0	466	7	11	1	762	29	24	3	935	64	25	4	58	8	24	0
15	Tripura			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	211	0	14	0
16	Uttarakhand	12	0	10	0	0	0	0	0	7	0	7	0	0	0	0	0	174	2	1	0	0	0	0	0
17	Uttar Pradesh	3012	537	193	36	3073	556	302	50	3540	494	325	59	3492	579	224	27	3484	557	139	23	3096	609	281	47
18	West Bengal	58	0	41	1	454	5	57	5	70	0	1	0	714	58	101	3	1216	100	87	13	735	102	87	9
		3855	684	427	70	4975	779	653	103	5167	679	555	112	8249	1169	1214	181	8344	1256	745	140	6387	1146	1009	196

Life Cycle of Japanese Encephalitis - How does it spread?

JE spreads by the bite of infected mosquitoes. Certain types of mosquitoes can become infected with JE. The virus first infects animals such as pigs and birds. When a mosquito bites an infected animal and then bites a human, the person can become infected with the JE virus. Humans are not able to pass the virus to other humans. After entering the body the virus reaches various organs but mainly targets nervous system.

Symptoms of JE   Certain important aspects of the JE symptoms are described as under :-
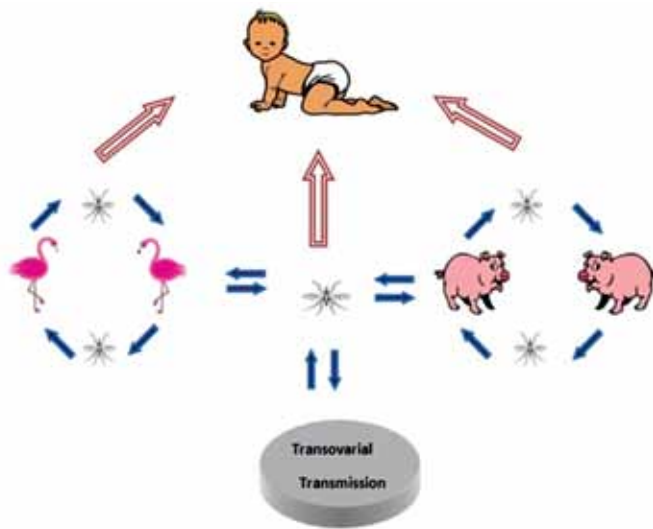
Birds and pigs are amplifying hosts, while mosquito is a vector for the spread of JE.

- Though JE can cause permanent neurological complications or death, the majority of JE infections in people cause no symptoms.

- Symptoms (if they are to occur), usually develop 5 to 15 days after being bitten by infected mosquitoes. These include nausea and vomiting, lethargy, malaise, tremors, visual disturbances, decreased appetite, stiff neck, or seizures.

- Some infected people experience an illness with fever and headache.

- Those with a severe infection may experience neck stiffness, disorientation, tremors, coma, convulsions (especially in children) and paralysis.

- Symptoms may progress rapidly, changing from mild to severe, sometimes within several days or even several hours in some instances. Some patients may have symptoms of a cold or stomach infection before encephalitis symptoms begin.

- Symptoms in newborns and younger infants may not be as easy to recognize. These include body stiffness, Irritability and crying more often (these symptoms may get worse when the baby is picked up), poor feeding and recurrent vomiting. Soft area on the top of the head may bulge out more.

- During a JE Emergency there may be a sudden loss of consciousness, poor responsiveness, stupor, coma, muscle weakness or paralysis, seizures,

severe headache, sudden change in mental functions, "Flat" mood, impaired judgment, less interest in daily activities and memory loss (amnesia).

● Symptoms similar to those of JE also appear in diseases like Meningitis, Febrile seizures, Rabies, Cerebral Malaria and toxic poisoning.

Detection of JE

Diagnosis of encephalitis includes careful questioning, and various clinical symptoms to determine possible exposure to viral sources. Tests that can help confirm the diagnosis and rule out other disorders include blood tests, spinal tap, CT and MRI scans. Definitive diagnosis can be done by Virus isolation from CSF (Cerebro-Spinal Fluid) sample and brain biopsy.

Treatment

There is no specific treatment for Japanese encephalitis and treatment is only supportive, with assistance given for feeding, breathing or seizure control as required (rest, nutrition, fluids) to help the body to fight the infection, and to relieve symptoms. Reorientation and emotional support for confused or delirious people may be helpful. There is no transmission from person to person and, therefore, there is no need to isolate patients. Infection with Japanese Encephalitis confers lifelong immunity.

Preventive Measures

Preventive measures include sanitary prophylaxis, medical prophylaxis, vaccination of animals and poultry, vector control, best water management practices, use of mosquito nets, hand washing, adequate hygiene, etc. Among the control strategies, human vaccination has proven to be the single most effective control measure.

Mosquito-borne viruses may be avoided by preventing mosquito bites. Mosquitoes are most active at dawn and dusk and are most common in moist areas with standing water. Covering skin and using mosquito repellents on exposed skin can reduce the chances of being bitten.

Modified Live or Inactivated Vaccines for human beings are shown to be effective and also protect from clinical manifestations and possible after effects. However mass immunization, effective vector control, and adequate personal hygiene and awareness among the medical fraternity and first responders is required to combat this deadly yet preventable disease.

The Government of India has initiated National Programme for Prevention & Control of JE/AES (NPPCJA). The Multi Year Plan for JE endemic districts aims

to cover JE mass vaccination campaigns in all affected states, which has been quite effective in combating this deadly biological disaster.

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7. Lessons Learnt

The India Disaster Report (IDR), has attempted to compile and analyse the major disasters of the year 2013. The Uttarakhand Flash Floods has caught the attention of the country for several days and the whole world to a certain extent, due to the devastation and also due to the fact that the tourists from all over the country and few from other countries were stranded in the affected area.

Floods are a regular event in our country and the people who live in these flood prone areas have rather adapted to floods and have started 'living with floods', but the flash floods of Uttarakhand have raised several issues about the forecast of such floods, the causes of such floods, the preparedness and the immediate response required, for which the first responders, who are generally the community, have to be prepared.

The Thane building collapse, brought to fore the need for adherence to Building Codes in practical sense, and fixing the responsibility on the authorities, as these kind of incidents, result in loss of lives and the hard earning of individuals. Such incidents send wrong signal among the community and result in loss of faith in the system. Steps are to be taken in this direction as a corrective measure.

The Cyclone "Phailin" has been an excellent example of how can a disaster be managed if known in advance. The vast improvement in forecast in space and time, alongwith the intensity, especially almost five days in advance has been a real boon in planning the evacuation and preparing to face the cyclone. The event also showed how the central, state, district, and all the stake holders including every individual could coordinate and cope with such cyclones. Though, we could save precious lives, as a way forward we can think of how to reduce the impact on infrastructure, or construction of resilient structures and houses, so that livelihood is restored as early as possible in these vulnerable areas which face cyclones, every year, that too, with increasing frequency of cyclones, three in one year, which was not recorded in the near past.

The Human induced disasters, commonly known as "Man-made disasters" like the stampede of Datia in M.P and during the Kumbh Mela, in Allahabad, U.P were both avoidable, if we have learnt from the past, especially, the Sabari Mala stampede in Kerala, a few years back. The Administration

has to be more pro active in collecting data on the expected crowd and the governance has to be people centric, to improve their amenities and looking after their welfare, so that the community starts believing in the system and takes part actively in the development which is sustainable. The preparations were good for Kumbh mela, but for the coordination between various agencies, like in this case the railways could have helped to deal with the crowd in a better way avoiding such incidents. There can be real time monitors, simulation models, utilizing past data and behavioural patters, using the latest technologies to forewarn the authorities about such crowds, even if it happens after extensive preparations.

The biological disaster discussed in this issue, namely the Japanese Encephalitis, shows how the young children are affected. The issue was taken as simple measures can save lot of children, if precautions are taken in time by the administration and also by the community. It brings out that awareness can to a large extent save lives. Further, even if they are alive, majority of them suffer their whole life due to disability, which is more pathetic, as these children suffer for the deeds of the community.

This year's two major events have taught us several lessons. On the positive side it has taught, as already mentioned, the use of forecast, its precision in case of cyclones and the role of administration in utilizing these forecast. Further, the cooperation of the community with the administration was also an important lesson. The combined effort was that the country could cope up with the cyclone. The community had faith in the forecast, which was achieved through the sustained efforts of the scientists, improvement in the data collection, its analysis etc., which proved to be more accurate than the other forecasts from elsewhere in the world. However as pointed by the scientists at various forums, to sustain such forecast there is a need for improving their data collection mechanism using better equipment, with more control points to have wider coverage and confidence in the data, instead of only relying on experience.

The Uttarakhand flash floods, have shown the extent of devastation, which tempted the media to compare it with the Tsunami of Japan (2011), calling it a "Himalayan Tsunami". It has highlighted the supreme importance of community preparedness, in such incidences, even if the forecast does not give time to organize help. The youth of these areas, from every village, who are the native of that place can be trained to deal with such emergencies. This will develop their skills and utilize their energies in a positive way. There is need for sustainable development taking the community into confidence, as per their priority. The loss of livelihood, "tourism" for many of the locals of this area should

have been the focus, while developing, other allied things for the benefit of the people. Here again the development should be people centric, taking them into confidence, in a convincing manner. Most of the existing policies relate to riverine floods or to disasters in general. The Flash flood issue has to be dealt as a separate issue as its causes, mitigation and preparedness, are different from riverine floods. The procedure to make forecast of flash floods has to be initiated. The monitoring stations for monitoring weather and gauging stations for river levels and discharges have to be improved covering the vulnerable areas. If required these can be monitored by the trained locals, if that is more economical, as is being done in some of the developed countries. Even the remote controlled monitoring can be a viable option, taking into consideration the loss we had to face due to such disaster. Our motto should be lives first, and then development for the people. The analysis of the disaster has also shown that the alignment of the roads should be planned considering the disaster and we have to consider natural measures as slope stability measures while constructing roads etc on the hill slopes.

It is also proposed to have a mechanism through which official data on all incidents are made available on the respective web sites of the State Governments or sent to a central agency, even if no central assistance is required for the purpose of record and for the media, which otherwise becomes a speculation. Such mechanism will help in compiling and recording the disaster data for future use, which otherwise will be lost in local records.

Community preparedness is again highlighted in this report as was done in the last report also, as the major issue, which has to be prioritized for managing the disasters and to create a resilient India.

ANNEXURES

ROAD ACCIDENTS

Road traffic accidents continue to take a heavy toll of life across the country. The figures of the fatalities due to such accidents are alarming. As per the Ministry of Road Transport & Highways, Government of India, there were 4.97 lakh road traffic accidents during 2011(1 every minute) resulting into 1,42,485 deaths (one death every 3.7 minutes). During 2013 there were 1,693 road accidents in Delhi only in which 1,725 people died.

The high rate of road accidents can be attributed to variety of reasons to include unsafe road infrastructure, heavy vehicular traffic, poor maintenance of vehicles, lack of awareness regarding road safety norms and most importantly a poor traffic sense among the vulnerable road users. While drunken driving is a serious issue, use of mobile phones while driving has added yet another dimension to road safety. There is an inescapable need to intensify the ongoing efforts to minimize road accidents in the country. Major road accidents with a death toll of ten or more, as reflected in various media reports during 2013 are listed below.

S.No.	Date	States	Mortality Rate & Injured	Damage Caused	Source
1	10.01.2013	Aurangabad, Bihar	Twenty-five people including 11 children, killed in road accident	Twenty-five people, including 11 children, were killed and 10 others injured when a speeding truck overturned and fell into a roadside ditch near Titai Bigha in Aurangabad district in the wee hours. Victims were from Jharkhand and were returning home after farm work.	News on All India Radio
2	16.01.2013	Dhar, Madhya Pradesh	Eleven people, including five children killed in road accident	Eleven people were killed and 20 others injured when a passenger bus collided with a stationary truck on Badhnagar-Badnawar road in Dhar district in the morning. The bus was going to Indore from Ahmedabad.	News on All India Radio

S.No.	Date	States	Mortality Rate & Injured	Damage Caused	Source
3	23.01.2013	Gaya, Bihar	Fifteen killed in an accident	Fifteen people were killed and ten others injured on Wednesday morning when a speeding bus rammed into thick iron bars at a revenue check post under Barachatti Police Station amid heavy fog at Dobhi in Bihar's Gaya district.	Zee News
4	30.01.2013	Uttarkashi, Uttarakhand	Sixteen killed as jeep falls into gorge	Sixteen persons were killed as the jeep in which they were travelling skidded off the Mori-Jakholi road after snowfall and fell into a gorge near Sankri in Uttarkashi district of Uttarakhand on 29th January, 2013.	The Hindu
5	31.01.2013	Patan, Gujarat	Eighteen pilgrims killed in road mishap in Patan	Eighteen pilgrims, including five children and eight women, were killed and 15 others injured when an open loading van in which they were travelling collided with the Gujarat State Road Transport Corporation bus near Jhilwada village of Patan district.	News on All India Radio
6	02.02.2013	Barmer, Jaipur	Ten killed in road mishap	Ten people died and two others injured when a jeep in which they were travelling collided with a truck in Barmer district.	PTI
7	20.02.2013	Osmanabad, Maharashtra	Fourteen persons killed in road accident	Fourteen persons were killed and 5 others seriously injured when the pick-up jeep carrying them, collided with a container truck in Osmanabad district on 19.02.2013. All the victims hailed from Uplai village in Kalamb tehsil and were returning from Tuljapur.	News on All India Radio.

S.No.	Date	States	Mortality Rate & Injured	Damage Caused	Source
8	04.03.2013	Jalandhar, Punjab	Twelve children & driver killed in school bus-truck collision	Twelve children and a driver were killed when a school bus of Akal Academy collided with a truck in a village near Jalandhar in Punjab.	News on All India Radio
9	08.03.2013	Rajouri, Jammu and Kashmir	Ten people died in bus accident	In Jammu and Kashmir, ten people were killed and twenty others injured when a bus in which they were travelling rolled down into a deep gorge in Rajouri district.	News on All India Radio
10	12.03.2013	Mathura, Uttar Pradesh	Ten persons killed in school bus-auto rickshaw collision	A School bus collided with an auto rickshaw carrying more than 16 people on the Mathura-Brindawan road around 8.00 a.m. killing 10 persons and injuring 6. All the injured were admitted to the Mathura district hospital.	News on All India Radio
11	19.03.2013	Ratnagiri, Maharashtra	Thirty-eight died in a bus accident.	Thirty-eight people died in a bus accident, when a bus on its way from Goa to Mumbai fell into Jagbudi River, which was dry, near Khed junction in Ratnagiri district of Maharashtra.	News on All India Radio
12	20.03.2013	Jaunpur, Uttar Pradesh	Ten killed as truck collides with jeep	Ten people were killed and 6 injured in a collision between a truck and a jeep which took place near Kulhnamau village in Bakshan area.	PTI
14	14.04.2013	Surat, Gujarat	Twelve killed, nine injured in road accident	Twelve people, including 3 women, truck driver and children, were killed when a luxury bus was hit by a truck coming from the opposite direction near Kosamba in Surat district.	PTI

S.No.	Date	States	Mortality Rate & Injured	Damage Caused	Source
15	15.04.2013	Chamba, Himachal Pradesh	Road accident kills 12 youths	Twelve youths were killed in a road accident in Chamba district on 14.03.2013. The accident occurred in Bharmur area when the vehicle in which they were travelling rolled down about 700 metres in a gorge.	News on All India Radio
16	27.04.2013	Rayagada, Odisha	Twenty killed, 25 hurt in tractor accident	Twenty persons were killed and 25 injured when a tractor they were travelling fell into a gorge from the Upper Anchalghat road between Upper Anchalbadi and Hataguma in Kalyansinghpur block of Rayagada district of south Odisha on 26.04.13.	The Hindu
17	28.04.2013	Bidar , Karnataka	Ten persons killed in road mishap	Ten persons were killed in a road mishap on the outskirts of the taluk headquarters town of Humanabad in Bidar district of north Karnataka. Their multi-purpose vehicle crashed into an oil tanker when their driver tried to overtake.	PTI
18	01.05.2013	Hamirpur, Himachal Pradesh	Ten killed in accident	Ten people, including four children and six women, were killed in a road accident in Hamirpur district of Himachal Pradesh on 30.04.13.	The Times of India
19	06.05.2013	Prakasam, Andhra Pradesh	Ten killed, 4 injured in road accident	Ten people were killed and four others injured when a lorry in which they were travelling overturned near Singarayakonda in Prakasam district of Andhra Pradesh in the wee hours. It was on its way from Nalgonda towards Puducherry.	News on All India Radio

S.No.	Date	States	Mortality Rate & Injured	Damage Caused	Source
20	09.05.2013	Mandi, Himachal Pradesh	Forty-four died in bus accident	Forty-four died in Himachal Pradesh bus accident. The mishap occurred on 08.05.13, when a private bus fell into Beas river near Jhiri, about 20 Kms from Kullu on the National Highway. The driver was talking on cellphone at the time of the accident.	News on All India Radio
21	10.05.2013	Dehradun	Ten killed, 17 injured in two road accidents	Ten people were killed while 17 others got injured in two separate road accidents. A private bus fell into a ditch in Kirtinagar area of Tihri district killing six persons and injuring 17 on the spot.	PTI
22	11.05.2013	Garhwal, Uttarakhand	Eighteen killed, 22 injured in 3 road accidents	Eighteen people were killed and 22 injured in three road accidents in Garhwal region of Uttarakhand over the past 24 hours.	The Hindu
23	25.05.2013	Bolangir, Odisha	Thirteen persons killed, five charred to death in separate road accidents in Odisha	Thirteen persons were killed, five of them including two women charred alive, and 48 others injured in three separate road accidents in western districts of Odisha.	News on All India Radio
24	27.05.2013	Etah, Uttar Pradesh	Bus accident: 19 passengers killed	Delhi bound Uttar Pradesh State Road Transport Corporation bus fell into a canal in Etah district killing 19 passengers.	News on All India Radio
25	28.05.2013	Thane, Maharashtra	Death toll in Thane road accident goes up to 14	Fourteen died and 36 injured in Thane road accident when a private bus collided with a tanker at Medvan Khind on the Mumbai-Ahmedabad Highway in Maharashtra.	News on All India Radio

S.No.	Date	States	Mortality Rate & Injured	Damage Caused	Source
26	07.06.2013	Sirmaur, Himachal Pradesh	Eighteen killed as bus falls into gorge	Eighteen people were killed and 14 others injured some of them seriously, when a bus rolled down in a 500 feet deep gorge in Sangrah Tehsil of Sirmaur district of Himachal Pradesh.	News on All India Radio
27	22.06.2013	Basti, Uttar Pradesh	Fourteen killed, 23 injured as bus rams into truck.	Fourteen people were killed and 23 others injured when a bus dashed into a stationary truck on Lucknow-Basti road in the wee hours on Saturday as its tyres got burst and the driver lost control over the vehicle.	Zee News
28	25.06.2103	Ratnagiri, Maharashtra	Eleven killed in road mishap	Eleven people, including 3 children, were killed and two others seriously injured when their car collided with a dumper truck at Dabhil in Maharashtra's Ratnagiri district on 24.06.13.	DD News
29	23.07.2013	Bijapur, Karnataka	Eighteen die in road accident	Eighteen people, including 3 women and a child, died on the spot when their vehicle collided with a private bus at ChikkaSindagi village in Sindagitaluk of Bijapur district on Monday.	The Hindu
30	31.07.2013	Hanumangarh, Rajasthan	Eleven students killed in accident	Eleven students, including girls, were killed and 20 injured when their school bus collided with a truck in Rajasthan's Hanumangarh district on Tuesday.	The Hindu
31	01.08.2013	Sirhind, Punjab	Forty feared dead as bus falls into canal	Forty persons feared to have died when a State owned luxury bus plunged into the Bhakra canal.	The Hindu

S.No.	Date	States	Mortality Rate & Injured	Damage Caused	Source
32	15.09.2013	Patiala, Punjab	Fourteen killed in road accidents	Fourteen people lost their lives in two road accidents. Nine persons including 5 women, 3 men and a 5 month old child died and 3 got injured when the small tempo in which they were travelling had a head-on collision with a truck coming from the opposite side near Patiala, on 14.09.13.	News on All India Radio
33	20.09.2013	Nalgonda, Andhra Pradesh	Twelve killed as van rams two jeeps in Chintapalli	Twelve persons were killed and 15 others injured when a van crashed into two jeeps at Nasarlapalli gate in Chintapalli mandal in Nalgonda district on 19.09.13 night.	The Hindu
34	21.09.2013	Lahaul-Spiti, Himachal Pradesh	Ten killed in road accident	Ten people were killed on the spot in a road accident in tribal district Lahaul-Spiti. The accident occurred near Rohli in Udaipur sub division of the district when the ill fated vehicle rolled down about 200 meter deep gorge.	News on All India Radio
35	27.09.2013	Sirmaur, Himachal Pradesh	Bus falls into deep gorge in, 21 killed	Twenty-one people were killed and several others injured when a bus rolled down a 600-feet deep gorge near Ransua-Jabrog village in Sirmaur district Friday morning. The bus was on its way from UchhaTakkar to Renuka.	Zee News
36	03.10.2013	Barpeta, Assam	Thirty-two died in road accident in Assam	Thirty-two died in the road accident at Barpeta. Goods laden truck collided with two vehicles coming from opposite direction at Kismat Dwarika under Sorobhog police station early morning.	News on All India Radio

S.No.	Date	States	Mortality Rate & Injured	Damage Caused	Source
37	10.10.2013	Hoshiarpur, Punjab	Road mishap: 20 pilgrims killed, over 30 injured	Twenty pilgrims were killed and more than 30 others were seriously injured when an overloaded mini truck carrying them fell into a deep gorge in Manguwal village, early Thursday.	Zee News
38	12.10.2013	Saharsa, Bihar	Road accident kills 13 people and injured more than 10.	Thirteen people were killed and more than 10 injured, when a tractor-trolley overturned and slammed into a roadside ditch in Saharsa district on Friday night.	News on All India Radio
39	16.10.2013	Agartala, Tripura	Fourteen killed in road accidents during Durga Puja	Fourteen people were killed and 55 injured, in separate road accidents across Tripura during the five-day Durga Puja festival.	IANS
40	21.10.2013	Nainital, Uttarakhand	Seventeen killed, 23 injured in U'khand car accident	Seventeen people were killed and 23 injured near Kala Dungi in Nainital District. The incident occurred on 20.10.13 evening.	News on All India Radio
41	13.11.2013	Datia, Madhya Pradesh	Thirty-one killed in twin road accidents in MP	Thirty-one people have been killed in two separate road accidents. At least 15 labourers were killed and 24 injured when a truck carrying them turned turtle near Kalapuram.	News on All India Radio
42	16.11.2013	Belgaum, Karnataka	Thirty-two killed in road mishap	Thirty-two people were killed when a mini-truck in which they were travelling toppled on a highway near Belgaum on Saturday. The victims included 9 women and 5 children.	Zee News
43	19.11.2013	Amritsar, Punjab	Ten killed in Punjab as car plunges into drain	Early morning fog has claimed 10 lives which include 5 children and 3 women as a car plunged into a drain at Ajnala in Amritsar district.	News on All India Radio

S.No.	Date	States	Mortality Rate & Injured	Damage Caused	Source
44	20.11.2013	Pithoragarh, Uttarakhand	Fifteen killed in road accident	Fifteen people were killed and 7 seriously injured when an overloaded jeep ferrying passengers, fell into a deep gorge near Dharchula in Pithoragarh district.	News on All India Radio
45	25.11.2013	Mahasamund, Chhattisgarh	Twelve killed in road mishap	Twelve persons killed and 23 others were injured in a road accident in Mahasamund district on 25.11.13 afternoon.	News on All India Radio
46	10.12.2013	Pithoragarh, Uttarakhand	Fifteen killed, six injured as jeep plunges into gorge	Fifteen people were killed and six others injured when an overloaded jeep fell into a gorge.	PTI
47	14.12.2013	Sitapur, Uttar Pradesh	Speeding truck kills 14	Fourteen people were killed and 16 injured when a speeding truck crushed a car and a passenger vehicle near Terhwa village under Kotwali Police Station in Sitapur on 13.12.13 night.	News on All India Radio
48	14.12.2013	Davangere, Karnataka	Ten died in road accident	Ten persons of a marriage party died and over 50 were injured when a goods vehicle by which they were travelling overturned between Karadikallu and Suggahalli villages, near Nyamathi in Honnalitaluk, about 80 km from Davangere.	The Hindu

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OTHER DISASTERS

Throughout the year, there were several disasters across the country which included natural disasters such as floods, biological disasters such as swine flue and dengue, and man made disasters such as industrial accidents and fires etc. The major disasters causing more than ten fatalities are listed below .The details have mainly been extracted from the print and electronic media.

S.No.	Date	States	Mortality Rate & Injured	Damage Caused	Source
1	07.01.2013	Northern part of India	Twenty-three died as Cold wave intensified	The entire North India continued to remain in the grip of severe cold. 23 people succumbed to the chill in various parts of the region.	The Hindu
2	08.01.2013	Uttar Pradesh	170 cold-related deaths in UP	Western UP under intense cold wave with the day temperature remaining at 4 to 7 degree celsius in many districts. The authorities had confirmed 170 cold related deaths across the state.	News on All India Radio
3	10.01.2013	Lucknow, Uttar Pradesh	Sixteen more died due to cold wave in UP	Biting cold wave conditions snuffed out 16 more lives in Uttar Pradesh during the last 24 hours as death toll due to the harsh weather touched 249 this winter. Five people died in Gorakhpur which was the coldest place in the state yesterday, followed by four each in Farrukhabad and Barabanki, two in Sant Kabirnagar and one in Bijnore.	PTI

S.No.	Date	States	Mortality Rate & Injured	Damage Caused	Source
4	07.02.2013	Punjab	Twenty people died in Punjab due to swine flu	In Punjab, 20 persons have died due to swine flu since January this year. 79 confirmed cases of swine flu were reported from different parts of the state while 19 swine flu affected persons from other states were also admitted in the hospitals of the state.	News on All India Radio
5	08.02.2013	Haryana	Twenty-three died in Haryana due to swine flu.	In Haryana, 10 more cases of swine flu have been confirmed. With this the number of swine flu cases has risen to 88 in the state, out of which 23 had died.	News on All India Radio
6	11.02.2013	Allahabad, U.P	Allahabad stampede toll mounts to 36	Stampede broke out at the railway station on 10.02.2013 during the Maha Kumbh Mela at 7 p.m. near platform no 6, where a footbridge reportedly collapsed due to the heavy rush of pilgrims who had converged on the sangam for the Mauni Amavasya Snan. The death toll reached 36 on Monday, with 14 more people succumbing to their injuries. The victims include 26 women, 9 men and a child.	The Hindu
7	21.02.2013	Etwah, Uttar Pradesh	Ten killed in UP as ferry capsizes in Yamuna	Ten people feared drowned as a ferry capsized in river Yamuna on 20th evening under Lavedi police station area of Etawah district. 23 were on-board the ferry out of which thirteen have been rescued. All of the on-board were coming from a feast arranged nearby at a temple.	News on All India Radio

S.No.	Date	States	Mortality Rate & Injured	Damage Caused	Source
8	22.02.2013	Dilsukhnagar, Hyderabad, A.P	Hyderabad blasts: 16 died.	Two powerful simultaneous blasts had ripped through a crowded area close to a cluster of bus stands in Dilsukhnagar area in Hyderabad on 21 February 2013. 16 died while 117 were injured. NIA begins probe.	News on All India Radio
9	27.02.2013	New Delhi	254 died of swine flu	254 lives have been lost in the country due to swine flu during the current year till February. Rajasthan reported maximum of 105 deaths. 2,267 persons have tested positive for the Influenza (H1N1) virus across the country, with the maximum of 759 reported from Delhi alone.	PTI
10	20.03.2013	Kinnaur/Shimla, Himachal Pradesh	Rain, snow claimed 23 lives in HP	Twenty-three people died in rainfall and snow since the beginning of this year and property worth Rs 229 crore damaged. 15 deaths had been reported in Kinnaur district, followed by eight in Shimla.	PTI
11	15.04.2013	Indore, M.P	Fifteen deaths due to swine flu in Indore	A 60-year-old woman Resham Baee from neighbouring Dewas was admitted to Choithram Hospital, died of the disease last evening.	News on All India Radio

S.No.	Date	States	Mortality Rate & Injured	Damage Caused	Source
12	13.05.2013	Aizawl, Mizoram	Seventeen people died in landslide, probe announced	Mizoram Chief Minister Lal Thanhawla announced setting up of an inquiry commission to probe the circumstances leading to the disaster which claimed 17 lives. The massive landslide at Laipuitlang area in northern part of the state capital early on May 11 was triggered by a cyclonic storm and heavy pre-monsoon rainfall.	Zee News
13	24.05.2013	Hyderabad, Andhra Pradesh	Twenty die as heat wave sweeps State	Twenty sunstroke deaths have been reported in Andhra Pradesh, from different districts, particularly in Telangana and coastal Andhra regions. Most of the sunstroke victims were either tender children or the elderly. The families which suffered sunstroke deaths would be paid a compensation of Rs. 50,000 each under the Apathbandhu scheme.	The Hindu
14	05.06.2013	Patna, Bihar	Lightning kills 27 in Bihar	Twenty-seven people, including women and children, have been killed in lightning strikes across Bihar on 05.06.13. More than two dozen people have sustained serious burn injuries.	Zee News

S.No.	Date	States	Mortality Rate & Injured	Damage Caused	Source
15	12.06.2013	Mahim, Mumbai, Maharashtra	Building collapse claims 10 lives in Mumbai	Ten people were killed and seven injured when a five-storey building in Mumbai's Mahim area partially collapsed late on 10.06.13 night following two days of incessant rain.	The Hindu
16	13.06.2013	Thiruvananthapuram, Kerala	Dengue death toll rises to 11 in State	As many as 141 confirmed cases of dengue fever and five deaths suspected to be of dengue were reported in the State on 12 June. Of the 141 cases, 88 cases were reported from Thiruvananthapuram, 20 from Kollam, 18 from Kottayam and the rest scattered across Pathanamthitta, Idukki, Thrissur and Kozhikode districts of Kerala.	The Hindu
17	17.06.2013	Shimla, Himachal Pradesh	Ten died in landslides in HP,	Landslides triggered by incessant heavy rains and snow killed 10 persons in Himachal Pradesh and a high alert was sounded and army assistance sought for rescuing stranded people.	Zee News
18	18.06.2013	Lucknow, UP	Flash floods claim 15 lives in U.P.	Flash floods following heavy rains in the last 24 hours have claimed 15 lives in Uttar Pradesh. All the casualties have been reported from Saharanpur city and adjoining areas.	The Hindu

S.No.	Date	States	Mortality Rate & Injured	Damage Caused	Source
19	21.06.2013	Thane, Mumbai	Thane building collapse: 10 died, 14 injured.	10 died while 14 people have been injured when the 35-year-old three-storey 'Shakuntala' building, situated at Bazarpeth in Mumbra area of Thane district, collapsed after midnight, when they were fast asleep.	Zee News
20	22.06.2013	Uttar Pradesh	Floods claim 41 lives, 5 lakh affected	Floods have claimed 41 lives in Uttar Pradesh and affected over five lakh people in 600 odd villages. According to relief commissioner's office statement, following incessant rains and release of water in the barrages, large areas of Lakhimpur Kheri, Bahraich, Muzaffarngar, Bijnore, Amroha, Pilibhit, Sitapur, Meerut, Balrampur, Shamli, Saharanpur, Aligarh, Shahjahanpur and Rampur have been affected.	Zee News
21	28.06.2013	Guwahati, Assam	Encephalitis claimed 53 lives in Assam	Fifty-three people died due to encephalitis and 362 others suffered from acute encephalitis syndrome (AES) in Assam since January this year.	Zee News

S.No.	Date	States	Mortality Rate & Injured	Damage Caused	Source
22	03.07.2013	Uttar Pradesh	UP major rivers in spate; 78 deaths in state due to rain	In Uttar Pradesh, although only mild rain occurred at a few places in the last 24 hours, all the major rivers are either in spate or flowing above the danger mark, making the flood situation grim in the state. During this period, Jhansi received 54.2 mm of rainfall followed by Allahabad 36.8 mm, Gorakhpur 31 mm and Banda 26 mm. Meanwhile, with 11 more deaths reported due to rain related incidents in the last 24 hours, the toll has reached 78 since June 15.	News on All India Radio
23	08.07.2013	Secunderabad, Andhra Pradesh	Secunderabad building collapse: 11 killed; 20 injured.	Eleven persons were killed and 20 others injured when an old two storied building of a restaurant, collapsed in Secunderabad.	News on All India Radio
24	10.07.2013	Uttar Pradesh	Four died in rain-related incidents in UP, toll rises to 116	Lightning claimed two lives in Azamgarh and two in Barabanki in incidents of lightning and house collapse. The death toll rises to 116 this monsoon.	DD News
25	11.07.2013	Lucknow, UP	UP floods hit 5 lakh people; claim 124 lives	Rains continued to lash parts of Uttar Pradesh, where swollen rivers have flooded 600 villages in 12 districts, disrupting the lives of five lakh people. Floods and rains have so far claimed 124 lives in the state since June 15. Ganga, Yamuna, Ramganga, Sharda, Ghaghra, Rapti and Budhi Rapti were flowing above the danger mark in several districts.	The Times of India

S.No.	Date	States	Mortality Rate & Injured	Damage Caused	Source
26	12.07.2013	Madhepura, Bihar	Boat capsizes in Bihar killing 10 persons including nine children	In Bihar, 10 persons including 9 children were drowned when a country made boat capsized in Kosi River at Madhepura district, Ratvara village in Aalamnagar Block. Only 1 person was saved.	News on All India Radio
27	16.07.2013	Uttar Pradesh	UP floods claim 140 lives.	In Uttar Pradesh, the floods have claimed 140 lives so far and affected about five lakh people.	DD News
28	17.07.2013	Bihar	Death toll in midday meal rises to 20.	Twenty students died due to food poisoning after consuming midday meal at a government primary school in Bihar's Saran district. Twenty seven others, including the woman cooks, were taken seriously ill and have been shifted to Patna Medical College and Hospital (PMCH).	DD News
29	18.07.2013	Uttar Pradesh	Death toll in UP reaches 146; major rivers in spate	In Uttar Pradesh, the sub Himalayan Terai region continues to be flood affected even almost after a month. All the major rivers are reported to be in spate. The death toll due to rain and flood has reached 146 in this season in the state.	News on All India Radio
30	24.07.2013	Andhra Pradesh	Heavy rain hits normal life in Andhra; Death toll rises to 18	Heavy rain and flood continued to hit normal life in several parts of the state. However, water levels have come down in the Godavari River and its tributaries. 18 people died in rain related incidents as six persons were killed in a wall collapse at Moulali in Hyderabad.	The Hindu

S.No.	Date	States	Mortality Rate & Injured	Damage Caused	Source
31	05.08.2013	Andhra Pradesh	Twenty-two killed due to floods	Twenty-two persons died due to floods in Godavari River due to heavy rainfall at upper streams in the past four days.	News on All India Radio
32	05.08.2013	Idukki, Kerala	Rain, landslide kills 13 in Kerala.	The death toll due to heavy rains in Idukki district has gone up to 13. These include four women and two girls. Over 250 families have been evacuated and 13 rehabilitation centers have been set up in the district. Cochin Intl. Airport was closed due to water logging.	News on All India Radio
33	07.08.2013	Uttar Pradesh	Death toll reaches 184 due to floods	The floods in Uttar Pradesh continue to paralyse more than five lakh people in sub Himalayan and Terai region. Six more people died in the last 24 hours in house collapse incidents due to excessive rain in Sitapur and Muzaffarnagar districts, taking the death toll in this season to 184.	News on All India Radio
34	11.08.2013	Sundergarh, Odisha	Odisha coal dump yard incident: Toll rises to 10	Ten persons were killed when a coal dump of the Mahanadi Coalfields Limited near the Kulda open cast mining area in the Sundergarh district, caved in.	News on All India Radio
35	12.08.2013	Uttar Pradesh	Three killed in flood, rain related incidents in UP; toll rises to 196	Three persons killed in flood and rain related incidents on Monday at Etawah district taking the total number of deaths to 196 in the state this monsoon.	News on All India Radio

S.No.	Date	States	Mortality Rate & Injured	Damage Caused	Source
36	15.08.2013	Jammu and Kashmir	Rain and flash floods claim 10 lives in J&K	Ten persons were killed due to incessant rain and flash floods across Jammu region yesterday. Roads, bridges, houses, railway track and government buildings suffered extensive damages. Six persons were buried alive in a house-collapse and four others were washed away in swollen nallahs in Mahore and Gool of Reasi and Ramban districts. 24 persons trapped in flash flood were rescued at different places and nearly 200 families were shifted to the safer places.	News on All India Radio
37	17.08.2013	Uttar Pradesh	Flood situation remains grim in UP, death toll mount to 221	In Uttar Pradesh, there is no let up in the flood fury. The death toll in flood and rain related incidents have reached to 221 in current season of monsoon. Large areas have been inundated in about 30 districts. Over 200 villages were marooned and about 10 lakhs population were affected due to flood.	News on All India Radio
38	18.08.2013	Odisha	Sixteen killed in rain related incidents in UP, & Odisha. Toll rises to 226	Sixteen people have been killed in rain related incidents in Uttar Pradesh and Odisha. Ten persons were killed in UP and 6 in Odisha. The death toll has reached 226 due to rain and flood related incidents.	News on All India Radio

S.No.	Date	States	Mortality Rate & Injured	Damage Caused	Source
39	19.08.2013	Bihar	Thirty-seven killed in train mishap	In Bihar, at least 37 people were killed and over 20 injured as the speeding Rajya Rani Express ran over them at Dhamara Ghat railway station on the Saharsa-Mansi route of the East Central Railway while they were trying to cross the rail track. Most of the dead are women devotees who were going to attend Shiv Puja.	News on All India Radio
40	22.08.2013	Narsinghpur, Madhya Pradesh	Twelve killed in MP as debri collapses over shanties	In Madhya Pradesh, twelve people were killed when a pack of debri reportedly collapsed over shanties near Shamshan Ghat locality of Gadarwara area of Narsinghpur district today. The state government has announced an ex-gratia of two lakh fifty thousand rupees each to the relatives of the deceased.	News on All India Radio
41	23.08.2013	Madhya Pradesh	Over 88 killed in rain related incidents.	Over 88 people have been killed in rain related incidents in the state. Relief and rescue operations are on in flood affected Hoshangabad district. Chief Minister Shivraj Singh Chouhan conducted an aerial survey of the flood affected areas of the state. Incessant rain has disrupted normal life in several parts of the state.	News on All India Radio

S.No.	Date	States	Mortality Rate & Injured	Damage Caused	Source
42	28.08.2013	Vadodara, Gujarat	Eleven killed, many others feared trapped in Vadodara building collapse	Gujarat Government has ordered high level inquiry in Vadodara building collapse incident constructed by Vadodara Urban Development Authority-VUDA. The death toll of the mishap has reached to 11 and six persons were injured in the incident.	News on All India Radio
43	28.08.2013	Visakhapatnam, A.P	Fourteen died in HPCL refinery fire at Visakhapatnam	The death toll in the fire at state owned Hindustan Petroleum refinery-cum-Petrochemical Complex - HPCL at Visakhapatnam has risen to 14 as three more workers succumbed to burn injuries.	News on All India Radio
44	28.08.2013	Uttar Pradesh	Thirteen killed as rain lashes U.P.	Thirteen people lost their lives as moderate to heavy rain lashed several areas of Uttar Pradesh on Tuesday even as the mercury settled above normal in parts of North India.	The Hindu
45	28.08.2013	Uttar Pradesh	Death toll: 230 in Uttar Pradesh floods	The death toll in rain and flood-related cases in Uttar Pradesh on Tuesday rose to 230, as the flood situation worsened with a new spell of rains.	The Hindu
46	29.08.2013	Karnataka	Dengue claims 12 lives in Karnataka	Twelve confirmed deaths due to dengue. The number of dengue cases has also gone up since the onset of monsoon.	News on All India Radio

S.No.	Date	States	Mortality Rate & Injured	Damage Caused	Source
47	01.09.2013	Lucknow, Uttar Pradesh	UP flood situation remains grim, toll reaches 280	Over 17 lakh people have been hit by the floods in Uttar Pradesh, where the situation continued to remain grim with the swollen rivers inundating thousands of villages and the death toll in the deluge and other rain-related mishaps climbing to 280.	PTI
48	03.09.2013	Visakhapatnam, A.P	HPCL fire: Toll rises to 24 as one more victim dies	The death toll in last month"s fire accident at Hindustan Petroleum Corporation Limited"s (HPCL) complex rose to 24 with one more worker succumbing to his burn injuries.	PTI
49	04.09.2013	Bihar	Over 5 million hit in Bihar floods, toll 160	Around 5.5 million people have been affected due to floods in 20 districts of Bihar, with the death toll going up to 160. Thousands of people have been forced to flee their homes and struggle for survival with inadequate relief at hand.	The Hindu
50	06.09.2013	Bihar	Bihar floods claim 176 lives.	The flood situation in Bihar continues to be grim, as all major rivers including the Ganga are flowing above the danger mark at many places. Death toll due to floods in the state has risen to 176.	News on All India Radio

S.No.	Date	States	Mortality Rate & Injured	Damage Caused	Source
51	09.09.2013	Muzaffarnagar, UP	Thirty-one died due to violence.	Thirty-one died due to communal flare in Muzaffarnagar, Uttar Pradesh. Violence spread to neighbouring Shamli and other districts even as curfew remained in force and the Army staged flag marches for the second consecutive day.	PTI
52	10.09.2013	Bihar	Bihar flood toll mounts to 201	The death toll in Bihar floods has reached 201. The water level in rivers and riparian districts has been receding.	The Hindu
53	10.09.2013	Muzaffarnagar, UP	Toll due to violence climbs to 38.	Curfew remained in force in riot-hit areas of Muzaffarnagar. Death toll in the clashes in the district and adjoining towns rose to 38. Over 360 people have been arrested in connection with the violence.	PTI
54	13.09.2013	Muzaffarnagar, UP	UP riots: Death toll touches 47, curfew eased	With recovery of more bodies, the death toll in riot-hit Muzaffarnagar and adjoining areas touched 47, while the curfew was eased in the city for the fourth day.	PTI
55	19.09.2013	Jaipur, Rajasthan	Thirteen die in Jaipur due to mite-borne disease in 2 months	Thirty-one persons have lost their lives due to a mite-borne disease since July this year in Jaipur.	PTI
56	19.09.2013	Gorakhpur, Uttar Pradesh	UP: 15 more kids die of encephalitis, toll reaches 271	Nine children died today. 15 kids succumbed to encephalitis during the past three days.	PTI

S.No.	Date	States	Mortality Rate & Injured	Damage Caused	Source
57	20.09.2013	Muzaffarnagar, UP	UP riots: 48 dead, say district authorities	A list of 48 victims, including five women and two children, who were killed during the communal violence were released by district authorities yesterday. Of the 48 deceased, 43 were from Muzaffarnagar while three victims were from Meerut and one each from Saharanpur and Hapur.	Zee News
58	23.09.2013	Visakhapatnam, A.P	Death toll in HPCL fire reaches 28	One more worker succumbed to burn injuries at a local hospital, the death toll in the fire that broke out at the Hindustan Petroleum Corporation Limited's premises here last month has risen to 28.	PTI
59	26.09.2013	Karnataka	Rains leaves 119 dead so far in Karnataka	As many as 119 people have lost their lives in Karnataka in rain-related incidents. It also led to damages estimated at Rs. 2,724.37 crore this year.	The Hindu
60	29.09.2013	Mahim, Mumbai	Mumbai building collapse death toll hits 61	The death toll in the Mumbai residential building collapse in Mahim area has risen to 61 as more bodies were recovered from debris on Sunday morning. Due to weather constraints, the rescue operations were called off early Sunday.	Zee News

S.No.	Date	States	Mortality Rate & Injured	Damage Caused	Source
61	06.10.2013	Patna, Bihar	Lightning kills 21.	Twenty-one people have been killed by lightning across Bihar. Six people were killed in Aurangabad district, Five in Banka, three in Jamui, two in Supaul and one each in Bhojpur, Katihar, Patna, Gaya and Rohtas districts.	Zee News
62	14.10.2013	Datia, Madhya Pradesh	Death toll rises to 139	One hundred people were injured and 139 died in the stampede during Navratri festival on the bridge over Sindh River near Ratangarh temple in Datia district.	News on All India Radio
63	18.10.2013	West Bengal	West Bengal flood situation unchanged, death toll rises to 17	Flood situation in West Bengal's six districts remain unchanged, even as the death toll rose to 17 with reports of eight more deaths from different districts.	PTI
64	19.10.2013	Malda, West Bengal	Twenty infant deaths in last three days in hospital	At least 20 infants have reportedly died in the last three days in a government hospital in West Bengal's Malda district. Out of the 20 infant deaths, at least 10 of these infants have reportedly died in the last 24 hours in Malda Medical College Hospital.	Zee News
65	20.10.2013	Azamgarh , Uttar Pradesh	Forty-two persons die in hooch tragedy.	At Azamgarh in Uttar Pradesh, 42 persons have lost their lives in hooch tragedy and scores of others are struggling for life in the hospitals.	News on All India Radio

S.No.	Date	States	Mortality Rate & Injured	Damage Caused	Source
66	27.10.2013	Andhra Pradesh	AP rain fury: Toll mounts to 42, over 84,000 evacuated	Incessant rains lashing Andhra Pradesh for the last five days have claimed 42 lives so far in various rain-related incidents like wall collapse and inundated crops in about eight lakh hectares. 84,769 people have been evacuated to safer places and 225 relief camps set up so far to provide shelter and offer help. Nineteen teams of National Disaster Response Force (NDRF) have been deployed in various districts for rescue operations.	Zee News
67	30.10.2013	Mahabubnagar district, Andhra Pradesh	Death toll rises to 45 in AP bus fire accident	In Andhra Pradesh, the death toll rose to 45 in the bus fire accident that took place in Mahabubnagar district this morning. Police recovered 45 bodies from the charred bus and shifted them to Hyderabad for identification.	News on All India Radio
68	27.11.2013	East Champaran, Bihar	Mystery disease claims 12 lives in Bihar	A mysterious disease has left 12 people, including three women, dead in Bihar's East Champaran district in the past four days.	Zee News
69	25.12.2013	Gorakhpur, UP	Encephalitis; toll reaches 640	The menace of encephalitis continues unabated in Eastern Uttar Pradesh as three more children succumbed to the disease at BRD Medical College Hospital.	PTI

S.No.	Date	States	Mortality Rate & Injured	Damage Caused	Source
70	27.12.2013	Muzaffarnagar	Thirty-four children died in the wake of Muzaffarnagar clashes.	Thirty-four children died in the aftermath of the Muzaffarnagar communal clashes, a panel constituted by the Uttar Pradesh government has found. Of these, about a dozen deaths took place in the relief camps in Muzaffarnagar and Shamli. The other casualties took place either in the Primary Health Centres (PHCs), or in hospitals where the children had been referred for treatment. Four children died of pneumonia. The panel found that the deaths were due to various reasons, mostly health-related.	The Hindu
71	28.12.2013	Kothacheruvu station near Puttaparthy in Ananthpur district of Andhra Pradesh.	Thirty passengers survive train fire tragedy, Bangalore-Nanded express fire which chars to death 26 passengers	26 passengers of coach B-1 of Bangalore-Nanded express were charred to death and eight were injured in the fire that happened at around 3:45 a.m. on Saturday morning, at Kothacheruvu station near Puttaparthy in Ananthpur district of Andhra Pradesh.	The Hindu
72	31.12.2013	Annual figure	Eleven journalists killed in India in 2013	Eleven journalists were killed in India in 2013; putting it at third position in the International Press Institute's (IPI) list of media personnel killed across the world during the year.	The Hindu

NIDM ACTIVITES 2013

1 Training Programme on "Comprehensive Disaster Risk Management"

NIDM organized the captioned programme for the officials of African countries during 07-18 January 2013. Nineteen participants from eight African countries i.e. Zambia, Uganda, Mauritius, Tanzania, Togo, Zanzibar, Niger and Nigeria attended the programme. The aim of the programme was to provide knowledge and skills on disaster management related issues and skills on training. The objectives of the programme were:-

- Discuss various concepts of Disaster Management.

- Study the Hazard, Risk and Vulnerability Analysis tools in the risk and vulnerability mapping.

- Explain the impact of various disasters on development of Africa.

- Study draft National Disaster Management Framework in the context of Hyogo framework of Action and Millennium Development Goals.

There were overall 11 modules mainly focusing on concepts, climate change, drought risk management, emergency response etc. The participants visited drought prone areas at Agra and Jaipur and interacted with the community. They also visited various institutes including India Meteorological Department (IMD), National Disaster Management Authority (NDMA), National Disaster Response Force (NDRF) etc. to have inputs

on cyclone tracking, preparedness and response, earthquake response, policies and legal provisions of disaster management and response to various disasters.

The programme was inaugurated by Sh. Lokesh Jha, JS(PP), MHA. The valedictory function was presided over by Sh. GVV Sarma, JS (DM), MHA and attended by Sh. R. Bangar, JS (E&SA), MEA. The programme was highly appreciated by the participants and they requested to conduct similar training programmes in future also.

2 NIDM takes part in Science Expo, Jan 31-Feb 4, 2013

For the first time, the National Science Centre, New Delhi organised Science Expo to showcase the latest Research & Development activities of different Indian Scientific Institutions in various fields. During this event popular science lectures, interactive sessions on careers in the area of R&D, demonstration of instruments/ gadgets and contests for students were arranged. In order to popularize disaster management education and awareness, NIDM took part in the expo along with 12 more premier organizations of the country.

During this exhibition, the NIDM showcased disaster management scenarios through demonstration of physical models with particular reference to earthquake and buildings and live videos. Wide range of IEC material developed by NIDM, especially for generating awareness and enhancing knowledge of the students about disaster management, were displayed and distributed amongst the visitors. The main IEC material included leaflets for school safety planning, fire prevention, do's and don'ts for common disasters, earthquake awareness ludo game kit and wall and desk calendars showing safety tips etc. Documentaries on Disaster Risk Reduction were also screened during the exhibition. Around 25,000 students visited the expo.

3.   Eighth Annual Training Conference of NIDM, 7ᵗʰ March, 2013

National Institute of Disaster Management (NIDM) conducted the Eighth Annual Training Conference (ATC) on March 7, 2013 at its campus to discuss training strategy for disaster management for 2013-14. Shri V. K. Duggal, Hon'ble Member, NDMA inaugurated the Conference. Shri Anup K. Chanda, Addl. Chief Secretary & Director General, Administrative Training Institute , West Bengal and Shri G. V. V. Sarma, Jt. Secretary (Disaster Management), Ministry of Home Affairs along with 67 participants comprising of DGs/ Directors of State ATIs, Head/ faculty of Centres for Disaster Management (CDMs), representatives from State Disaster Management Authorities (SDMAs), Central Ministries, State Governments and other Training Institutions of different sectors graced the occasion. This annual event provides an opportunity to all stakeholders to get together, deliberate and decide strategy as well as calendar of activities for the forthcoming year. The emphasis for the year 2013 was on training and capacity building initiatives on institutionalization and mainstreaming of disaster risk reduction in all departments and agencies at all levels.

4.   First Session of National Platform on Disaster Risk Reduction, 13-14 May 2013, Vigyan Bhawan, New Delhi

The first session of National Platform on Disaster Risk Reduction was inaugurated by Hon'ble Prime Minister of India Dr. Manmohan Singh on 13 May 2013. The session was addressed by Shri Sushil Kumar

Shinde, Hon'ble Union Home Minister, Shri M. Shashidhar Reddy, Hon'ble Vice Chairman, NDMA, Sh. Mullapally Ramachandran, Hon'ble MoS, and Shri R. P. N. Singh, Hon'ble MoS, Ministry of Home Affairs. The event was attended by more than 1000 delegates from Central and State Governments, NGOs, Public Sector, CBOs and other stakeholders. The inaugural session was followed by plenary session with the theme "Mainstreaming DRR in Development: Achievements and way Ahead" followed by 6 thematic sessions as under : -

- Harnessing Technology for DRR
- Making Our Cities Safe
- Risk Financing Mechanisms
- Long Term Recovery & Rehabilitation
- Public Policy and Governance
- Multi-stakeholder Consultation

During the plenary and thematic sessions, various issues related to mainstreaming Disaster Risk Reduction in Development were discussed.

An exhibition showing various products / material related to Disaster Risk Reduction was also organized in collaboration with FICCI in Vigyan Bhawan Campus, where number of stakeholders, including NDRF, NIDM, GSDMA, BSDMA etc. displayed various tools, publications and IEC material related to DRR. The NIDM stall distributed hundreds of IEC material to the visitors and was highly appreciated by the Hon'ble Home Minister Shri Sushil Kumar Shinde. Four stalls including that of NIDM were awarded for their good performance in the exhibition.

5. **NIDM participation in the 4th Session of Global Platform for Disaster Risk Reduction, May 19-23, 2013, Geneva, Switzerland**

The Fourth Session of Global Platform for Disaster Risk Reduction was held at CICG, Geneva, Switzerland from May 19-23, 2013. The event was organized by UNISDR. Indian delegation led by

Shri A. K. Mangotra, Secretary (BM), MHA and comprising of Dr. Shyam S. Agarwal, Secretary NDMA, Dr. P. M. Nair, DG NDRF, Prof. Santosh Kumar NIDM, Shri Sanjay Agarwal, Director, MHA, Shri Shekher Chaturvedi, NIDM and Shri Santosh Kumar Tiwari, NIDM attended the event and participated in various sessions. Shri Shekher Chaturvedi and Shri Santosh Kumar Tiwari of NIDM managed the NIDM booth at the market place of the event and displayed/distributed the DRR documents and IEC material developed by NIDM, NDMA and NDRF to the participants. During the event, hundreds of delegates of various countries visited the booth and inquired about the Institute, structure of disaster management and of DRR initiatives in the country. These queries were dealt with by officials of NIDM managing the booth. This was the first time that India participated in exhibition at Global Platform for Disaster Risk Reduction and the credit goes to NIDM and its faculty.

6. Uttarakhand Disaster - Visit by NIDM Teams (June 22-24, 2013 and July 10-14, 2013)

NIDM initiated documentation process of Uttarakhand disaster with an objective to understand the causes, impact and lessons learnt. To compile primary information about the disaster including views of various stakeholders/ role players, NIDM teams visited Uttarakhand disaster twice i.e. from June 22 to 24, 2013 and July 10 to 14, 2013.

The first visit to the affected site was made by Dr. Surya Prakash, Associate Professor, in which he made observations about the causes and impact of the disaster. The second team of NIDM consisting of Executive Director Dr. Satendra, Prof. Chandan Ghosh, Associate Prof. Dr. Surya Prakash and Consultant Shri Ashok Kumar Sharma, visited the area between July 10 to 14, 2013. The team extensively visited the affected areas, and interacted with various stakeholders and role players including policy makers, administrators, academicians, responders, etc.

7. NIDM organized National workshop on "Uttarakhand Disaster 2013: Lessons Learnt" on August 19, 2013

In order to share the learning experience of all the organizations involved in the rescue, relief and rehabilitation, NIDM organized one day national workshop on "Uttarakhand Disaster 2013: Lessons Learnt" on Monday, August 19, 2013 at its campus.

The occasion was graced by Shri. M. Shashidhar Reddy, Hon'ble Vice Chairperson, NDMA, Padma Bhusan Shri Chandi Prasad Bhatt, Shri S.K. Muttoo, Chief Resident Commissioner, Uttarakhand Government, Shri V.K Duggal, Hon'ble Member, NDMA, Shri P.P. Srivastava, Hon'ble Member, North Eastern Council (NEC), Shri Nand Kumar, Hon'ble member NDMA Shri Anil Sinha, Hon'ble Vice Chairman Bihar Disaster Management Authority, Dr Muzaffar Ahmed, Hon'ble Member NDMA, Dr P. K. Mishra, Chairman GERC and Professor V. K. Sharma, Hon'ble Vice Chairman, Sikkim Disaster Management Authority.

The other dignitaries like Dr R. K. Bhandari and Dr. Y.V. N. Krishnamurthy also attended the workshop. More than 130 participants from various government and non government organisations attended the workshop. The inaugural session started with the observation of two minutes silence for those deceased.

8. 7th meeting of the Governing Body of NIDM on 23rd August, 2013

The 7th meeting of the Governing Body of NIDM was held on 23-08-13 under the Chairmanship of Shri M. Shashidhar Reddy, Hon'ble Vice Chairman, National Disaster Management Authority (NDMA).

The meeting was attended by Ms. Gauri Kumar, Secy (BM), MHA, Dr. Shyam S. Agarwal, Secy, NDMA, Shri Bibhas Kumar, Chairman, CWC, Shri Suresh Chandra Panda, Addl. Secy & Financial Adv., MHA, Shri G. V. V. Sarma, JS (DM), MHA, Ms. Neelkamal Darbari, JS (Admn.), NDMA, Shri Sandeep Sarkar, Dir (Finance), MHA, Ms. Preeti Banzal, JA (CBT), NDMA,

Shri Dina Nath, JD, Dept. of Expenditure, Ministry of Finance, Prof. Saibal Chattopadhyay, Director, IIM-Kolkata, Prof. M. L. Sharma, Head, Deptt. of Earthquake Engineering, IIT-Roorkee, Dr. Srinagesh, Chief Scientist, NGRI & Shri T. Viswanath, OSD to Hon'ble VC, NDMA. The Governing Body considered various agenda items and approved/gave directions on the proposals for implementation.

9. National Workshop with State Relief Commissioners on 'Capacity Building Grants' on 26th Aug, 2013

A National Workshop on 'Capacity Building Grants' was organized by the NDMA and NIDM on August 26, 2013 at the NIDM Campus, in which various important issues were discussed with 32 State representatives. The workshop was chaired by Shri T. Nanda Kumar, Hon'ble Member, NDMA. Other dignitaries, who attended the workshop included Smt. Gauri Kumar, Secretary(BM) MHA; Dr. Shyam Agarwal, Secretary NDMA; Shri G.V.V. Sarma, JS(DM) MHA; Smt. Neel Kamal Darbari, JS(Admn) NDMA; Smt. Anita Bhatnagar Jain, JS(PP) NDMA; Smt. Archana G. Gulati, Financial Adviser NDMA . In addition, Dr. Muzaffar Ahmad, Hon'ble Member NDMA also attended the Workshop.

The inaugural session commenced with the welcome address by Dr. Satendra, ED NIDM followed by the opening remarks by Shri T. Nanda Kumar, Hon'ble Member NDMA. Smt. Gauri Kumar, Secretary (BM) MHA and Dr. Shyam Agarwal, Secretary NDMA addressed the participants in the session. The issues discussed during the workshop were:-

- Utilization of specific grants recommended under 13th Finance Commission, such as Capacity Building Grant.
- Grant for Revamping Fire Services.
- Issues for 14th Finance Commission.
- State Disaster Management Plans / District Disaster Management Plans.

- National Earthquake Risk Mitigation Programme (NERMP).

In addition, some specific issues related to NIDM were also discussed and presented as under :-

- India Disaster Resource Network (IDRN);
- National Cyclone Risk Mitigation Project;
- Trainees Database;
- Directory of Disaster Management Resource Persons;
- National Portal for Disaster Risk Reduction; and
- Financial Assistance to ATIs.

The workshop terminated with the concluding remarks by Smt. Anita Bhatnagar Jain, JS(PP), NDMA.

10. National Level Workshop on Training on 3rd Oct, 2013

A National level Workshop/Consultation was organized in NIDM for the study 'Preparing Long Term Training and Capacity Building Strategy for Disaster Risk Reduction', under Component "C" of NCRMP. The workshop was on Training Needs Analysis, Training Gap Analysis, Quantification & Prioritization of Training Needs, Strategy for Implementation of Training and Accreditation Method for Short Term DM Trainings. It was aimed at facilitating discussions to get useful comments and feedback, updated facts and information from the state representatives and key professionals in the sector to validate the issues included in the project. The workshop resulted in discussion on a number of key issues and some valuable inputs from the participants. An interactive web portal was also launched in this workshop where all the reports under the project are uploaded and readers can post their comments as well. The link of the portal is http://www.seedstechnicalservices.com/projects/NCRMP.

11. NDMA & NIDM observed "Disaster Reduction Day", 9th October 2013

NDMA and NIDM observed "Disaster Reduction Day" on the 9th October, 2013 at New Delhi on the lines of International Day for Disaster Reduction which is observed in October every year.

The occasion was graced by Shri B. Bhattacharjee, Hon'ble Member, NDMA, Shri Krishna Chaudhary, Director General, NDRF, Shri Sandeep Rai Rathore, Inspector General, NDRF and many other dignitaries, officials and children. A Skit play on school safety was presented by students of ASN School, Mayur Vihar, New Delhi followed by sharing of experience by school students on recent disaster in Uttarakhand and its impact on education. Various children from schools across the country were also awarded for participating in slogan & poster competition organized by NDMA and NIDM.

12. NIDM conducted an Outcome Discussion and Strategy Workshop on "Environmental Planning and Disaster Risk Management (EPDRM): Six years of Indo-German Cooperation in the field of Disaster Risk Management (DRM) in India" on 22 October 2013

The 'Deutsche Gesellschaft für internationale Zusammenarbeit' (GIZ) with the Indo-German Environmental Partnership Programme (IGEP) has contributed to India's national efforts for Human Capacity Development in Disaster Risk Management since 2008 with the Environmental Planning and Disaster Risk Management (EPDRM) project. The project worked under the political

cooperation with the Ministry of Environment and Forests (MoEF), GoI and in substantial coordination with the National Disaster Management Authority (NDMA) and the Ministry of Home Affairs (MHA), GoI. The objectives of the workshop were :-

- to share the experiences and reflect on the observable impacts with respect to the work and output of the EPDRM project.

- to discuss role and contribution of training for human capacity development in the field of disaster preparedness and response; and climate change adaptation.

- to discuss role of Environmental Knowledge for different target groups.

Shri. G.V.V Sarma, Joint Secretary (DM) MHA, Mrs. Neelkamal Darbari, Joint Secretary (Admin) NDMA, Dr. Dieter Mutz, Director IGEP-GIZ and Mr. Florian B. Lux, Advisor GIZ were the key dignitaries on dais. Twenty four delegates from NIDM, DMI, NCDC, NDMA, MHA and GIZ participated in this workshop.

Dr. Satendra, ED NIDM delivered the welcome address. Dr. Anil K. Gupta, Head of Policy Planning Division NIDM and Programme Director- EKDRM briefed about the workshop. Mr. Florian, gave an overview, components, key achievements and challenges of the EPDRM.

All the three partners of the EPDRM i.e. Dr. Rakesh Dubey, Director, Disaster Management Institute Bhopal (DMI) (Sub-project IDRM: Industrial Disaster Risk Management - 2008-2010) , Ms. Sreeja S. Nair, Asst. Professor, NIDM (Sub-project EKDRM: Environmental Knowledge for Disaster Risk Management - 2010-2013) and Shri G.S. Saini, National Civil Defence College, (NCDC) Nagpur (Sub-project CDDRM: Civil Defence and Disaster Risk Management - 2010-2013) shared the experiences in implementing the respective sub-components.

Dr. Dieter Mutz congratulated the partner organisations for their achievements and expressed thanks to the ministries for supporting the programme. The session was closed with concluding remarks by Mrs. Neelkamal Darbari, JS NDMA.

13. **Disaster Management orientation programme for the participants of Advanced Professional Programme in Public Administration (APPPA), 08th November 2013**

The APPPA course is conducted annually at the Indian Institute of Public Administration for senior civil service officers from various sectors. The duration of the course is 10 months. A one-day orientation programme on Disaster Management was organized at NIDM, on 08.11.2013 for the APPA participants . The programme was chaired by Shri Anil Kumar Sinha, Hon'ble Vice Chairman, Bihar State Disaster Management Authority, Patna. Dr. Satendra, ED NIDM welcomed the dignitaries and APPPA participants and informed about the course schedule. There were in total 4 sessions dealing with basic issues of disaster management. The other dignitaries, who interacted with the participants, include Shri K.M. Singh, Hon'ble Member, National Disaster Management Authority; Prof. V.K. Sharma, Consultant IIPA and Executive Vice Chairman, Sikkim Disaster Management Authority; Dr. Surya Parkash and Dr. K J Anandha Kumar, Associate Professors NIDM. The programme ended with the valediction address by Shri K.M. Singh, Hon'ble Member NDMA and certification.

14. **National Training Workshop on Disaster Risk Reduction and Mainstreaming into Development Process for Joint Secretaries of Central/State Governments, 11-12, November, 2013**

The NIDM organised a special National Training Workshop for Joint Secretaries and Director level officers from Central Ministries/ State Governments on "Disaster Risk Reduction and Mainstreaming into Development Process" during 11-12 November, 2013 at New Delhi.

The key objectives of the course were:-

● To sensitize and orient the delegates on implications of disasters on development and sustainability facets.

- To discuss the need, approaches, tools and strategies for mainstreaming DRR into developmental planning.

- To acquaint with the objectives, scope and ways of integrating DRR and DM functions into various programmes/schemes and actions across sectors.

The workshop was convened by Dr. Anil K Gupta, Associate Professor and Head of Policy Planning Division. Inaugural session was presided by Hon'ble Member of National Disaster Management Authority Mr V K Duggal, and keynote was delivered by Mr. Anil Sinha, Vice-chairman of Bihar State Disaster Management Authority. Secretary of NDMA Mr Shyam S. Agarwal chaired the valedictory session. A special panel discussion was chaired by Dr B N Satapathy, Senior Advisor at Planning Commission.

15. NIDM Participated in India International Trade Fair (IITF-2013), 14-27 November 2013

The NIDM in collaboration with NDMA and NDRF participated in the India International Trade Fair with an objective to create awareness about Disaster Management in general public.

Through its stall at Phoolwari Convention Centre, NIDM shared various awareness materials with the community, demonstrated shake table for liquefaction testing and displayed building models for earthquake resistance. Street Play (Nukkad Natak) on disaster management, skit on school safety by school children and quiz contest on various disasters were also held at the stall.

The stall was inaugurated by Shri M. Shashidhar Reddy, Hon'ble Vice Chairperson of NDMA in presence of the Hon'ble members of NDMA, Secretary /Joint Secretaries/Directors of NDMA, Executive Director of NIDM and other staff of NDMA, NDRF and NIDM on 14-11-2013. NIDM displayed its products and activities in form of a collage, showcasing various conferences, training activities, and the training modules published by the Institute. In addition, NIDM also displayed various IEC materials for distribution. A calendar, showing month wise "do's & don'ts" for various disasters, was also released during the inaugural function by Shri M. Shashidhar Reddy, Hon'ble Vice Chairperson of NDMA.

16. **NIDM participated in ICL-IPL Kyoto Conference 2013, 18-22 November 2013, Kyoto, Japan**

International Consortium on Landslides (ICL) organized a conference at Kyoto, Japan during 18-22 November 2013 to conduct strategic discussions to strengthen science and technology network and promote partnership to create a safer geo-environment. Dr. Surya Parkash, Associate Professor NIDM and Leader, World Centre of Excellence on Landslide Risk Reduction at NIDM was sponsored by ICL to participate in the conference. NIDM has been working on an IPL project -172 on "Documentation, Training and Capacity Development for Landslide Risk Management" and coordinating the ICL's Thematic Network on Landslide Risk Management.

17. **First Meeting of Technical Advisory Committee (TAC) of NIDM – 19th Nov 13**

The Governing Body (GB) of NIDM in its 7th meeting held on 23rd August, 2013 under the Chairmanship of Hon'ble VC, NDMA, had constituted the TAC to discuss and recommend on the Academic / Technical and Perspective Plan related matters of NIDM. The first meeting of Technical Advisory Committee (TAC) was held at NIDM on 19-11-13.

Many technical and academic issues to include various policies, Trainee and Trainer database, Collaborative Research, Disaster Management Research Fellowship and Perspective Plan of NIDM etc, were discussed. The meeting was attended by Prof. Harsh K. Gupta, Hon'ble Member, NDMA (Chairman), Ms. Neelkamal Darbari, Jt. Secretary (Admn.), NDMA, Prof. Ashwini Kumar, Dean Eq. Engg., IIT, Roorkee, Dr. Satendra, Executive Director, NIDM (Member Sceretary) and Dr. Anil K. Gupta, Associate Professor and Head PPCCI Division, NIDM (Coordinator).

18. **Second Central Review Committee Meeting for Capacity Building Study under NCRMP - 23rd Dec, 2013.**

A study on 'Preparing Long Term Training and Capacity Building Strategy for Disaster Risk Reduction' under NCRMP project Component "C" being implemented by NIDM is nearing completion. The objective of the study is to strategize and suggest DM training models with focus on quality, accreditation process, research and education initiatives, strengthen organizations and institutions and further strategize public awareness initiatives.

Second Central Review Committee (CRC) meeting for monitoring the status and deliverables of the study was held on 23rd Dec, 2013 at NDMA. The meeting was chaired by Project Director- NCRMP, Shri S. P. Vasudeva. Others who attended the meeting included Dr. Taradatt, IAS, Addl Chief Secretary, Revenue and DM Dept, Odisha; Shri Bhaskar Khulbe, IAS, Principal Resident Commissioner, Govt. of West Bengal; Dr. Satendra, IFS, ED, NIDM & Project Director, NCRMP PIU, NIDM; Shri C Parthasarthi, Commissioner DM, Govt. of Andhra Pradesh; Shri Rahul Jugran, Manager Operations, DMMC, Uttarakhand; Shri Amit Chemdhi, Joint Secretary DM, Govt. of West Bengal; Shri SS Jain, Deputy Project Director, NCRMP PMU, NDMA; and Dr. KJ Anandha Kumar, Project Coordinator, NCRMP, NIDM. A presentation regarding the status of the study, highlights of the approved deliverables and future course for completion of the study, was made by Ms Priyanka Chowdhary on behalf of NIDM PIU. This led to discussion on various aspects of the study amongst the Committee members and some valuable inputs were received in the process. The meeting ended with a presentation by the consultants on key components of a forthcoming deliverable which will be a white paper on training and capacity building.

19. Release of NIDM Calendar-2014 and India Disaster Report-2012


Release of NIDM Calendar 2014 and India Disaster Report was held at NIDM conference hall on 6th January 2014. The release saw some of the VIP's in the function, which included Shri K.M. Singh, Hon'ble Member, NDMA, Prof. V.K. Sharma, Hon'ble Vice Chairman, Sikkim State Disaster Management Authority, Ms. Sneh Lata Kumar (IAS), Secretary (BM), Ministry of Home Affairs, Dr. Satendra (IFS), E.D. NIDM and last but not the least Dr. K.J. Anandha Kumar, Associate Professor, NIDM, who is also the backbone behind the India Disaster Report 2012. E.D. NIDM was complimented by various dignitaries on the dais for the successful release of the calendar 2014 and India Disaster Report 2012.

NIDM PUBLICATIONS 2013

BIHAR FLOODS 2007: A FIELD REPORT - By: Santosh Kumar, Arun Sahdeo, Sushma Guleria, NIDM, 2013

The purpose of documentation of this disaster event by the National Institute of Disaster Management is to draw important lessons from floods and its management. The study highlights on the practical problems, dilemmas and challenges and suggests measures for reducing the loss of life and property due to major floods. The study clearly establishes the needs for a comprehensive approach on flood hazards with a broader perspective of flood plain management, non-structural approaches, and institutional innovations, which may be used for integrated and comprehensive flood control strategies.
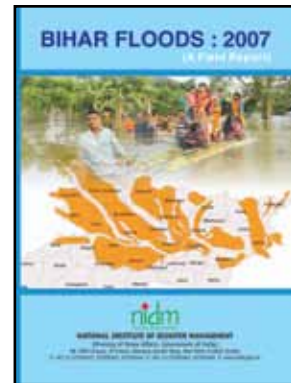
ACTIVITY BOOK ON DISASTER MANAGEMENT FOR SCHOOL STUDENTS - By: Surya Parkash, Irfana Begum and Rita, NIDM, 2013

National Institute of Disaster Management teamed up with Vigyan Prasar

developing an Activity Book on Disaster Management, especially for school children for making them aware with various hazards and disasters with the help of interesting activities, maps and pictorial representations. This book also contains information about various natural disasters and their do's and don'ts.
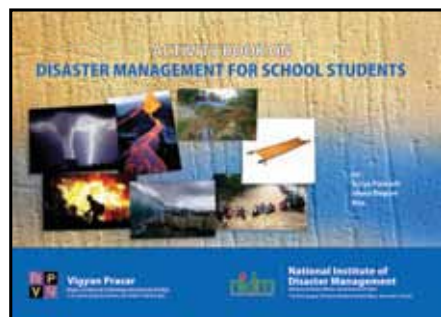
FLOOD DISASTER RISK MANAGEMENT - GORAKHPUR CASE STUDY: TRAINING MODULE - By: Anil K. Gupta, Sreeja S. Nair, Shiraz A. Wajih and Sunanda Dey, NIDM, 2013

Knowledge of environmental systems and processes are key factors in the management of disasters, particularly the hydro-meteorological ones. Climate change is the challenge of modern times known to aggravate natural hazards like floods, drought, cyclone, landslides and forest fires, and it also intensifies people's vulnerability by affecting their resources and capacities. Environmental conditions including climatic and topographic factors also determine the dispersion, transport and thereby, the fate of chemical incidences. NIDM and GIZ Germany, under the aegis of Indo-German Environment Partnership (IGEP) Programme with Indian Ministry of Environment and Forests, implemented a joint project entitled "Environmental Knowledge for Disaster Risk Management (EKDRM)" with the National Institute of Disaster Management, wherein development of case studies and training modules are among the key activities.

VILLAGE DISASTER MANAGEMENT PLAN: TRAINING MODULE - By: Ajinder Walia and Sushma Guleria, NIDM, 2013

Development of Village Disaster Management Plan is the most important ingredient in implementing Community Based Disaster Risk Management in any area. It refers to a list of activities a village agrees to follow to prevent loss of life, livelihoods and property in case of a disaster. It also identifies in advance, action to be taken by individuals in the community so that each one knows what to do when a disaster strikes or when a warning is received. The main objective is to empower the community to deal with disasters on their own as a way of life. In this context, National Institute of Disaster
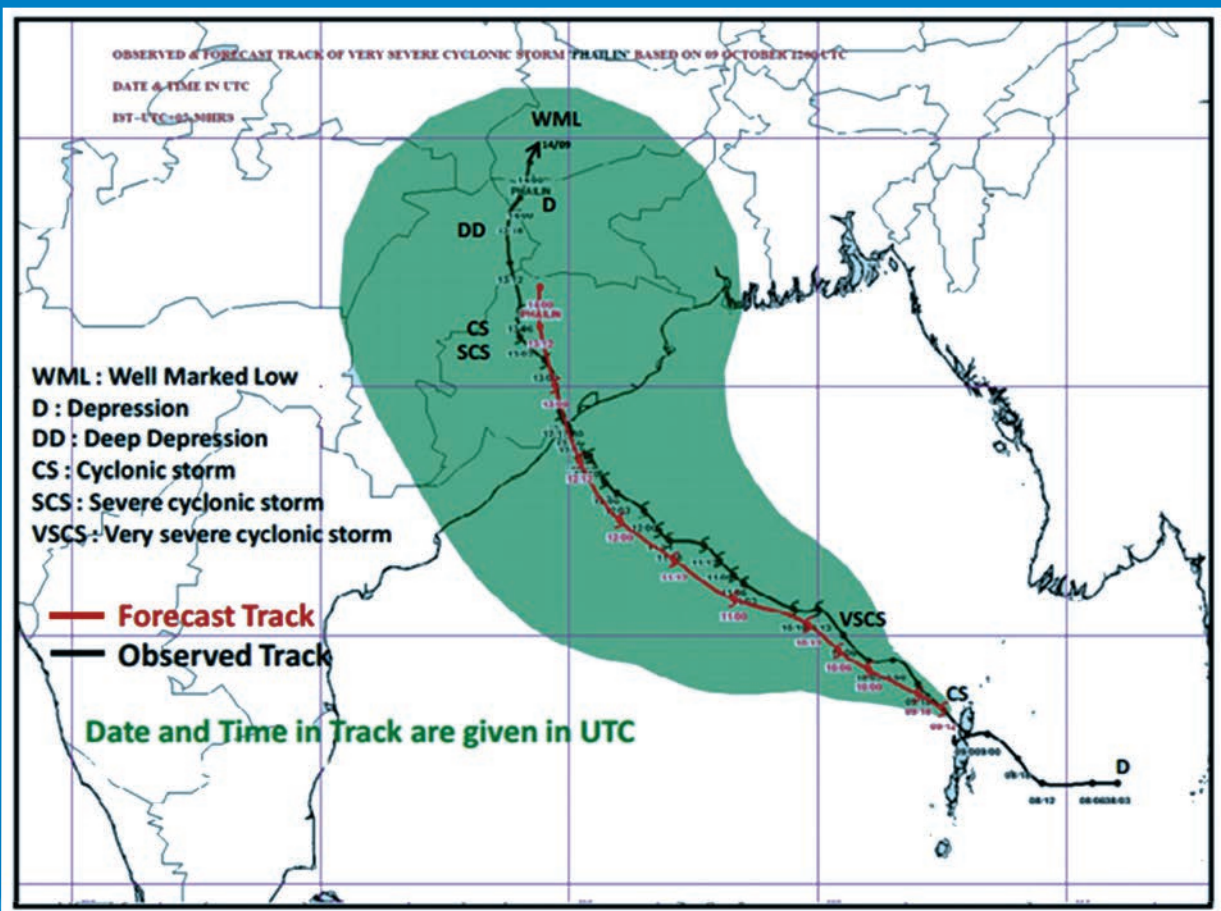
Management (NIDM) has developed a training module on "Village Disaster Management Plan "to help the trainers working at the grass roots level to build the capacity of community to develop village disaster management plan. The training module is the result of the work of many trainers working in the area of community issues and specifically community based disaster risk management.

INDIA DISASTER REPORT 2012 - By : K.J. Anandha Kumar and Ajinder Walia, NIDM, 2013

The scale of any disaster is linked closely to past decisions taken by communities and government, or the absence of such decisions. Hence it is always important to review and analyze the challenges faced and the emerging trends observed so that the future decisions are in the right direction. Keeping this in view, National Institute of Disaster Management has initiated the process of compilation of India Disaster Report in 2011. This is the second report published by the Institute for the year 2012. The publication is an effort to improve compilation of data to promote research which may enable to identify gaps in the management of the disaster to be addressed in future. The report draws on lessons learnt from the disasters of 2012 reflecting a common concern in building disaster resilient communities and reducing human, social, economic and environmental losses due to natural hazards.

OBSERVED & FORECAST TRACK OF VERY SEVERE CYCLONIC STORM 'PHAILIN' BASED ON 09 OCTOBER 1200 UTC
DATE & TIME IN UTC
IST=UTC+05.5HRS

WML : Well Marked Low
D : Depression
DD : Deep Depression
CS : Cyclonic storm
SCS : Severe cyclonic storm
VSCS : Very severe cyclonic storm

Forecast Track
Observed Track

Date and Time in Track are given in UTC

NATIONAL INSTITUTE OF DISASTER MANAGEMENT
(Ministry of Home Affairs, Government of India)
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Towards a disaster free India...