Disaster Governance in India

Series-2

LBSNAA
Centre for Disaster Management
Lal Bahadur Shastri National Academy of Administration

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Director

Director's Message

Due to its unique geographic and geological conditions India is vulnerable to various natural disasters. In India, the incidents of flood, draught and other natural disasters are on the rise and pose tremendous challenges for the Administration. In this context, the training of civil servant in Disaster Management assumes critical significance. Each disaster heightens the urgency to equip ourselves better in coping and managing them. The recurring incidence of such disasters necessitates learning from our own experiences as well as the best practices adopted all over the world in the field of Disaster Management.

Here comes the role of well documented best practices which can be circulated widely for creation of awareness at all levels of administration.

It gives me immense pleasure to see that Center for Disaster Management, LBSNAA, under the capacity building project from National Disaster Management Authority (NDMA) is bringing out the edited volume "Disaster Governance in India – Series 2". This is a compilation of case studies, learning and experiences of the Officer trainees of 2012 batch of Indian Administrative Service, as part of their district training. I hope that volume will be of use to the administrators in handling disasters and emergency situations across the country.

Rajeev Kapoor, IAS

PREFACE

Disasters have adversely affected human civilization since the dawn of our existence. Natural disasters and human induced disasters have increased both in frequency and fury over the years. India has suffered enormously, in terms of loss of lives and livelihoods and damage to both public and private property due to recurrence of major natural and human induced disasters. In response, various strategies have been formulated and implemented with regard to mitigation, prevention, response, rehabilitation and reconstruction during pre-disaster and post-disaster periods. All these efforts have the same underlying goal: Disaster Management and Disaster Governance.

By virtue of the Disaster Management Act 2005, District Magistrate / Divisional Commissioner is the pivotal role of the District Disaster Management Authority (DDMA) and hence, it is essential that he should be well versed in various aspects of Disaster Management.

After the successful publication of the first volume of "Disaster Governance in India - Series 1" under the project "Capacity Building for IAS and Central Services Officer on Disaster Management" sponsored by NDMA, Centre for Disaster Management (CDM), LBSNAA is coming up with the second series of the book named "Disaster Governance in India - Series 2" compiled from case studies based on the inputs received from young IAS officers of 2012 batch during their district training. The book will be useful to administrators, at various levels, who are handling the subject of Disaster Management. It can also serve as a good reference material for the ATIs and CTIs for their in-house courses.

The book "Disaster Governance in India - Series 2" will delve into the emergency management and Disaster Governance issues in various districts of India. The book will also provide perspectives of IAS officers posted across Indiaon the subject of Disaster Management.

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Disaster Management in Thane Planning & Preparedness

Nidhi Choudhari, IAS

INTRODUCTION TO DISASTER MANAGEMENT

Disasters threaten sustainable economic development worldwide. In the past twenty years, earthquakes, floods, tropical storms, droughts and other calamities have killed around three million people, inflicted injury, disease, homelessness, and misery on one billion others, and caused damage worth millions of rupees. Disasters destroy decades of human effort and investments, thereby placing new demands on society for reconstruction and rehabilitation[1].

India is one of the most disaster prone countries in the world. Over 65% land area is vulnerable to earthquakes. Over 70 per cent of land under cultivation is prone to drought while 5 per cent of land is prone to floods. Over 8 per cent of total geographical area is prone to cyclones. A major disaster occurs in India almost every 2-3 years and 50 million people are affected annually from these disasters. On an annual basis, around 1 million houses are damaged annually along with human, social, economic and other losses. It is clear that we as a nation have to have disaster management a key priority to averse disasters, prepare well, reduce and mitigate their impact.

WHAT IS DISASTER ?

A Disaster is an event that occurs in most cases suddenly and unexpectedly, causing severe disturbances to people, objects and environment, resulting in loss of life, property and health of the population. Such a situation causes disruption in normal pattern of life, generating misfortune, helplessness and suffering affecting the socio-economic structure of a region or country or continent to such an extent that there is a need for assistance or immediate outside intervention. Disasters can be manmade or natural.

WHAT IS DISASTER MANAGEMENT ?

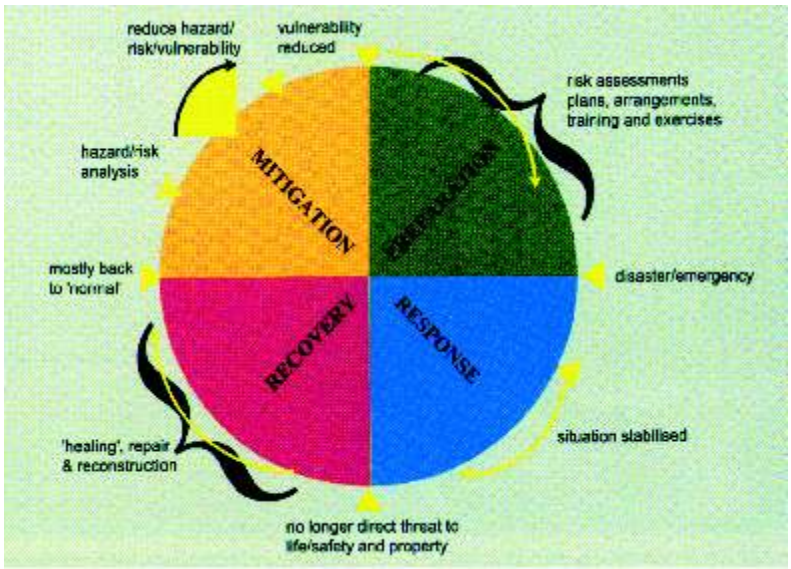
Disaster Management is an applied science which seeks, by the systematic observation and analysis of disasters, to improve measures relating to prevention, mitigation, preparedness, emergency response and recovery.

CYCLE OF DISASTER MANAGEMENT

The cycle of disaster management includes response, recovery, prevention and mitigation, and preparedness. This cycle has been shown in the following figure:

[1]www.ndma.gov.in

Figure : Cycle of Disaster Management



Source: NDMA

PREPARATION

Preparation focuses on plans to respond to a disaster threat or occurrence. It takes into account an estimation of emergency needs and identities the resources to meet these needs. It also involves preparation of well-designed plans to structure the entire post-disaster response, and familiarizing the stakeholders, particularly the communities through training and simulation exercises.

The best examples of preparation activities are the development of local warning and community evacuation plans through community education, evolving local response structures and administrative preparedness by way of stockpiling of supplies, developing emergency plans for rescue and relief.

RESPONSE

Response measures are usually those which are taken immediately prior to and following disaster impact. Typical measures include:

- Implementation of plans
- Activation of the counter-disaster system
- Search and Rescue
- Provision of emergency food, shelter, medical assistance etc.
- Survey and assessment
- Evacuation measures

RECOVERY

Recovery is the process by which communities and the nation are assisted in returning to their proper level of functioning following a disaster. Three main categories of activity are normally regarded as coming within the recovery segment:

- Restoration
- Reconstruction
- Rehabilitation

PREVENTION & MITIGATION

Pre-disaster planning consists of activities such as disaster mitigation and disaster preparedness. Disaster mitigation focuses on the hazards that causes the disaster and tries to eliminate or drastically reduce its direct effects. Examples include strengthening buildings to make them cyclone or earthquake resistant, controlling land-use patterns to restrict development in high-risk areas and diversification of economic activities to act as insurance to offset losses in different sectors. Structural measures such as the construction of protective works or alterations designed to diminish the vulnerability of the elements at risk, and non-structural measures, such as regulating land use and building codes, and equipping line departments for damage reduction, can all reduce the impact of the disaster on a region or a population. Everything that is done to reduce or prevent the damages that a disaster may cause is called "mitigation of risks" Such mitigation can be integrated with normal inter-departmental coordination.

Various locations in Thane are vulnerable to different disasters in varied degrees. Preparedness and mitigation plans, therefore, will have to be evolved and implementation monitored locally at the ward level to reduce the impact of the disasters. While evolving such area specific preparedness and mitigation plans, types of vulnerabilities will essentially define the levels of preparedness and mitigation strategies. These strategies will have to be concentrated more towards the social and economically backward communities as against the vulnerability of the overall system.

In brief, disaster management cycle allows the policy makers to develop a holistic and integrated approach towards disaster management with emphasis on building strategic partnerships at various levels of preparedness, response, recovery, mitigation and prevention.

DISASTER VULNERABILITY OF THANE DISTRICT

The total geographical area of the district of Thane is 9558 Sq. Kms which is 3.11% of the total Maharashtra area. Its northern limits adjoin the Union territory of Dadra Nagar Haveli and the State of Gujarat while the districts of Ahmednagar and Nashik are to its east, Raigad to its south, Pune to the south-east, Mumbai suburban to the south-west and the Arabian Sea to the west. From disaster point of view, the district is prone to floods, cyclones, rail and road

accidents, industrial and commercial accidents, epidemics, building collapses etc., which are discussed in detail in later chapters. The map of district is given below:

Figure : Map of Thane District

The headquarters of the district is the city of Thane. Other major cities in the district are Kalyan-Dombivli, Mira-Bhayander, Bhiwandi, Ulhasnagar, Ambarnath, Kulgaon-Badlapur, and Vasai-Virar. The urban areas of the district suffer from huge extent of illegal and unauthorised buildings which result into man-made disasters like building collapses.

COASTAL AREAS IN THANE DISTRICT : Cyclone & Tsunami Threat

Being near to island city onside hilly region the coastal wards (facing the Arabian Sea) are prone to gusty winds and cyclonic impacts. Vasai, and Thane talukas are on the Arabian Coast. Many small creeks are found all along the western coast, in which tidal waters flood upstream and fill up low ground. The bigger creeks are Bhiwandi and Chinchani creeks. In most of these coastal areas, a number of houses have also mushroomed along the coastal area. The quality of housing material used and without permission, this settlement is highly vulnerable and the possibility of their capacity to withstand the Tsunami or strong cyclones is very limited.

RIVERS IN THANE DISTRICT : Prone To Floods

The district of Thane comprises the wide amphitheatre like Ulhas basin on the south and hilly Vaitama valley on the north together with plateaus and the slopes of Sahyadri. The two main rivers flowing through the district are the Ulhas and the Vaitarna. These rivers have many tributary rivers. Thane being a high rainfall area, probability of flooding is always there in these rivers. There are many dams in the district and therefore, many villages of the district have been identified as flood prone and disaster management has to invariably take into account planning relating to floods. The list of main rivers, sub-rivers, crops and irrigation methods is given in the following table:

Table : Rivers and Crops in Thane District

Main Rivers	Ullas, Vaitarna, Damanganga
Tributary Rivers	Bhatsa, Tansa, Barvi, Deharja, Surya, Pinjal, Kalu, Shai
Main Crops	Rice, Maize, Pulses, Horticulture (Cheeku, Turmeric etc.)
Irrigation	Borewell, Dugwell, Minor Dams, Major Dams
Dams	Bhatsa, Tansa, Kalu

Source: Disaster Management Cell, District Collector Office, Thane

In all 15 tahsil offices, 15 rain gauges have been kept while all 61 Circle offices have also been equipped with rain gauges. There are 15 rain gauges with the Municipal Corporations. Three rain gauges have been kept at three major dams of the district. There are 2 Automatic Weather Stations in the district. There are a total of 101 flood prone villages in Thane district which may affect a population of 19.37 lakhs.

Table : Flood Prone Villages in Thane

S. No.	Tahsil	Flood Prone Villages	Affected Population
1	Shahpur	17	29521
2	Bhiwandi	17	17108
3	Kalyan	16	1024894
4	Dahanu	16	22802
5	Palghar	19	26607
6	Vikramgad	3	4635
7	Ullasnagar	4	503201
8	Ambernath	9	308872
Total		**101**	**1937637**

The number of boats available with the district disaster management machinery is 45 which is given in the following table:

Table : Boats with the Disaster Management Machinery of Thane

Organisation	Total
District Control Room	3 Rubber and 2 Fiber Boats with Engine
Thane Municipal Corporation	13 Fiber Boats with Engine
Navi Mumbai Municipal Corporation	6 Fiber Boats with Engine
Kalyan Dombivali Municipal Corporation	2 Rubber and 3 Fiber Boats with Engine
Ullasnagar Municipal Corporation	2 Fiber Boats
Bhiwandi-Nizampur Municipal Corporation	6 Fiber Boats and 4 Rubber Boats with Engine
Ambarnath Municipal Council	2 Rubber Boats with Engine
Kulgav-Badlapur	2 Rubber Boats
Total	**45 Boats**

Source: District Disaster Management Cell, Thane

INDUSTRIES : Threat of Industrial Accidents and Fire

Thane is the third most industrialised district in the State. There are 1548 large and medium scale and 18,480 small scale industries in the district. The main products of these industries are Drugs, Textiles, Adhesives, Plastics, Rubber, Steel, Pharmaceuticals, Engineering, Fertilizers, Electronics, Chemicals and Iron and Steel. The Thane-Belapur-Kalyan industrial belt is the centre of highly sophisticated modern industries. Central Government's ammunition factory is also situated at Ambernath taluka. Bhiwandi city is famous for power loom industry. The Maharashtra Industrial Development Corporation (MIDC) has developed 10 industrial areas in the district. The major concentration of the hazardous industries is seen in the Kolshet, Balkum Industrial belt, having major chemical complexes, establishment and station. Clustering of various operating units, make these industries highly vulnerable to accidents.

ACCIDENTS

There are three national highways and three railway tracks for communication. Recently, there was a train accident in Dahanu and oil tanker accident in Shahpur. The district disaster planning authorities have to coordinate with railway and National Highways Authority of India (NHAI) in case of road accidents. When I was posted in Shahpur, I visited the site of oil tanker accident and while doing the enquiry, I realised that ensuring coordination from NHAI was a difficult task. The length of road and rail network in the district is given in the following table and figure:

Table : Length of Road & Rail Network in the District

Type of Road	Length in Kms.
National Highway	467
State Highway	3349
Major District Roads	2205
Other District Roads	3398
Rural Roads	11824
Railways	545

Source : Disaster Management Cell, District Collector Office, Thane

Figure : Length of Road and Rail Network in Thane District

Source: Disaster Management Cell, District Collector Office, Thane

Case Study 1: Bus Plunges Into Valley At Tokawade Village: January 2, 2014

The Thane-Ahmednagar bus carrying around 50 passengers hit a tempo (a three-wheeler vehicle) around 9:30am and slid off the hilly road into a 300-foot-deep valley at Tokawade village near Malshej Ghat, a popular picnic spot. At least 27 people died and many were injured. I had the opportunity to interact with revenue, police and health officials with reference to disaster management.

Case Study 2: Rail Accident At Dahanu: January 8, 2014

The New Year began with a train tragedy near Dahanu in Thane district, Maharashtra. Accident relief trains and top railway officials reached the spot. The fire which broke at around 3 am caught the passengers unguarded in the 3 bogies of coach 19019 down past 1.5 km of Gholwad railway station. The gateman first observed the fire and informed the guard, who subsequently informed the motorman following which the train was stopped. Due to alertness of the gate man, a major disaster was averted. The train was halted at Gholvad railway station near Dahanu road where the fire was brought under control.

Case Study 3: Chopper Crash In Malshej Ghat: September 28, 2013

On September 30, 2013 I went to SP office to report for my Police Attachment. During my meeting with the SP Sir, he discussed with me about the chopper crash that happened on September 28, 2013 and about the rescue operations undertaken by the police. The helicopter took off from Juhu helipad in suburban Mumbai and was on its way to Aurangabad district when it ran into severely inclement weather. The pilot may have tried to land in a valley surrounded by mountain peak at a village called Vaishagre where an adivasi hamlet is located. However the chopper hit a high-tension electricity wire and burst into flames. I was told by SP Sir that Malshej Ghat is so difficult that they have to walk for 2 hours to reach at the site and vehicles could not reach there. In thick forest and heavy rains, the police reached at the site and found that all the bodies were charred to death and had to arrange for bringing these charred bodies.

LANDSLIDES

Thane also faces the risk of Landslides with pressure on land, many vacant sites on hill slopes or bottoms of hills have turned into inhabited area and thereby become vulnerable to landslides. Most cases of landslides occur during heavy rain associated with high velocity winds. It sometimes results in loss of human lives and damages to structure. The sites

vulnerable to landslides in Thane are generally located on or near the hill ranges. These hillside lands are mainly owned by different authorities like the State/Central Government, or the forest department and therefore, close coordination between these authorities is required when landslides takes place.

EARTHQUAKES

Thane comes under seismic zone four. The town planning department of Municipal Corporations or Municipal Councils is competent authority to look after building permission. The department is expected to follow the Development Control Regulations which has provisions/ rules regarding earthquake resistant structure. However, there are huge number of unauthorised buildings constructed in the urban areas of Thane district which have flouted all the norms and are therefore highly vulnerable.

TARAPUR ATOMIC POWER PLANT : in View of Fukushima Disaster

The first atomic power project of India is situated at Tarapur in Palghar taluka, thereby threat of nuclear disaster cannot be denied. During my visit to Tarapur Atomic Power Plant, I enquired about their security systems and was told that they have improvised their security after the Fukushima tragedy in Japan and have incorporated new disaster management plan.

GAS PIPELINE/OIL TANKER ACCIDENTS

In some urban areas, piped natural gas supply to household has started and is intended to cover most of the urban areas of Thane district. In view of this, the risk of fires due to leakage of gas is an added dimension. There were two oil tanker accidents that took place in Thane district during my district training.

Case Study 4: Oil Tanker Accident At Charoti Toll Naka: March 22, 2014

A tanker carrying around 35,000 liters of petrol lost control, ramming several vehicles before exploding at Charoti toll naka in Dahanu. On March 22, 2014, a tanker carrying around 35,000 liters of petrol lost control, ramming several vehicles before exploding at the Charoti toll naka in Dahanu. Seven people died on the spot, while eight were injured. Three persons among those injured died under treatment, bringing the toll to 10.

Case Study 5: Bus-tanker Accident At Manor: January 29, 2014

In the month of January, there was an accident involving a luxury bus and a diesel tanker in Thane district's Kude village on the Mumbai-Ahmedabad highway in which death toll was eight and the number of injured went up to 14. According to the police, the luxury bus was going to Ahmedabad from Pune when it collided with the tanker at Kude village within the Manor police station limits in Palghar taluka. The bus immediately caught fire after the collision and a sedan is said to have rammed into it.

RIOTS

As the urban settlement of the district, compromise of non-local, external settlement from remaining Maharashtra and India, multi-cultural, multi-linguistic, multi-racial settlement is observed. Generally harmony is observed during all Cultural, Festival and National programmes however, the possibility of misunderstanding and conflicts which may lead to riots is always present. Bhiwandi, Manor, Mumbra and Thane city are very prone to such communal rioting.

BUILDING COLLAPSES

As Thane district is full of illegal and unauthorized constructions in its urban areas, the number of dangerous dilapidated buildings is also huge. Collapse of these dilapidate buildings has become a regular phenomenon. I observed that in the absence of adequate transits accommodation, emergency shelters become a major requirement in the event of house collapse.

Case Study 6: Building Collapse At Mumbra: September 21, 2013

Soon after I joined the District, there was a building collapse in Mumbra at around 7.20 in the morning and the District Collector Shri P. Velarasu advised me to attend to the rescue operations. On receiving his message, I immediately left for Mumbra and reached the site at 7.50 a.m. where the rescue operations were going on. Two bodies were already found while two more bodies were found when I was there. According to the witnesses, the building reduced to debris in around 10 minutes. As the accident happened in the morning, most of the people could come out when the building started shaking and only those who were asleep died during the collapse. In this rescue operation, I observed the coordination between Municipal Corporation, Tahsil office, District Collector office, police commissioner office, hospitals etc. was required. According to the Deputy Municipal Commissioner, Thane who was at the site, the building was about eight to twelve years old and a Notice for vacating the building was already served to them.

In May 2014, the Thane Municipal Corporation has reinstated all those officials who were suspended for negligence of duty in this building collapse matter. I believe that this is the fate of all enquiries in such cases. It is very difficult to stop the buck at one point and hold anyone responsible. Massive corruption and political involvement is behind construction of illegal and unauthorized buildings and it needs to be dealt heavy handedly which is possible only with strong political will and administrative direction.

To sum up, we may say that Thane is a huge district with immense variety in its demography and topography, which is prone to both natural and man-made disasters. During my district training period, I directly or indirectly attended to several types of disasters and observed its management which is discussed in further chapters. This district gives an immense variety in

terms of learning disaster management. The study of disaster management in the District Thane has been an eye-opener for me and provided me deeper insights about this issue.

DISASTER MANAGEMENT IN THANE DISTRICT

Major disasters in the district of Thane are- Earthquakes, Floods, Landslides, Building Collapses, Epidemics, Road Accidents, Fire, Industrial and Chemical Accidents and Cyclones. The machinery and planning for these calamities is discussed below:

Control Room

The control rooms under the jurisdiction of various line departments will be responsible for coordinating and facilitating the performance of the services and functions listed against each control room. The Control Rooms would also ensure availability and movement of the staff of their respective departments. The following control rooms are operational in the district:

- District Control Room for Thane
- Control Room at Municipal Corporations/Councils
- Police Control Room
- Fire Brigade Control Room
- TMT control Room
- MSRDC Control Room
- MSRTC Control Room
- MSEB Control Room
- Railway Control Room
- MIDC Control Room
- MPCB Control Room
- MTNL Control Room
- Railway Control Room

District Control Room

District Disaster Management Control Room is situated on the 1st floor in the Collector office, Thane. It is equipped with V-SAT Network, V.H.F. Network of control room and V.H.F. network of Thane Manufacturers Association. MAHANET network in the Control room provides various facilities to Collector Office, Taluka Offices and other Govt. offices in Thane District. The facilities include email, Video Conferencing, Satellite Telephones, Satellite Fax and Internet. With increase in usage of MAHANET facilities mentioned above, there is reduction in expenditure and time, expediting easy communication with Mantralaya, all Commissioner Offices and Yashada Pune. V.H.F. Network is established at District Control room Thane and all 15 Tahsils

along with mobile V.H.F. setup in Collector's vehicle and 5 SDO'S vehicles. The V.H.F. base station is located at Thane and Kalyan - Dombivili Municipal Corporation. A separate control room is established during Monsoon season, which works round the clock. The contact no. is +91-22-2534 5130.

Police Control Room

The role of Police Control Room is as per the following:

- Co-ordinate with District Control Room and Municipal Control Rooms.
- Cordoning of area to restrict movement of vehicular and pedestrian traffic.
- Shifting the rescued/affected people to hospitals.
- Providing easy access to rescue and relief personnel/vehicles
- Corpse disposal
- Law and order
- Divert traffic on alternate routes as and when necessary in co-ordination with TMT & MSRDC / MSRTC.
- Set-up an information centre to organise sharing of information with mass media and community

Fire Brigade Control Room

In all Municipal Corporations and Municipal Councils, there is a Fire Brigade Control Room which performs the following activities:

- Rescue and evacuation
- Salvage Operations
- Communicate to District Control Room and Control Room of respective Municipal authority with respect to details of all the above activities
- Communicating about any additional resources required for performing the above tasks.

Railway Control Room

Thane district having intensive railway network is prone to rail accidents. There was a train fire accident in the month of January this year in Dahanu taluka of Thane district. In this respect, the role of railway control room becomes very important which is as following:

- Rescue and Salvage Operations for rail accidents
- Monitor flood situations on railway tracks and co-ordinate with District Control Room for mass transport requirements
- Co-ordinate with District Control Room for draining of flood waters from the railway tracks

- Co-ordinate medical and first aid with Railway Hospitals and District Control Room
- Communicate to District Control Room details of all the above activities

DISASTER MANAGEMENT MEETINGS

The Disaster Management Meeting in Maharashtra usually takes place before Monsoon at all levels of government. In these meetings, the chairperson who can be either Secretary or Divisional Commissioner or DM or SDM or Tahsildar etc. according to the jurisdiction takes a review of disaster preparedness of the machinery and issues instructions to update the emergency contact numbers, control room numbers, rescue operation related machines and materials, list of swimmers, officers-in-charge for disaster management, hospital, ambulances, fire brigades, JCBs, medicine stock etc. The Zilla Parishad, Municipal Corporations, Municipal Councils, Panchayat Samiti and disaster related line departments also have Disaster Management Committee at their level which takes a review of disaster preparedness on regular basis.

HEALTH ACTIVITIES DURING DISASTER

The role of health department, hospitals, ambulances become very critical during any disaster and in fact, the first golden hour after disaster can save many lives if health activities are well-coordinated, planned and instant. The following activities need to be taken up by health officials during a disaster:

- Emergency Supplies of medicines and first-aid
- Providing emergency treatment for the seriously injured
- Corpse disposal
- Preventive medicine and anti-epidemic actions
- Supervision of food, water supplies, sanitation and disposal of waste
- Assess and Co-ordinate provision of ambulances and hospitals where they could be sent, (public and private);
- Provide special information required regarding precautions for epidemics
- Communicate to District Control Room details of all the above activities
- Communicate to District Control Room any additional resources required for performing the above tasks

ROLE OF NON-GOVERNMENT ORGANIZATIONS (NGOS) AND VOLUNTARY AGENCIES

The non-government organization and voluntary agencies play an important role in disaster management and provide a strong band of committed volunteers with experience in managing the disasters. Their strength lies in the choice of their manpower, the informality in operations and flexibility in procedures. These organizations enjoy a fair degree of autonomy and hence can respond to changing needs immediately.

Specific activities in which NGOs/Private Sector can be involved during disaster management operations are search and rescue operations, information dissemination, first aid, disposal of dead, damage assessment and management of information centers at temporary shelters.

OTHER DEPARTMENTS

The important departments involved in disaster management are Revenue, Police, Fire, Public Health Department (Civil Surgeon & District Health Officer), Municipal Corporation/Council/ZP depending upon jurisdiction, MTNL, BSNL, Maharashtra State Electricity Board, Maharashtra Jal Pradhikaran, PWD, Irrigation Department, Agriculture Department, Animal Husbandry, Civil Defense, Home Guards, State Transport Corporations, Regional Transport Office and the District Information Officer (DIO). During disasters all departments work under the leadership of District Collector. Hence, the revenue department takes the pivotal role and coordinates between all departments for disaster mitigation, rescue and relief operations, rehabilitation of victims etc.

To sum up, there are defined functionaries in case of every kind of disaster and also set operating guidelines often termed as Standard Operating Procedures (SOP) are in place in every district. Any disaster management is primarily management by the District Administration under the leadership of District Collector and s/he can call for resources from any and every government department, NGOs and other private organisations. Thus, District Collector gets an overall responsibility for its management and all available resources and institutions come under his/her disposal. S/he can directly get in touch with the Secretariat (Mantralaya in case of Maharashtra) and ask for funds and flexibility in rules.

CONCLUSION

To sum up, I can say that Thane district is prone to several kinds of disaster and though there is adequate planning for all kinds of disasters yet the issues of coordination has been a key concern in all the disasters that I witnessed during my district training. Also, a lot of political involvement and interference stop officials from taking stern action against illegal encroachment, unauthorized building construction, flouting of building regulation etc. No one is ready to stop the buck at some point. There are flaws in highway construction such as sudden sharp turns near valleys or hills which result to increased number of road accidents on some highways like Mumbai Nashik Highway, Mumbai Ahmedabad Highway etc. The stationing of police chowkies is not scientifically done. Arrangement of CCTVs is also not done with proper research. Besides, the disaster management machinery is inadequately occupied with modern technology. After the joining, I asked in almost every attachment with district level functionaries regarding improvement done in fire safety standards after the Mantralaya fire and to my surprise the unanimous answer was “NO”. In fact, during my independent posting as Tahsildar, SDM, BDO and CO, I always inspected this one particular aspect and tried my best to improve the situation. I pointed this out in my inspection reports of Petrol Pumps, Gas Agencies, Hotels, Boarding & Lodging etc. Also, there were no serious disaster drills and most often the mock drill was a kind of mockery. My summation of disaster management can be that

there is "no culture of disaster management". Instead of focusing on awareness, preparedness, response, training, citizen participation etc., Indian bureaucracy only wakes to the disaster when it occurs. Before the occurrence, we sleep over disaster management idea which to a great extent does not exist in its true sense.

Probably, as a country we lack in this one particular aspect and needs to work unitedly to have lesser disasters and reduce their impact through collective coordinated efforts towards pre-disaster awareness and preparedness. There is an urgent need to include disaster management in the school and college curricula as a mandatory subject. A disaster is nothing but a natural hazard but it turns into a disaster when we humans are incapable of managing it properly.

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The author is an Indian Administrative Service officer of 2012 batch. She has over 5 years of working experience in Reserve Bank of India as a Manager. She has also worked in Indian Audit and Accounts Service before joining IAS. She has three Master degrees to her credit, the first in English Literature in 2005 (Gold Medalist, University of Rajasthan, Jaipur), second in Public Administration in 2007 (University of Rajasthan, Jaipur) and third in Rural Development in 2011 from IGNOU. The author has qualified UGC NET in Public Administration. She has also cleared JAIIB and CAIIB from Indian Institute of Banking & Finance. At present, the author is pursuing Ph.D. in Public Administration from IGNOU, New Delhi.

Disaster Management: Thanjavur District

Rahul Nadh A. R., IAS

Chapter 2

INTRODUCTION

Due to the unique geo-climatic conditions prevailing in the Indian land mass and its geo-physical nature, India has been witnessing different types of devastating natural disasters like floods, cyclones, earthquakes, landslides, droughts, tsunami etc. at regular intervals, causing huge loss of life, property and damage to the environment and hence, considered as one of the most disaster prone country in the world.

Natural Disasters cannot be prevented. It can only be managed.Hence, the Scientists, as well as the Society may have to live with certain level of risk – the level of risk depending on the level of Science & Technology available for induction in Disaster Management and the resources available with us.

Advances in the field of Information and Communication Technology have made it possible to forecast the disasters as well as provided us the means for quick and effective rescue and relief operation, thereby minimizing the deadly impacts of some of the worst disasters.

DISTRICT PROFILE

Thanjavur District lies on the East Coast of Tamil Nadu. It is situated between 9.50'and 11.25' of the Northern Latitude and 78.45'and 79.25' of the Easter Longitude.

The District is bounded on the North by the River Coleron which separates it from the districts of Ariyalur and Tiruchirapalli. Towards the East, Thanjavur is bounded by the districts of Tiruvarur and Nagapattinam. Towards the South of the District is the Palk Strait. The western parts of Thanjavur are bounded by the districts of Pudukkottai and Tiruchirapalli.

There are no hills in the entire District. The District being predominantly agricultural,

it is also known as the "Granary of South". Out of a Total Geographical Area of 3396.57 Sq. Km., Paddy is cultivated almost 1, 31,521 Hec.

There are no perennial rivers in the district. The entire cultivation depends on the water from the Cauvery- Mettur Project, thus making the district the central hub of the "Cauvery issue". The Grand Anaicut built by the Great King Karikal Chola on the River Cauvery is a standing Monument testifying the ingenuity and skill of South Indians in harnessing river for purposes of Irrigation. Three main rivers are run throught Thanjavur District are Cauvery, Vennar, Grand Anicut Canal and Coleroon from Grand Anicut.

The district receives rainfall during both the South-West, as well as the North- East monsoons. Among them, large scale rainfall is received during the North-East monsoon.

The Thanjavur District had been hit by Cyclone in the years 1952, 1955 and 1977, 1984, 1988 and 1991 and after bifurcation in 1993(the composite district of Thanjavur district was bifurcated into three- Thanjavur, Thiruvarur and Nagapattinam). But the impact due to Tidal Waves had been very rare in the past 60 years. Only during 1955 and 1978, the tidal waves had entered into the coasts of Nagapattinam, Adirampattinam and Vedaranyam.

Flash floods are common during the North East Monsoon. Similarly,floods occur in the rivers Coleron and Cauvery frequently. However, heavy winds were reported during 1978 also, resulting in damages to houses and trees. During December 1988, a large number of

houses were damaged due to incessant rains. During the year 1984, cyclone crossed the coast of Karaikkal(under the limits of Pondicherry State), which affected the Taluks of Sirkali and Tarangambadi. During November 1985, 15 Taluks were flooded, excluding those of Thanjavur, Tiruvaiyaru, Orathanadu, Papanasam and Valangaiman. During the year 2005, heavy rains occurred all over the State and Thanjavur District was the worst affected, with a large number of houses were damaged. Thanjavur District is vulnerable to face the following calamities.

1.	CYCLONE	:	Normally hit the district during the month of November
2.	TIDAL WAVES	:	Occur rarely
3.	FLOODS	:	In all rivers and tanks during the months of October to December, When North East Monsoon sets in and active.
4.	FLOODS	:	In River Coleroon and Cauvery during South West Monsoon.

CLASSIFICATION OF THE AREA

The calamities such as Cyclone, Floods and Tidal Waves do not hit the district as a whole. But the experience of 1978 floods has taught us to stress on an integrated action plan to manage these natural disasters, by giving special priority to that the coastal areas and the areas under cultivation. They have to be kept ready to face any natural calamity. Hence, the whole district has been classified as "vulnerable", giving special importance to certain parts.

The 16 km coastal belt in Pattukkottai and Peravurani Taluks are vulnerable to the attack of Tidal Waves. Hence a separate plan of action has to be adopted in these areas. This plan includes the evacuation of people from low lying area, the provision for shelter homes, the supply of food and medicines, and the provisions for post-relief operations. This has to be classified and Talukwise and Firkawise for meeting cyclone, floods and other such disasters in Coleroon and Cauvery.

Regarding the tidal waves, a separate set of shelter homes are built at a distance of more than sixteen kilometers from the seashore. Moreover, special officers in charge were also posted to coordinate the rescue and relief operations.

FLOOD IN COLEROON AND CAUVERY - FLOOD PATROLLING

A separate flood control rule, approved by the Government, is already being implemented. The banks of the rivers Cauvery and Coleroon are continuously being patrolled by both the Revenue and the Police personnel. A separate section of Public Works Department personnel, known as "Laskars(Irrigation Assistants)" are posted along the banks of the river Coleroon. Every 2km of the distance is covered by a Laskar. They are provided with proper communication systems to inform the control centre about the ground situation from time to time.

FLOOD IN LOCAL RIVERS AND TANKS

A system of patrolling of tanks, rivers and jungle steams and taking preventive measures is already in force in which the Executive Engineers and the Sub Divisional Officers are involved. Besides the Executive Engineers and Assistant Executive Engineer, the Revenue Divisional Officers and Block Development Officers of the respective area are also responsible for effective patrolling in the vantage points in local rivers and tanks. A proper contingency plan has been be prepared well before the monsoon and revised where ever necessary.

SPECIAL ATTENTION OF FISHERMEN

The officers responsible for communicating the messages and for enlightening the fishermen population were placed in the Control Centre, located in the District Collectorate. These officers, on receipt of warning from the Assistant Director or Deputy Director, would communicate it to the fishermen in the respective areas earmarked for them.

The Village Administrative Officers and the Revenue Officers concerned are also empowered to inform the fishermen under their jurisdiction. In addition to these, the warnings received from the Metrological Centre located in Chennai will be effectively communicated to the concerned officer,i.e., the Assistant Director of Fisheries (Regional), Thanjavur. He/She willwould immediately pass on the information to the concerned fishermen The Inspector of Fisheries (Regional), Adirampattinam, and the Assistant Director of Fisheries, Mallipattinam will communicate the message to the respective fishing villages allotted to them. In addition, the Assistant Director of Fisheries (Fisheries Training Centre), Nagapattinam would coordinate between the three districts of Thanjavur, Thiruvarur and Nagapattinam, with the help of the Chief Executive Officer, Fish Farmers Development Agency, Thanjavur. The weather warning or any other precautionary instructions would be communicated to the Presidents of all

Fishermen Co-operative Societies and in turn they should send frequent messages about the prevailing situation in the villages under their jurisdiction.

VHF

As a special measure, all the Taluk Tahsildars, Revenue Divisional

Officers, Block Development Officers are provided with V.H.F. sets both in their offices as well as in their vehicles. The warning messages would be passed on to the concerned officers as quickly as possible.

CONTROL ROOM

A Control Room at the District Level has been opened in the District Collectorate. The officers in charge of the Control Room in the district level are:

1.	**The District Level**	
	a.	Collector
	b.	Superintendent of Police
	c	Personal Assistant (General) to Collector
	d	Deputy Superintendent of Police, C.R.P. / Duty Police Officer
	e	Any other Officer required based on the situation
	f	Ministerial and Sub Staff.

The main functions of the Control Room are as follows;

FUNCTIONS	
1.	Maintenance of Log Book of Message received and transmitting in the Joint Control Room in the Format.
2.	Maintenance of visitors book in the Format.
3.	Maintenance of message book to be received and transmitted by the Police Control Room in Format of Log Book.
4.	Maintenance of a situation map.
i.	Showing all dispositions and events as they may occur for 24 hours commencing from 06.00 hours being corrected by every hour of occurrence.
ii.	Important events of the previous day should be projected prominently on the left side of the situation map being typed and affixed.

Apart from this, Control Rooms have been opened in all the Revenue Divisional Offices and the Taluk Offices. They are managed by the Revenue Divisional Officers and the Tahsildars respectively.

FORMATS OF REGISTERS

The prescribed formats for the different books maintained by the Control Rooms are;

(i) Log Book

Sl. No.	Date and Time	From	To	Text	Action taken by the recipient with name and designation	Remarks/ Gist of the follow up
(a)	(b)	(c)	(d)	(e)	(f)	(g)

(ii) Visitor's Book

Sl. No.	Date and Time	Particulars of the person visiting	Purpose	Remarks/ Instructions and Remarks of the Visiting Officer.
(a)	(b)	(c)	(d)	(e)

DISTRIBUTION OF FOOD AND OTHER BASIC FACILITIES PRECAUTIONARY MEASURES

The areas classified as "very vulnerable", i.e. the 16 km. Coastal belt, should receive maximum attention in case of a warning of tidal waves or cyclone. The rest of the district, which is classified as "vulnerable", should also receive quick attention. Wherever required, the people should be evacuated. The evacuation of the residents of the low lying area would depend up on the severity of the tidal waves or cyclones.

Keeping this in mind, public buildings such as schools, colleges, offices etc. has been selected at the rate of one per each village or two or more villages to accommodate the evacuees/ the victims. They are rechristened as "Shelter Homes". Each shelter home is placed in charge of a Village Administrative Officer. The Village Administrative Officer is responsible for evacuating, as well as providing basic amenities like drinking water, food etc.

As soon as a cyclone or flood warning is received, the Village Administrative Officer responsible for the evacuation should arrange the movement of the inhabitants of low lying areas to the shelter home. Apart from this, Zonal Officers have been appointed at the rank of Tahsildar and Deputy Tahsildar to monitor the process of evacuation. The Zonal Officers should visit the villages and shelter homes and ensure that the low lying residents are safely evacuated. Moreover, they should ensure that the basic amenities are provided for the public inside the Shelter Homes. Apart from this, a medical team, comprising of a doctor and five nurses have been allotted to each Shelter Home. He would examine the inhabitants and ensure the prevention of spread of any epidemic.

The zonal officers should quickly go around and ensure that the relief operations are carried out on war footing. The Extension Officer (Panchayat) is appointed as the officer incharge of the relief centre. Immediately after evacuation or before evacuation, if possible, the relief

officer should arrange to get the essential commodities through Tamilnadu Civil Supply Corporation Limited, lead Co-operative Society including fire wood, rice etc. and prepare the flood and serve to the victims. All Taluk Supply Officers are asked to ensure supply of essential commodities like food grains. Each evacuee victim should be given food two times a day. They

should be provided food till the District Collector orders to stop. Adequate stock of all the materials should be ensured by the Enforcement Officer in charge of the Shelter Home.

A DISASTER MANAGEMENT PLAN was prepared at the district level. It comprised of all the measures that should be taken in case of a natural disaster. A class on "Disaster Management and Mitigation" was taken by the District Collector himself. He explained all the actions to be taken during the disaster. He also formed the different teams for relief and evacuation. A DISASTER MANAGEMENT MANUAL was distributed to all the officers. It consists of all the duties and responsibilities of the concerned officers and their contact numbers.

Duty of each and every officer was explained in detail in the Manual. Apart from this, the Collector travelled extensively throughout the District to ensure the smooth functioning of all Shelter Homes and Control Rooms. He inspected all the Control Rooms regularly and conducted review meetings with all the officers concerned. Moreover he toured along the entire banks of the rivers Cauvery and Coleroon round the clock to ensure 100 percent evacuation.

The Public Representatives and the Political Parties played an important role in rescue and relief operations. All the Panchayat Presidents, Ward Members, Panchayat Union Presidents and members helped in arranging the basic amenities in the Shelter Homes. They helped in the evacuation. They informed the Public about the disaster from time to time and alerted the fishermen. All the political parties extended their cooperation in this regard.

All these efforts helped the District Administration to manage the disaster well. There were no casualties. All the Shelter Homes ran effectively for two weeks. The people were rehabilitated within zero time. The losses happened mainly in the form of crop. It was compensated within no time. Thanjavur got a special appreciation from the Hon'ble Chief Minister. The credit goes to the District Collector and his team for proper planning, monitoring and execution of the disaster management plan.

Rahul Nadh A.R.

Rahul Nadh A. R. belongs to the 2012 Batch of the Indian Administrative Service. He belongs to the Tamil Nadu cadre and has worked as the Assistant Collector (Trg.) in the district of Thanjavur for one year. He did B.Tech in Electronics and Communication from Kerala University.

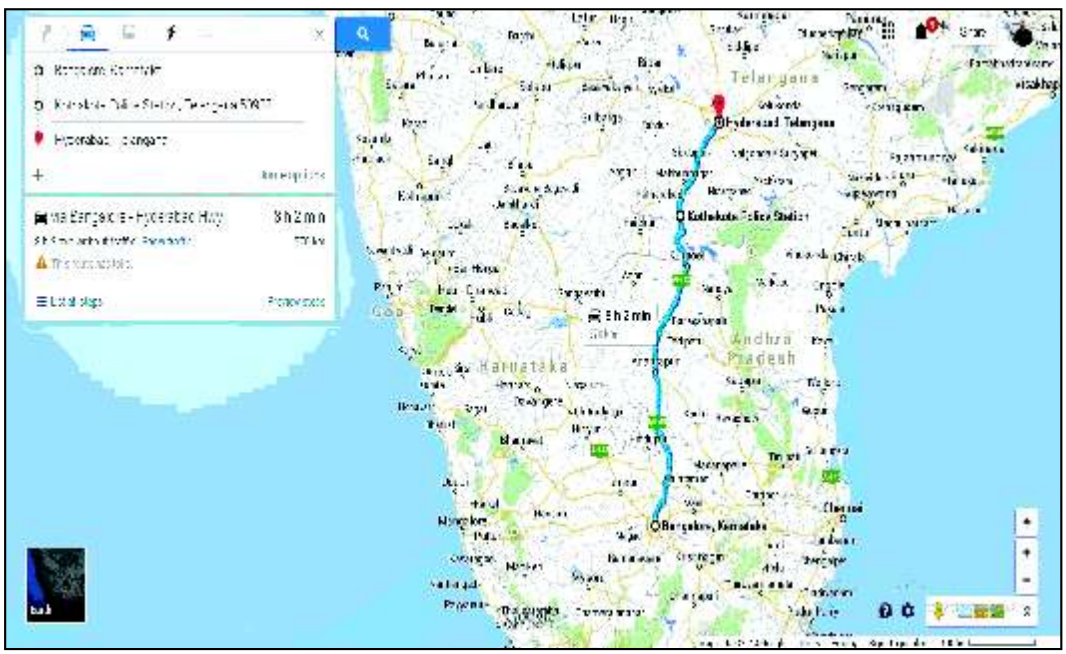
Palem Bus Accident: A Human Tragedy

Vijay Rama Raju, IAS

INTRODUCTION

Roadways play a predominant role in providing transport facility for passenger traffic in the country. Hyderabad and Bangalore are two big metropolis cities in south India, both of them are the two nerve centers for software technology development in India. Many MNCs have established their operating bases in both the cities.

The distance between the two cities is 570kms. Both the cities have good air-connectivity and train connectivity. But the airways and railways are not able to cater to the transport demands of the commuters. This gap is filled by the Roadways. Hyderabad and Bangalore are connected by NH7 (4 lane highway).



Daily, nearly 200 Volvo buses travel between Hyderabad and Bangalore on both ways. The new model of Volvo buses operate at high speeds, in few stretches they cross 200km/hr speed. During the peak festival season and weekends, there is a heavy demand for the Volvo bus bookings. Few passengers are willing to travel in the driver cabin to reach Hyderabad.

INCIDENT

More than 45 people are charred to death after a Hyderabad bound Luxury Bus caught fire at Mahbubnagar in Andhra Pradesh, which is located 150 km from Hyderabad. The Air-conditioned Volvo Bus had originated from Kalasipalyam area of Bangalore at 11 PM on 29th Oct, 2013 and belonged to a local tour operator Jabbar Travels.

The Incident occurred at around 5 AM of 30th Oct, 2013, when the Bus Driver tried to overtake a Car and hit its Fuel Tank with a culvert, leading to an explosion and subsequent fire.

Eyewitnesses say that the Bus was travelling at a very high speed and upon accident, the entire Bus engulfed in fire immediately. The Bus driver, the cleaner along with five other passengers could only manage to escape, by breaking the glass windows. Most of the passengers were asleep when the Bus caught fire.

According to the Bus Owner Shakeel Ahmad, “Most of the passengers could not escape as the flames caught the plastic and cloth materials, especially the seats, and were burnt to death”.

The Bus Driver admitted that he was unable to open the emergency exit in time. He claimed that the tyre of the Bus Burst and due to which he lost control.

Later it was confirmed that only 29 passengers had boarded the Bus at Bangalore, while the remaining passengers boarded at Hindupur and Ananthapur.

Only few passengers could be identified, because of the disfigured and burnt corpses. Police tried to identify the rest using online Reservation list and other clues. Later, 45 Dead Bodies have been retrieved out from the burnt Bus

INTENSITY OF LOSS

The rescue team spotted the body of a mother and child, who stuck to her child tightly. Both of them died in the fire.

A bus passenger, who survived the accident said, "All passengers were sleeping when the bus caught fire. Some of us tried to break open the window glass, however, we were unable to do so. I immediately moved towards the emergency (exit) window and broke it and managed to jump out of the bus."

According to the cleaner of the bus, most of the passengers were sleeping when the accident took place. The cleaner, who has been admitted to a hospital in Hyderabad, said he was pulled out of the burning bus by the driver of a car passing through the area.

An eye-witness said he saw the bus going in flames at around 5.15 AM and within 30 minutes it was reduced to ashes.

Majority of the passengers are in their 20’s and 30’s, of which 8-10 members are working for MNCs. The deceased include two kids and a pregnant lady.

RELIEF AND RESPONSE

The whole bus was gutted in fire and the bodies of the deceased were charred to death and were beyond recognition. So, the administration counted the number of skulls in the burnt bus to identify the number of deceased.

Two teams of doctors and police were formed and specific area was demarcated near the accident site for the conduct of post-mortem of the dead bodies. By the evening of 30th Oct, 2013 three bodies were identified by the relatives basing on the ornaments and wallet found on the bodies. So, a decision was taken by the district administration after consultation with the FSL (Forensic Science Laboratory, Hyderabad) that all the bodies samples (D-1 to 44) will be collected and sent to FSL for DNA sampling.

The FSL experts have informed the administration that the process of DNA sampling will take some time and the bodies have to be preserved till the identification process is completed based on DNA sampling. The district hospital did not have the requisite infrastructure to preserve the 42 bodies. So, the district administration has taken the decision that the bodies will be shifted to Gandhi Hospital Mortuary for preservation.

At the site,

- The Fire, Health and Police departments coordinated with each other in removing the bodies from the burnt bus to make-shift site for conduct of post-mortem.

- L&T staff cordoned the stretch of the highway and provided a single traffic lane to protect the crime scene.
- The local RDO, Tahsildar's and the revenue staff made arrangements with regard to tents, chairs, drinking water, ambulances and drivers for transporting the bodies to Gandhi hospital, Hyderabad.

- Control room was set-up at the Collectorate and Police control room to give information to the relatives of the deceased.
- The police department cordoned the area to prevent the crowd from entering the accident site.
- Victim's addresses were ascertained by the special cell, they retrieved the last call registers of the contact numbers given as reference to Jabbar travels, Bangalore. Also, the relative's details who came to the site were collected.
- Media was effectively used in communicating with the families of the deceased. Information regarding the blood samples of the relatives to be collected at the FSL, Hyderabad on 31st, 2013 was also intimated through media.
- Lions Club and other NGO's were engaged at the accident site to console the families and to provide the necessary assistance.

DNA TESTING: THE NEED FOR DNA SAMPLING ?

By the evening of 30th Oct, 2013, only 3 bodies were identified. Also, there was conflicting claims on a single body. The district administration has taken a decision to go for DNA sampling to avoid any confusion in identifying the bodies.

The main problem is to convince the family members that the process of DNA sampling will take 7 to 10 days. As the bodies were charred beyond recognition, the process is still more complicated.

The blood samples of the immediate blood relative was collected at the FSL, Hyderabad. The relatives contact numbers were collected they were informed about the developments on a daily basis.

The FSL team worked in shifts on a 24 hour basis to complete the process. They were able to identify the bodies on the following dates,

- On 4/11/2013, the identification of the deceased persons in Cr. No.193/2013 of Kothakota PS, Mahabubnagar District based on DNA profiling examination (19 bodies as of now) was furnished.
- On 5/11/2013, the identification of the deceased persons in Cr. No.193/2013 of Kothakota PS, Mahabubnagar District based on DNA profiling examination, in addition to the number nineteen (19) figured in on (04.11.2013) interim report, fifteen (15 bodies) more was furnished.
- On 6/11/2013, the identification of the deceased persons in Cr. No.193/2013 of Kothakota PS, Mahabbunagar District based on DNA profiling examination, in addition to the interim reports dated 04-11-2013 and 05-11-2013 four (4 bodies) more was furnished.
- On 7/11/2013, the identification of the deceased persons in Cr. No.193/2013 of Kothakota PS, Mahabubnagar District based on DNA profiling examination, in addition to the interim reports dated 04-11-2013, 05-11-2013 and 06-11-2013 three (3 bodies) more was furnished.
- On 7/11/2013, the identification of the deceased persons in Cr. No.193/2013 of Kothakota PS, Mahabubnagar District based on DNA profiling examination, in addition to the interim reports dated 04-11-2013, 05-11-2013, 06-11-2013 and 07-11-2013, the last deceased person (1 body) was furnished.

Finally, on 7/11/2013 all the bodies were identified and by 8/11/2013 all the bodies were handed over to the respective family members.

Few special measures were taken by the administration, a team of revenue and police were stationed round the clock at the Gandhi Hospital Mortuary to provide the Death certificate, FIR copy and Post-mortem report to the relatives for filing the insurance claim.

Also, assistance was provided for few relatives of the deceased from distant places in perform the burial at Hyderabad itself.

Assistance was also provided for couple of families in taking the bodies by air cargo to Bhubaneswar (Orissa) and Indore (MP).

CONCLUSION

Disasters, whether natural or man-made, leave a trail of destruction in their wake. The suffering that it causes to the kith and kin of the deceased is beyond description. The material and financial loss adds to this.

What matters in times like these is the swift response on the part of all stakeholders be it the district administration, the police, the various line departments and so on. However, lack of a coherent and swift response is an underlying theme in majority of the disaster situations in India. It is in this context that a well thought out disaster management plan is critical. Post this incident, a comprehensive disaster management plan has been prepared for Mahbubnagar incorporating the roles and responsibilities of the various stakeholders prior, during and post the disaster.

Also, one important dimension is the use of DNA sampling to identify the deceased. India, being a diverse nation and the religious customs are weaved into the fabric of the society. The death of an individual in the family is personal to everyone and every religion has a prescribed set of customs for cremation. So, in any disaster the primary objective of the administration should be to identify the deceased and hand over the body to the family members. Any delay in this regard will increase the anxiety of the family members. The State governments should take necessary steps in this regard to revamp the infrastructure of the DNA profiling laboratories.

It is hoped that with the widespread adoption of plan, any evolving disaster situation in the future would be handled both effectively and efficiently to minimize damage to both life and property.

Vijay Rama Raju

Vijay Rama Raju is an Indian Administrative Service Officer of 2012 Batch. He has undergone his district attachment training in Mahbubnagar District between June-2013 to May-2014. He handled the relief work to the families of Palem Bus Tragedy. The experience from the incident helped the author in preparing the District Disaster Management Plan for Mahbubnagar District.

2013 Flash Flood in Uttarakhand: Dharchula Experience

Mangesh Ghildiyal, IAS

INTRODUCTION

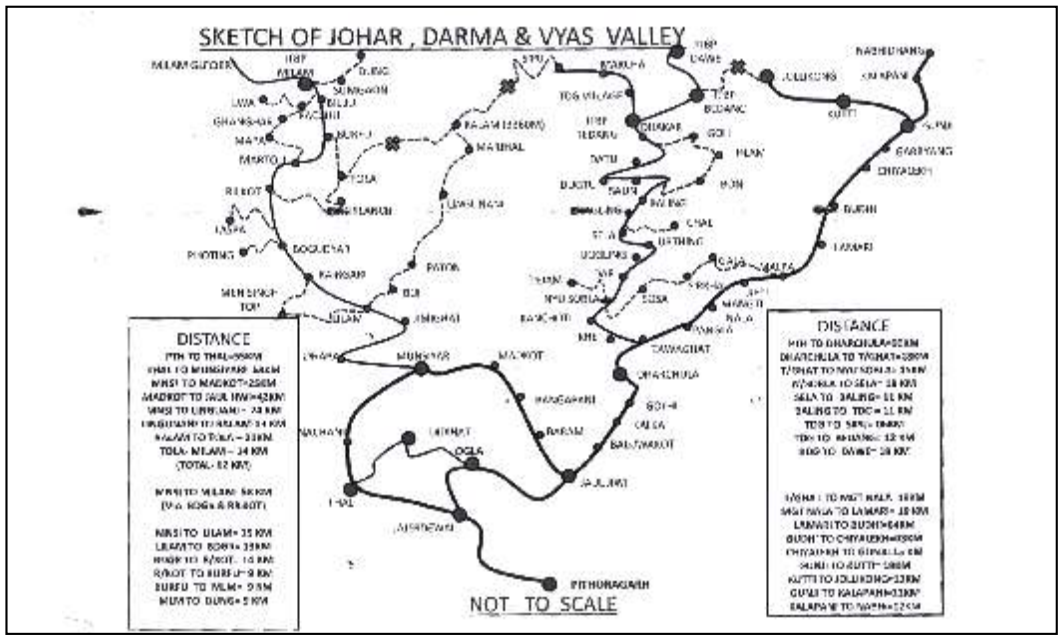
From 14 to 17 June 2013, Uttarakhand and adjoining areas received heavy rainfall, which was about 375% more than the benchmark rainfall during a normal monsoon. The major reason of these massive floods was cloud burst in upper reaches of Himalaya. In Garhwal region, this caused the melting of Chorabari Glacier at the height of 3800 metres, and eruption of the Mandakini River, which led to heavy floods near Gobindghat, Kedarnath and Rudraprayag town of Rudraprayag district [1]. In Kumaun region of Uttarakhand, cloud burst in the upper reaches of river Kali led to heavy floods near Dharchula town of Pithoragarh. Two tehsils of Pithoragarh; Dharchula and Munsyari were badly affected by this disaster. I was posted in Dharchula for disaster management duty.

DESCRIPTION OF DHARCHULA

Dharchula town is situated at the bank of the River Kali, which forms the boundary between India and Nepal. At the opposite bank of Dharchula, a city of Nepal named Darchula is situated. Kali River is joined by its tributary Dhauli Ganga at Tawaghat and then it proceeds towards Dharchula. The valley of river Dhauli called Darma Valley and the valley of river Kali called Vyas Valley meet at Tawaghat. The valley connecting Darma and Vyaas is called Chaudas Valley. One hanging bridge joins Indian town Dharchula with the Nepali town Darchula. The boundary of tehsil Dharchula touches two countries Nepal and China. Due to international importance, Dharchula tehsil has heavy presence of Army and paramilitary forces. Only one mobile network named BSNL works in Dharchula and no private player exists in communication industry in Dharchula.

Dharchula is connected from rest of India via NH 125 which is maintained by Border Road Organization (BRO). This is the only road which is life line of Dharchula. The distance of Dharchula from Pithoragarh is 90 km. The holy Kailash Mansarovar Yatra and Aadi Kailash Yatra, which pass through Dharchula, are also conducted in the summer season. There were many mini hydle projects on Kali and Dhauli rivers which used to fulfill the power requirements of many villages on upper reaches.

The people of Dharchula region follow twin village concept. It means that they have two residences, one in their parental village at high altitude and one at Dharchula town or nearby Dharchula town. During summers they live in their parental village and during winters they



Sketch Map of Dharchula Region

come down to Dharchula due to snowfall in their high altitude villages. One peculiar thing about this region is that at higher altitudes a medicinal plant named Yarsa Gamboo is found which is sold at around 8 lakh rupees/kg. This plant starts growing after first rainfall of monsoon.

SEQUENCE OF EVENTS DURING DISASTER

Dharchula along with all the villages on upper reaches received massive rainfall on 14th and 15th June 2013, which caused continuous increase in water level of the river kali. In the evening of 15th June river kali crossed danger level mark and the SDM announced emergency in Dharchula. He issued warning to the people and all the families on the bank of river started leaving their houses. In the afternoon of 16th June 2013, River Kali started cutting its banks and the houses along the bank of river started falling into the river. This sudden increase in the water level of river Kali was due to the cloud burst in the upper reaches of river Dhauli.

As the houses along river bank were falling into the river Kali, SDM got the information that the villages named Sobla and Suwa had washed away and people were witnessing destruction of their houses. Because all this happened in the day time so people got time to evacuate their houses and they assembled at the safe places. These two villages were completely washed away and people of these villages started moving towards Dharchula. Among 80 houses in the village Sobla only one house left and all other houses washed away. Similar situation was there in village Suwa. A hanging bridge which used to connect village Suwa with the main route, also washed away along with the village, so the people of this village struck in the jungles at opposite side of the

route. Thus they were not able to cross the river. These villagers took shelter in the jungle and this was the most vulnerable group to the starvation and death at that tough time of disaster. There were 40 houses in village Suwa but the river destroyed all the houses.

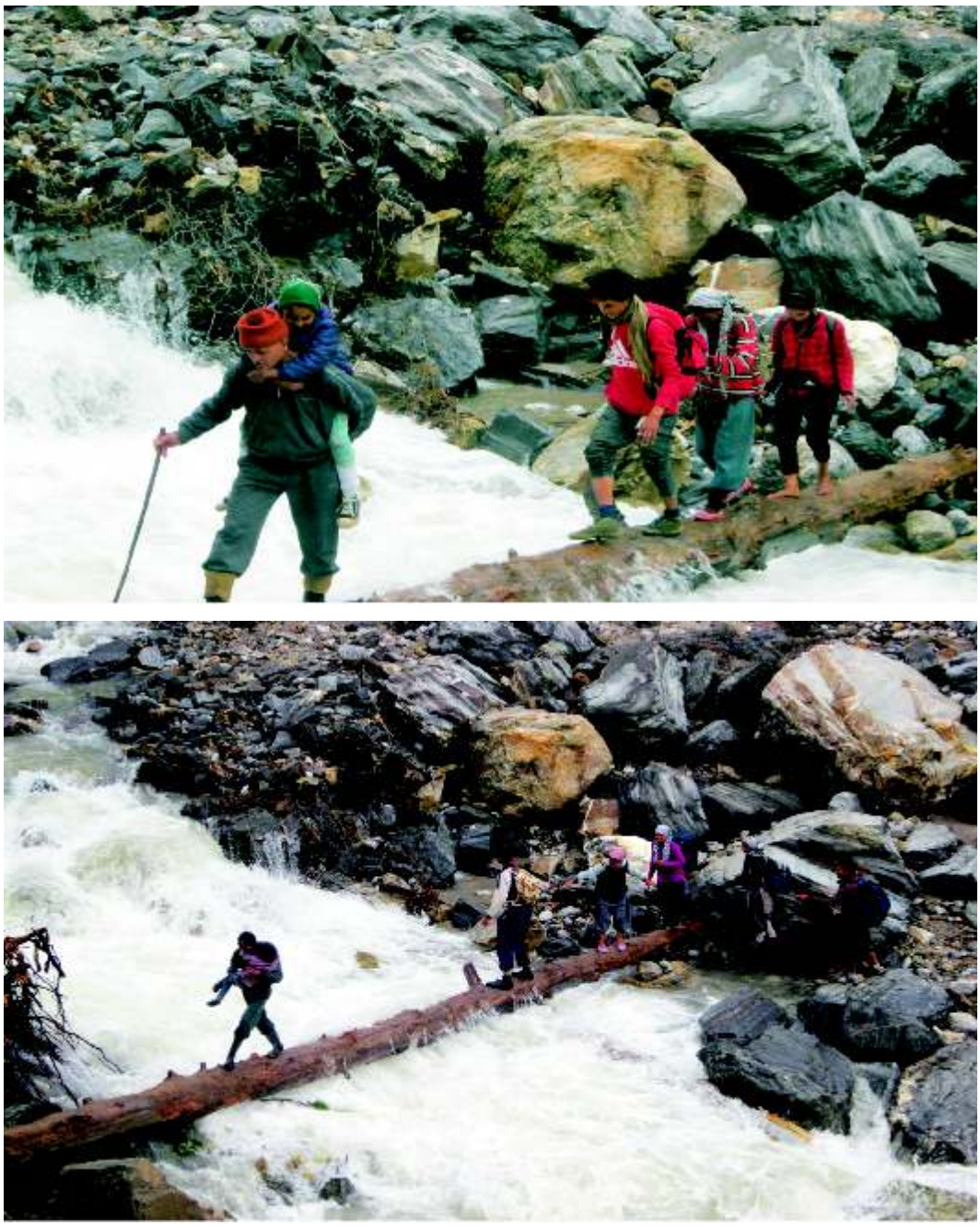
Massive Landslide in a village

Village Sobla: Before and after the disaster… No village is there now…

Village Sobla: Before and after the disaster… No village is there now…

Before Disaster…

Village named Suwa: Before and after the disaster… No village is there now…



People adopting dangerous methods to cross the river

Some more villages were partially damaged in the similar fashion. The complete destruction of houses was also due to excessive rainfall and landslides. The place Tawaghat faced an unpredictable landslide in which the land beneath the houses distorted in such a way that the houses themselves started deforming and tilting.

A house damaged due to deformed land beneath it……

Due to continuous rain on 14th to 16th June 2013 roads/ routes were completely damaged. At many places the route was so much damaged that it was not possible to cross the area of landslides; even on foot. The route connecting Tawaghat and Sobla was motorable, but due to continuous rain on 14th to 16th June 2013 this route was also completely damaged. At some places the entire patches of 2-3 km of road were completely washed away. The pictures below show the level of destruction.


KM 24.000 TO KM 24.150 ON J-M-ROAD


100 TO KM 40.825 ON J-M ROAD


02/07/2013 20:20

Apart from these two completely wash out villages other villages were also disconnected from Dharchula due to damaged roads and routes. Some villages, which were connected to main route by swinging/hanging (jhula) bridges, also got disconnected from the main route due to falling of these bridges into the river. The people of these villages were not able to come out of their villages and they became isolated from the rest of the world. Dharchula itself was completely disconnected from the rest of the world because due to landslides NH 125 was damaged at various places. The pilgrims of holy Kailash Mansarovar Yatra and Aadi Kailash Yatra had also got struck at different places in these high altitude villages. SDM of Dharchula started getting information about these pilgrims on 17th of June. Collection of Yarsa Gamboo was also one of the reasons of migration of people to their high altitude villages during this summer season. These people were also struck at different places on mountains.

Another major concern was loss of communication from these high altitude villages. These villages do not have any mobile network. Each village has got a wireless connection device called DSPT. But due to this natural calamity all the DSPT phones were out of order and nobody was able to contact these villages. Therefore it was difficult to know the situation in each village and the amount of damage each village had undergone.

People walking on tough mountains slopes

RESPONSE OF ADMINISTRATION

There was no early warning system placed in high altitude villages so the incident of cloud burst and enormously increasing water level of river could not be recorded. On 17th and 18th June the weather was cloudy and it was raining heavily so Indian Air Force could not send any helicopter to Pithoragarh. The relief and rescue operations were conducted at local administration level. First time district administration responded on 19th June when we got two

helicopters from Indian Air Force due to clear weather. We started helicopter operations from Pithoragarh. Food supply department was asked to prepare the food packets of 10 kg and 5 kg each to be dropped in high altitude villages. Helicopters started dropping food packets in different villages and evacuating the people from these villages. One relief camp in main town of Dharchula was established for people evacuated by helicopter and around 12 relief camps were started at different places around Dharchula for other affected people of nearby villages.

The medical facilities were arranged in these camps and more doctors were made available in the Community Health Centre (CHC) Dharchula. Due to lost communication, administration was not able to get exact location of casualties and people struck at different locations. Only the wireless sets of police, paramilitary forces and armed forces were working at certain places, so we were getting information from few areas only. The young people of the villages who managed to reach Dharchula were another source of information for administration.

Then the process of deployment of officials at various places started. The major tasks were distribution of relief material, conducting helicopter operations, getting accurate information of damage and loss of lives in various villages. After few days, urgent evacuation part was over. The damage to the routes and roads was so severe that it was not possible to restore the connectivity within several months so we started sending our officials to different villages by helicopter for analysis of damage. The process of dropping of ration in various villages was continuing because these were totally disconnected villages. At later stage we had five

Evacuation by helicopters of Indian Air Force

helicopters (two from Indian Air Force and three from a private company) which were continuously dropping ration and evacuating people from different villages.

A relief camp in tents near Dharchula

Medical help by paramilitary forces to affected people…

Preparation of packets of Relief material

A team of doctors was sent from the district headquarter to Dharchula. All the patients who were brought to Dharchula got medical treatment in Dharchula only, while in case of any referral; helicopter was being used to send the patients to Pithoragarh. Within two weeks of disaster the criticality was over and major focus was on dropping of ration and reconstruction of the damaged government and private properties. Now we were getting ample amount of relief material from NGOs and other multinational companies. But still Dharchula was not connected to rest of country thus Dharchula was not able to get basic commodities by road.

ANALYSIS OF DAMAGE

Total 56 villages in Dharchula tehsil were disconnected from the road. A large number of bridges of different kinds like RCC, wooden and hanging bridges (Jhula Bridge) were completely washed away which resulted in isolation of a large number of villages from rest of habitation. Dharchula tehsil headquarter itself was disconnected from the rest of the district, so supply of essential commodities by road to Dharchula was not possible. Total damage in district Pithoragarh due to this massive disaster was as follows:

S.No.	Damage	Number	Relief(In lakhs)
1	Persons dead	19	91.50
2	Persons Missing	21	105.00
3	Handicapped persons	1	1.50
4	Injured persons	49	10.65
5	Completely damages pucca houses	647	1205.15
6	Completely damaged kutcha houses	55	8.25
7	Severely damaged pucca houses	318	292.575
8	Severely damaged kutcha houses	22	0.704
9	Partially damaged pucca houses	393	56.627
10	Partially damaged kutcha houses	4	0.076
11	Completely damaged animal sheds	45	1.10
12	Milch animals loss	393	60.01
13	Animals (horses, oxen) loss	182	27.87
14	Animals (calves) loss	211	10.74
15	Animals (Mules) loss	145	58.86
16	Animals (sheep, goats) loss	4332	129.78
17	Animals (poultry) loss	641	0.641
18	Families given Ex-gratia (loss of clothes) help	753	29.934
19	Families given Ex-gratia (loss of utensils) help	689	27.3292
20	Recovery of agricultural land	12.19 hectare	1.8285
21	Loss of land	111.49 hectare	139.3625
22	Loss of crop on non-irrigated land	45.76 hectare	2.288
23	Loss of crop on irrigated land	66.591 hectare	5.32728
24	Relief to widows	11	2.75
25	Dhabas and other shops	20	22.00
26	Relief to homeless families	662	176.49
27	Expenditure on woolens	658	32.90
28	Free Ration distributed to disaster affected villages		9211.40 quintal
29	Free Kerosene distributed to disaster affected villages		29933 liter
30	Relief material dropped by helicopter	46 villages	3210.42 quintal
31	Persons rescued by helicopter	40 villages	3810 persons

In addition to the loss to private properties there was much damage to government properties also. The expenditure incurred in the reconstruction of government properties till now is 3612.03 lakhs. Still the reconstruction works are going on in the state of Uttarakhand.

OBSERVATIONS IN DISASTER AND GROUND REALITY

Large Gatherings at Helipads

There was a huge gathering at the helipad of Dharchula. The pedestrian routes were completely damaged and PWD was not working properly. Many people were complaining about lack of food supply in their villages. People were angry with the evacuation of tourists first and ignorance of locals. Therefore everyone was approaching to the Nodal Officer at helipad for evacuation of their people.

Lack of Community Participation

Community participation in loading and unloading of ration at helipad was nothing. Dharchula town was not much affected and people were safe there, but nobody was co-operating with administration in such a critical situation. Nobody from public was willing to take part in disaster management with the administration.

Irregularities in Relief Material Distribution

We were getting a lot of relief material from different NGOs, private companies and Gujarat state government. We were trying our best to distribute the relief material uniformly, but number of affected families was so high that we were facing problems in distribution. Also we were not getting support from community so we were facing a lot of complaints of irregularities in relief material distribution.

Pradhans (Village Headmen) created Havoc

Pradhans (Village headmen) of different villages created havoc at the helipad. Due to their political obligations they were forcing the administration and helicopter pilots to send helicopter in their villages. They were making mob at helipad which sometimes seemed to be the law and order situation. The common feeling among people is that if helicopter did not land in their village it means their pradhans and public representatives are inefficient. Now to save their names, public representatives were forcing the administration to send the helicopter to their villages.

Mismanaged crowd at different Helipads

We were operating on around 30 helipads at different places in Darma, Vyas and Chaudas valleys. It was not possible to place two policemen at each helipad due to lack of food supply and lack of accommodation for these police officials in these villages. Therefore crowd was mismanaged at different helipads and pilots were facing huge problems in landing on these helipads.

Efforts to get inside the helicopter….

Management of Resources

Dharchula was cut off from rest of the district. Thus Dharchula was not getting food supply, vegetable, milk, petroleum oil and LPG cylinders even one month after natural calamity. Now the biggest responsibility of SDM was to manage the resources till the road could open. I saw that SDM Mr. Pramod Kumar was managing things well. Thus I realized that an administrator should focus on management of limited resources in addition to relief and rescue works during disaster.

Behavior of Air Force Pilots (Tale of landing in village Jipti)

People at the Dharchula helipad along with the MLA wanted the helicopter to go to the village Jipti but pilot said his helicopter can't land at Jipti. But one of the junior pilots told that he had already landed his helicopter at Jipti earlier. The main pilot scolded the junior pilot asking why he landed helicopter there. These wordings of pilot created anger among public. The local MLA was furious and decided to sit on a Dharna in Tehsil. He talked to many ministers and secretaries in this regard. This created a major law and order problem in Dharchula.

Fake Ration Cards and a Surprise Visit (Story of Village Dar)

For a surprise check we sent one of our officials to village named Dar. He checked the number of families living in that village. We found that the number of fake ration cards was 63% of actual ration cards. If we take this figure as 50 % average for this area then we can say that 50% of our

PDS ration is supplied to either non-beneficiaries or sold in black market. These mal-practices created extra burden for the government in such situations of disaster.

These fake ration cards increased the number of food packets to be dropped in various villages. Therefore the actual days of helicopter operation increased and the amount spent by the government on these operations increased enormously.

Distribution of Ration by road (Comparison between Delivery Cost of one Packet of Ration by Helicopter and by Road)

I calculated that cost of food packets was Rs. 843 and to drop it by helicopter we were spending around Rs. 4000 per packet. This means we were spending around five times more than cost of a food packet to drop it by helicopter. If we could monitor PWD and spend a part of this money in road/route opening, we could have saved a huge chunk of government exchequer.

Learning from My First Hand Experience

- Lack of authenticate information from distant villages in hill regions is major problem for administration. We shall have to arrange connectivity for maximum number of villages.
- Road connectivity is an essential requirement in any type of disaster. So road connectivity should be on priority of administration.
- Mismanagement in distribution of food grains was a real concern for administration. We should deploy sufficient number of officials with a proper strategy for distribution of food grains in affected villages.
- Continuous communication with BRO, CPWD and PWD is must for restoring road connectivity on time.
- Relief camps should be on high priority of administration, because this shows the face of administration and media usually focus on these issues. Also to provide basic relief to affected people is the prime responsibility of the administration.
- If the administration can get community participation, the effect of disaster can be minimized. So we should involve the community in disaster management.
- In the hill villages of Uttarakhand, GPS location of each vulnerable village should be available with the tahsil headquarter so that in case of disaster pilots of helicopters can land to the affected villages without taking anybody with them for route identification.
- Strict instructions should be given to NGOs to distribute the relief material in the presence of administration so that any law and order situation could not arise.
- Delegation of powers should be clear in case of disaster and each and every official should know his responsibility in such critical situation. A particular responsibility should be attached to a particular post so that everyone will be clear about his disaster management duty while joining that post.

- Deployment of officials should be done wisely. It should be a planned process. The deployment should be based on requirement, ability and background of official and demands of the situation. The deployment should not only base on present requirement but also on future consequences.
- Uttarakhand is the state where concept of revenue policing is still alive. In this system instead of regular policing revenue officials like patwari perform the duties of police. So they are highly burdened. They are not so adequately trained to handle such responsibilities. Thus there should be some mid carrier trainings for patwaris also so that their skills may be improved.
- Basic amenities during disaster like drinking water, sanitation, health and education of displaced children should be well taken care of by the administration.
- Administration should make tents available at each vulnerable tahsil because in case of disaster this will be immediate relief for affected people.
- Continuous monitoring of works of line departments is must because these departments are not serious even in case of disaster. I think they will be serious only when the disaster management plan shall be incorporated in their plans for the year which is also stated in recommendation para 5.6.3 of 3rd report of 2nd ARC which says "Making crisis/disaster management plans a part of development plans." Although this recommendation was accepted by the government but still a lot to be done on ground.
- Every year house census in vulnerable villages by Patwari is must. Because in village Sobla all the houses were washed away so we were getting false claims of houses and instead of 80 houses we got 180 claims for compensation.
- There should be brain storming session by District Disaster Management Authority including all officials involved in disaster management regarding their experience and the difficulties they faced in the field so that a lesson can be learnt and proper strategy can be planned for future.
- Role of State Disaster Response Force should be broadened in Uttarakhand. It should not only limit to rescue and relief but also local connectivity providers.
- In case of hilly terrain in Uttarakhand local people and volunteers can be of great help for administration. They should also be involved in relief and rescue operations. This fact was made strong by the 3rd report of 2nd ARC in which para 5.2.3 (c) states that "communities and local governments to be made aware of the hazards and vulnerabilities." And para 5.2.3 (d) states that "communities and local governments to be involved in disaster management plans." These recommendations were also accepted by the government.
- Each village in hilly regions of Uttarakhand should have some disaster response trained persons who can play the role of first responders in case of any natural calamity.

- State Emergency Operation Centre/State Disaster Management Authority should compile all the reports about disaster in Uttarakhand by various institutions, organizations and various independent studies and then come up with a sound report about causes and factors responsible for this massive disaster so that we have a sound strategy for future. The 2nd ARC in its third report gives clear recommendation in para 4.3.10.3 about Institutional support from science and technology institutions to disaster management.
- In such situations of disaster we should have a proper plan for the operations to be carried out. Usually we had a well framed plan and then everybody worked accordingly, so operations were smooth. Everyone in the team should know his responsibility and work accordingly.

CONCLUSION

The natural disaster of June 2013 paralyzed the whole economy of state of Uttarakhand. We were totally based on tourism industry but after this disaster the tourists flow in our state has reduced drastically. We shall have to come up with a sound Standard Operating Procedure (SOP) to handle this type of disasters and to be an example for the rest of the world. Uttarakhand is natural calamity prone area so we cannot sit idle and wait for a disaster to come and then respond. In addition to preventive measures we should evolve with some proactive measures to secure the life of our people. I feel that the recommendations of third report of second Administrative Reforms Commission (ARC): "Crisis Management: From despair to hope" should be implemented on ground with a true spirit. From my first hand experience of disaster management I realized that disaster management is not only the management of disaster but also the management of whole government machinery, NGOs, press, politicians and people.

Mangesh Ghildiyal

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Disaster Management: Capacity and Challenges of District Administration in West Delhi

Vikram Singh Malik, IAS

Chapter 5

BRIEF PROFILE OF THE DISTRICT

The West district lies in the western part of Delhi. It lies between North West Districtand the South west district of Delhi. It has three sub divisions namely

- Punjabi Bagh
- Patel Nagar
- Rajouri Garden.

Boundaries

The district has common boundaries with the Northwest, North, Central and the South West district. It shares its West Boundary with the state of Haryana. On its western end lies Bahadurgarh which is a sub division of Jhajjar district of Haryana. The national highway No. 10 which is also called the Rohtak Road and the Northern Railway Line connecting Delhi and Rohtak run parallel to the Northern Boundary of this district. The Northern Railway Line running from Inderlok to Delhi Cantt.runs parallel to the Eastern boundary of the district and the Pankha Road marks the Southern side.

IMPORTANT INSTALLATIONS /AREAS THAT ARE VULNERABLE TO DISASTER

- Major public sector installations of IOCL and HPCL. There are oil storage depot and LPG bottling plant of these oil PSU's
- Shopping malls cluster in Rajouri Garden
- Unauthorized colonies in Nangloi, Peeragarhi which have inaccessible lanes and clustered housing.
- Delhi Jal board plant in Nangloi.
- Industrial areas of Peeragarhi and Mundka.
- Plastic waste market in TikriKalan
- Plywood market In Nangloi

TYPES OF DISASTERS THAT MAY AFFECT THE DISTRICT:

Earthquake

Delhi lies in Zone IV in terms of its seismic resistance. This means that the whole of Delhi including the District West is highly vulnerable to earthquake. The clustered houses in the unauthorized colonies of Nangloi ,Peeragarhi and multistoried houses of PaschimVihar are at a very high risk.

Fire

The district receives daily reports on fire incidents. While most of them are minor in nature, some of them have resulted in casualties too.

Areas vulnerable to fire incidents

Shopping malls of the RajouriGarden , The plastic waste market in Mundka and Tikri, Industrial area of Mundka and Peeragarhi, IOCL and HPCL installations. The unregulated plastic waste market is major fire threat as the scrap dealers are often seen to indulge in plastic burning activities in the area in order to segregate it. Quite often the small fires that they burn spread to nearby areas too. Similarly the in industrial areas too units are known to at bay about fire safety and other norms. The plywood market in Nangloi is also prone to fires.

Chemical Disaster

The Delhi Jal Plant at Nangloi can become a potential site for an act of sabotage leading to a chemical disaster.

Rail Accident

A railway line connecting the Delhi to Rohtak in Haryana runs parallel to the NH-10 in the district. There is a major crossing near Ghevra village where shunting takes place often as there is the UIOCL depot as well as FCI godowns where rakes come and go. Any manual error at this junction can have devastating effects on the surrounding area especially Ghevra and TikriKalan villages which are densely populated.

Flood

The Nangloi drain/ nallah has a tendency to flow\w to its brim in rainy season .It has the potential of flooding the nearby areas if not de-silted from time to time.

RESOURCES AVAILABLE AT DISPOSAL OF THE DISTRICT ADMINISTRATION

Fire services

There are around 10 fire stations like Najafgarh, Bawana, Wazirpur, Keshopur etc which cater to the emergency fire situations in the district. As Delhi is a compact city fire tenders can rush from other parts of the city too. Also as the Districts borders Haryana and is well connected to the next town in Haryana via a National highway, It is also possible to call for help from neighbouring district too.

Hospitals

Maharaja Agrasen Hospital in Punjabi Bagh, Balaji action Hospital in PaschimVihar, Dr. Bhimrao Ambedkar Hospital in Rohini and Jaipur Golden Hospital near Peeragarhi are some of the bigger hospitals in or near the district which cater to emergencies. There are also a number of clinics and dispensaries in most of the villages where first aid can be easily provided.

Volunteers for disaster response

The District has more than 50 Civil defense volunteers that remain on duty in shifts in the district headquarters and also in the sub divisions to respond to any emergency. Besides them the DDMA cell of the district maintains a list of around 500 volunteers who can be called on duty in times of need.

Emergency Operation Centre

The District headquarters also has a district Emergency Operation Centre which is manned by the civil defence volunteers in supervision of the DDMA project mangers especially recruited for this purpose. The EOC remains in touch with the Delhi Revenue Headquarters and the other agencies like police and MCD for a quick and co-ordinated response to any disaster. All the officers of the district viz DM and SDM's remain in touch with EOC through wireless communication systems. the EOC has all the protocols and the list of all the agencies with their phone numbers. The moment any call is received it is relayed to all the agencies and officers in no time.

Emergency response vehicles known as Quick Reaction Vehicles (QRV) are stationed in each district of the capital. In case of an emergency, these vehicles can be called after dialing DDMA helpline number - 1077. Each QRV is a modified Innova with equipment worth Rs 35 lakh - a human life detection machine, inflatable light, a diamond chainsaw, oxygen cylinder and mask, stretcher etc - in it. The vehicles also have volunteers trained by experts from the National Disaster Response Force, Civil Defence experts and St John's Ambulance services to provide first-aid to the rescued victims. The teams and the QRVs are under the direct control of the concerned deputy commissioners of the districts and their movement is supervised and coordinated by the emergency operations centers (EOCs) of the district.

INITIATIVES UNDERTAKEN BY THE DISTRICT DISASTER MANAGEMENT AUTHORITY

Popularization of Disaster helpline Number

The DDMA is leaving no stone unturned in making sure that the emergency call number i.e. 1077 is popularized in the general public. Signboards reflecting the number are displayed in all the cinema halls and shopping malls, schools and in public transport like buses and metro.

Mock drills

In order to make people familiar to the concepts of disaster management mock drills are organized frequently at various places in the district. These include

- Shopping malls
- Cinema halls
- Schools
- Metro stations
- Railway stations
- Hospitals
- Oil depots of IOCL and HPCL

In addition to these there are more than 200 Resident welfare Societies which are being taken into the loop in a time bound manner to make them aware of the basics of Disaster management.

Mapping of Vulnerable areas

The DDMA west Delhi has started the work on identifying the most vulnerable areas of the district. More focus is being given to areas which are inaccessible for fire tenders. The unauthorized colonies have made the task of disaster management very difficult. As these colonies are ill planned they have very narrow lanes, sometimes so narrow that only a two wheeler can reach the houses. In addition to the inaccessibility factor there is another big problem and that is of the weak structures of the houses in these colonies. As they are not approved or regularized, they do not follow any norm of house building laws. There is very little adherence to basic structural safety norms. When these houses become multistoried, the risks are multiplied.

Making Disaster response Standard Operating procedures (SOP)

The response to any disaster cannot be in any haphazard manner. Therefore SOPs are being established. These SOPs are not only about the response mechanism but also about the decision making level and also about the chain of command. For every type of disaster a set of basic rules have to be established viz. informing all the stakeholders, reaching the spot quickly, rescuing the injured, identifying the nearest hospital etc In order to come up with a proper protocol it is necessary that the key installations like hospitals, police stations and fire stations, along with their capacity, are marked on the district map along with all the arterial roads and other approach roads.

MAJOR CHALLENGES AND PROBLEMS FACED BY THE ADMINISTRATION

Multiplicity of authorities with different chains of command

In Delhi there are multiple agencies that operate in silos that are having different chain of commands and have limited interaction. As a result there are real coordination issues sometime. Though as per the Disaster management Act, an incident commander (which is mostly SDM's) should take control of the rescue and relief work at the site, yet it has been seen that all agencies work in silos thereby giving a weakened response to any disaster.

Unauthorized construction activities

As the demand for housing is rising in the city, the number of unauthorized colonies is also increasing very fast. As discussed above these dwellings are poorly planned, lack basic amenities and are highly vulnerable to earthquake and fires. They make the task of authorities tackling the disaster all the more difficult.

Traffic problems

It has been noticed that there are certain areas that have heavy traffic round the clock. Also the number of vehicles on roads of Delhi is increasing day by day in leaps and bounds. As a result the roads especially the arterial roads have become clogged. The presence of heavy traffic makes it very difficult for the rescue and relief teams to reach the site of disaster in time. There have been cases when a delayed response has led to loss of life and property.

Inadequate medical facilities

Though we might be equipped to handle low scale disasters that keep happening in the city, we are still far from having the capacity to face the fallout of a bigger disaster like earthquake. God forbid, in case any major earthquake strikes Delhi, our hospitals will not be able to accommodate the affected persons. They are already about to burst at their seams with patients.

Unregulated plastic waste market

In the western part of the district, especially in the villages of Mundka and TikriKalan, a large number of dealers have started their work of segregation of plastic waste, mostly by burning the unwanted part. For eg. if they have to remove a plastic sole from a shoe they will burn the heap a of shoes and then collect the plastic therein. This is a very risky business and is also in contravention of the guidelines of the National Green Tribunal. Yet this business is going on in a highly unregulated manner. The segregated plastic is cut down into smaller pieces and then converted into plastic granules that go in making of recycled plastic products. There have been many instances when the godowns containing these plastic granules have caught fire.

Risk of spillover

It is also pertinent to mention that some vulnerable installations like the IOCL depot, HPCL depot and the LPG bottling plant are situated in close proximity. As a result there is a possibility that any disaster that strikes one of them will have a high degree of probability of affecting the other nearby installations which are equally volatile thereby snowballing into a major catastrophe.

High density living

The low cost housing in the unauthorized colonies is densely occupied. In some of the areas there is abundance of migrant workforce that is renting out single rooms for 3-4 persons. This means that any disaster in these illegal and unplanned constructions can lead to huge loss of

lives.

THE WAY FORWARD

Strict enforcement of building norms:We just cannot keep waiting for the disaster to strike and test our capabilities and neither can we leave things to fate. It is high time that strict enforcement of building laws takes place. We just cannot allow our people to inhabit unsafe dwellings and become a hapless prey to disasters. It is not just the task of district administration and the municipal authorities to mitigate disaster risks. It involves work on a bigger canvas where the major development agency like DDA is required to play a pro active role by providing a viable low cost alternative to the residents of the unauthorized colonies and other such people who wish to buy houses with their small savings. Similarly those colonies that are old are to be carefully surveyed to find out the weak and dangerous structures and also to look into the problems of accessing their remotest parts.

Managing the Traffic

Though traffic police is also kept in the loop when the disaster response teams are activated, still there is a lot to be desired from them. We have to identify the key corridors or arterial roads that lead up to the site of disaster and inform the traffic police about managing traffic on them in a more efficient manner even if it involves transfer of more man and resources to the focus areas. Another possible alternative can be of having special lanes for the emergency services on the key roads.

Increasing Capacity in Hospitals

More beds are needed in hospital along with the all other necessary paraphernalia and human resource. There is an urgent need to train the hospital staff about effective patient management in times of disasters.

Managing Risky Market of Plastic Waste and Ply

Both plastic and ply are highly combustible. It is therefore that there are stricter norms to regulate the markets of these products. There should be no compromise on the safety issue. The godowns of these products should follow basic safety rules.

Regular Safety Audits

Safety audits should be frequently carried out in all vulnerable installations. The weaker buildings should be identified and measures are to be suggested to the owners to strengthen them. The dangerous structures should be recommended for timely demolition either by using the municipal bye laws or by using the powers under DM act or the Section 133 of CrPC.

More Resources for Administration

There is an urgent need to supplement the resources available to the district to manage disaster. The corpus fund should be utilized optimally. There should be more Quick reaction Vehicles available to the district as there have been instances when QRV could not reach the site in tome as it was busy in some other site.

Unified and Well Coordinated Response

In a place like Delhi where every department has drawn its own boundaries it is difficult to coordinate in times of disaster. It is therefore required that either the districts of all the departments should be co-terminus or the different departments must identify their nodal officer for each revenue district. This in turn will lead to formation of a core team that will frequently interact and thus lead to better co-ordination. All nodal officers shall report to the incident commander as declared by the District magistrate.

Identification of Forces Available in the Vicinity for Help in Disaster Response

Although the mobilization of forces, be it the paramilitary or the army, is a very complex procedure. Still we should be always be equipped with the information about the nearest points from where help can reach us.

Identification of Safe Buildings as Possible Relief Shelters

In case of a possible disaster like a massive earthquake or fire, a large number of people shall be rendered homeless. In order to provide them relief we must have a master list prepared of all the structurally sound buildings that have adequate space and can be used as relief shelters. There should be periodic inspections of these buildings to ensure that they are always in a ready to move in condition, adequately supplied with water, sanitation and electricity at all times. Community halls, school and college auditoriums, satsangghars etc can be some of the possible sites for relief shelters.

CONCLUSION

Managing disasters in an urban setting can be a very tough exercise as seen from what happened after earthquake the Chile in 2010. The high density of population can result in greater number of casualty and put tremendous pressure on the resources of the administration. Therefore the focus needs to be more on disaster preparedness and mitigation. Disaster Management must be the priority for District Administration. We must always remember that procrastination is the foundation of all disasters.

Vikram Singh Malik

Vikram Singh Malik is an IAS Officer of 2012 Batch of AGMUT Cadre. He has done Masters in English Literature. He was attached with District West, Delhi for his District Training. His areas of interest include Disaster Management and innovations in Public service delivery.

Chapter 6

Disaster Governance in Tinsukia, Assam

Ajay Singh Tomer, IAS

INTRODUCTION

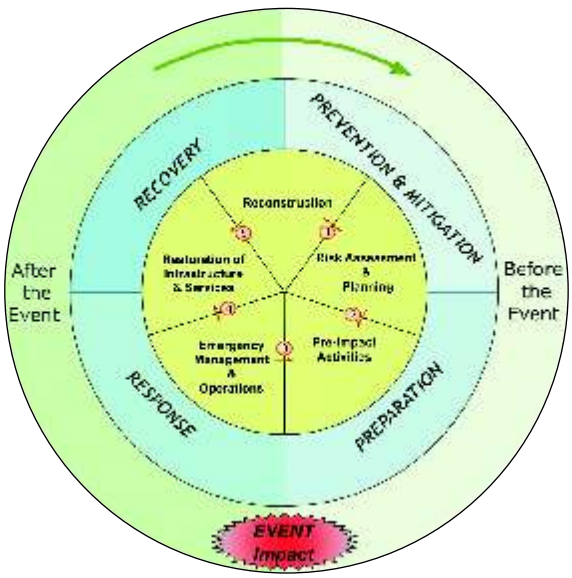
The word disaster is coming from a French word Disaster -meaning bad or evil star. However this is a very narrow conception of disaster and in our context, any disaster means a situation in which there is a sudden disruption of normalcy within society causing widespread damage to life and property.

> *"**A disaster** is a serious disruption of the functioning of a community or a society involving widespread human, material, economic or environmental losses and impacts, which **exceeds the ability** of the affected community or society **to cope** using its own resources." (DM Act, 2005)*

Natural Disaster is a part of our own earth so we can neither avoid it nor is it possible to prevent natural disaster altogether. But its effects can be reduced through systematic approach by Disaster Management initiatives. It can be an effective tool for saving valuable human lives and mitigation of human misery. It is not possible to do away with the devastation due to natural hazards completely. However, destruction from natural hazards can be minimized by the presence of well-functioning warning system, combined with preparedness on the part of the vulnerable community. Disaster management may be seen as a part of good governance.

To minimize the destruction of disaster there are four phases of emergency management- Mitigation, Preparedness, Response and Recovery.

The four phases are visualized as having a circular relationship to each other (Emergency Management Cycle). Mitigation refers to activities, which actually eliminate or reduce the vulnerability or chance of occurrence or the effect of a disaster. Mitigation phases begin with conducting hazards identification and vulnerability analysis – a two-step process. First the hazard is identified which has the potential of affecting the population. Secondly, how people, property and structure will be affected by the disastrous event. Preparedness is a state of being ready to react promptly and effectively in the event of an emergency. Being preparedness means that a plan of action exists for an emergency so that it is clear as to what to do before the emergency occurs. Preparedness measures to be undertaken depends upon the analysis of the hazards severity and vulnerability, which is also the basis for deciding mitigation strategy. In some cases, such as flood or hurricane, an early warning gives several hours to act. However, often no prior warning impending emergency, such as the earthquake, tornadoes, explosion, and major fire is possible. Preparedness for any emergency, especially those, which strike without notice, requires a plan. It is essential to identify the resource available and ways to utilize them. It must also be reasonably certain that the plan will work in an emergency situation.



The purpose of a plan is to provide a systematic way of responding to an emergency situation. The following aspects should be taken into consideration in the development of a Disaster Management Plan.

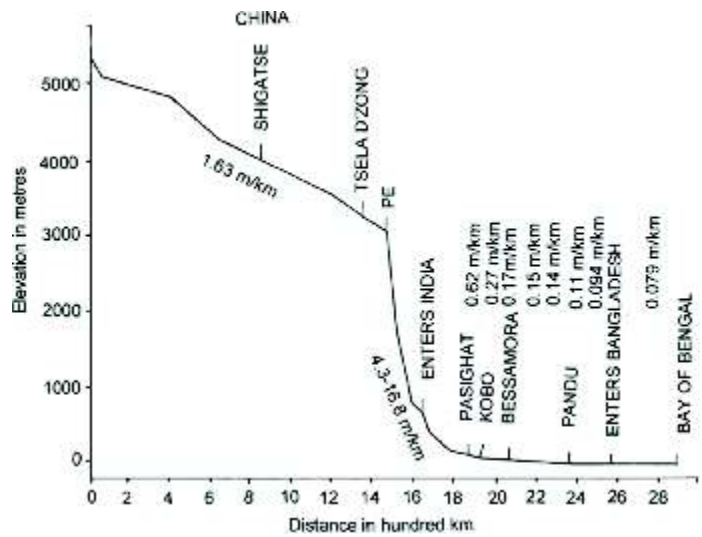
Necessity of a Plan

The entire North-eastern region is one of the most multi-hazard prone region in the Asian continent with different areas being prone to different hazards like Earthquake, flood, landslides and cyclonic storms etc. The vulnerability of natural disasters combined with socio-

economic vulnerability of the people living in these states poses a great challenge for the government machinery and underscores the need for a comprehensive plan for disaster preparedness and mitigation. Training and capacity building of the officials dealing with emergency situation would be an important instrument of disaster reduction and recovery. The Govt. of India since the last decade has been actively supporting programs for reduction of vulnerability and risks. UNDP has been a partner of the Government of India in such efforts. Vulnerability reduction and linking with sustainable development efforts has been one of the key approaches of UNDP. Strengthening capacities for disaster risk reduction and sustainable recovery process across the country and bringing together skills and resources for making communities disaster resistant is one of the first steps taken in the long term for achieving reduction in loss of lives and protecting the development gains.

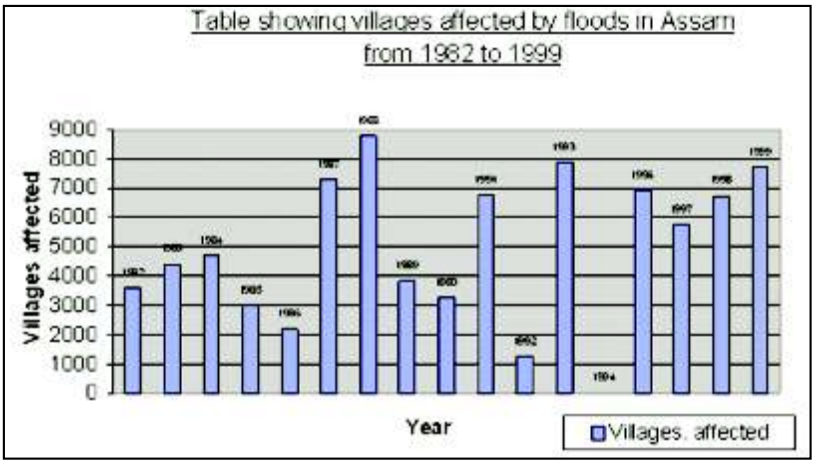
Flood in Assam

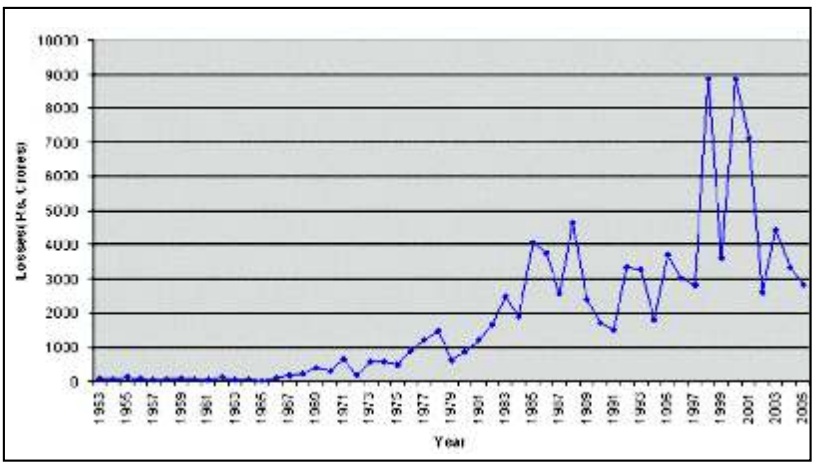
Flood in Assam is a regular feature. It comes every year and do a considerable damage. This happens due to young nature of river Brahmaputra.

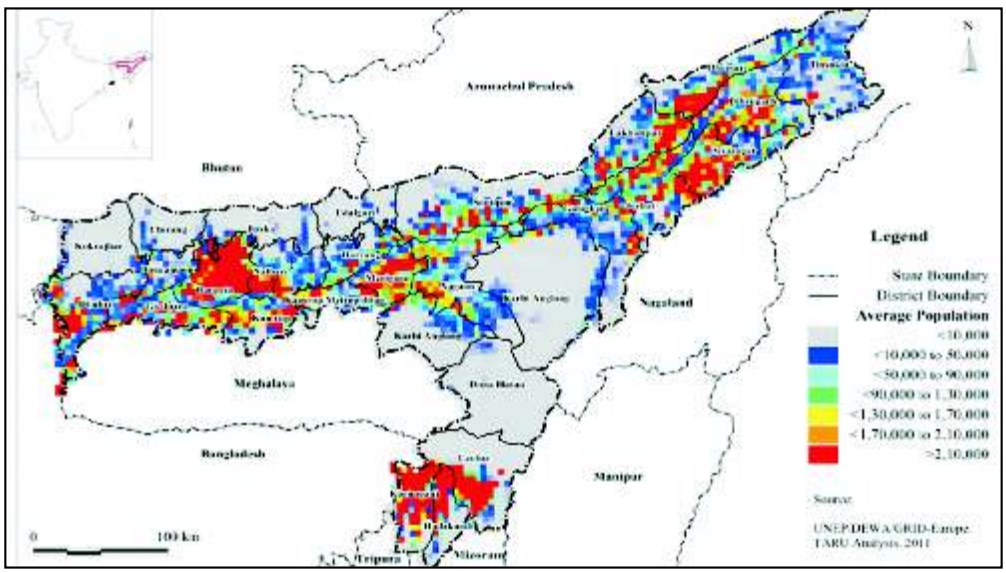


River Brahmaputra after travelling in Tibbet for almost 1500 Km enters India. The gradient is very steep and river flow is considerable. However once it enters plains of Assam in Tinsukia District, the gradient becomes very less. This cause the reduction of sedimentation carrying capacity of the river and so the river deposits its sediment forming plains of Assam. The breach of these naturally formed bund is what caused flood every year.

As seen in the last two images, the losses from floods have been regular. The flood has been occuring with regularity and causing human and property losses. The image below shows the main flood affected districts of Assam. The main Flood affected areas are district of Tinsukia where river enters plains of Assam, district of sibsagar, dibrugarh and Barpeta.







Expected Average Annual Population Exposed to Flood Hazard

FORMULATION AND PREPARATION OF THE DISASTER MANAGEMENT PLAN

The District Disaster Management Authority (DDMA), which is the advisory body, prepares the plan with support from all relevant line departments, member of PRI, Community based Organization, NGO's etc. The District Disaster Management Plan includes the facts and figures that have been collected from various officials and informal sources with a view to meeting the challenges during any natural disaster. Collection and classification of data are to be updated twice in May and November every year. The plan has been prepared with the following viewpoints-

- Contingency Plan is a continuous process.
- All are not equal in a crisis situation giving emphasis on special vulnerable groups like Economically weaker, sick and ailing, pregnant and lactating mother, old aged etc.
- During relief measures social auditing ensures transparency.
- Involvement of women and PRI is a must in the entire process.
- Mitigation Plan reflecting need base approaches from the grassroots level.
- Well defined preparedness and Response Plan for the entire district.

Objectives of Tinsukia Disaster Management Plan

The district is very vulnerable to natural disaster mainly exposed to Erosion and floods, and secondly earthquake is also a probable threat. Here it may be mentioned that the district experienced a terrible earthquake in 1897, due to which the town has at once submerged in water. Experience from earlier disaster, we have to prepare a disaster management plan to make Tinsukia a disaster resilient district .The main objectives of the plan are-

- To rescue and evacuate trapped people
- To provide first aid to the injured
- To take care of children, women and disabled people
- To transfer the seriously injured and people needing urgent medical attention to hospitals
- To restore communication network and essential services
- To clear debris blocking roads and communication network
- To provide shelter and relief to homeless people
- To arrange for food and drinking water to the affected people
- To take immediate measures for disposal of dead bodies and animal carcass to prevent the outbreak of epidemics.
- To take urgent measures for maintaining law and order
- To take the people to safer places (if necessary)

It is a fact that natural disaster cannot be avoided and prevented, but only by our sincere efforts we can mitigate it through advanced preparedness. Preparedness means development, rehabilitation and restoration on one side and mitigation, rescue, and relief on the other side.

DISASTERS IN TINSUKIA DISTRICT

Flood

Tinsukia district is situated in the riverine region and having a proximity to Dihing-Patkai Range. This district has a high amount of rainfall primarily because of the clouds of the monsoon. This leads to very high rainfall in the whole district. Such a heavy rainfall causes largely flash floods, and occasionally erosion etc.

Earthquake

The whole Tinsukia district falls under the seismic zone V and so vulnerable in terms of Earthquake, as well as the whole district is on alluvial soil stratum and on the foothills of Himalayan range. The major earthquake that occurred in 1950 it was seen that the physiographic appearance of Sadiya Sub- division was totally changed and the whole road communication network was disrupted.

Storm

There are frequent occurrence of storm and heavy rain in Tinsukia district especially in Margherita Sub- division. There are incidents of recurrent storm in the subdivision. EROSION: Erosion is a major problem in Tinsukia District. It will be mention-worthy that the effect of erosion in Dibru-Saikhowa WLS Division, a National Heritage spot, is of great importance as it may aggravate the effect of any major flood or earthquake in future causing heavy loss of human life and property along with wildlife.

Industrial and Chemical disaster

Tinsukia is primarily an agricultural district with industrial areas accounting less than 1% of the total area of the district. There is IOCL refinery at Digboi & its marketing terminal at Tinsukia and CIL establishments in Ledo near Margherita along-with one LPG bottling plant at Gopanery near Makum Railway Junction. There are no major incidents in these establishments in the past except one terrorist attack on oil storage tank on 7/3/2003 and a fire broke out at PNGB Road in Digboi town due to oil pilferage from oil field on 13/5/2009. There are many small tea gardens and industries located near human habitats in the district which may pause a threat of contamination of paddy field as well as ground water causing damage to both human and livestock.

TINSUKIA DISASTER MANAGEMENT

Based on the previous history, Tinsukia district has an unexpected rainfall and flash flood. This district receives high amount of rainfall during the rainy season. As a result most of the rivers get excess water and experience floods. The major river flows throw the district are Brahmaputra,

Buri-dihing , Na-dihing, Dirak, Dibru, Dangori and Dhola river and that also cause annual floods and river bank erosion. The major rivers cause flood at least once a year.

The disaster management will be more effective and sustainable if it is institutionalised. For this purpose Government of India has already passed Disaster Management Act on 23rd December, 2005, where it is clearly outlined that a Disaster Management Authority to be formed at the district level. It will be the apex body at the district level. Disaster management would involve many layers of participating organisation. The three focal levels would be State, District and the site of the disaster. The State level agencies would be involved in policy/decisions making, resource andbudget allocation and monitoring through the State Emergency Operations Centre.

Similarly, at district level a District Disaster Management Authority is already formed and activated to mitigate any unexpected situation in the district. There are nine members included in this authority. The Institutional Framework for disaster management developed at the District, Revenue Circle and Village level is as follows:- At each level, apart from disaster management committee, each level has a disaster management plan along with the various task forces like search and rescue, first aid, early warning, shelter management, etc. Tinsukia district has its own district disaster management authority chaired by the Deputy Commissioner. Besides, the district disaster management committee is also working under Deputy Commissioner where all line departments are its member. The District Quick Response Team consists of 23 members belonging to various departments is also set up in the district. At Circle level, every Circle in the district has a Circle disaster management committee headed by Circle Officer. As said above all line departments at Revenue Circle level are its members. Also a search and rescue team as well as first aid team have been set up at every Circle. At village level, every Panchayats has a village disaster management plan as well as village disaster management committee.

The information dissemination at times of emergency for Tinsukia District has been laid down as under:

- The Deputy Commissioner will be the nodal officer for this. He will apprise Addl.Deputy Commissioner, Project Officer(DM) and persons concerned, Circle Officers, Water Resource Dept., PWD (Roads)Dept. IWT Dept., Medical & Health Dept. through SMS and phone.
- Deputy Commissioner will give direction to BSNL of Tinsukia District to immediate arrangement for alternative phone connectivity in the control room of Deputy Commissioner's Office. Nazarat Officer to take steps accordingly.DPO will also train control room duty personnel properly.
- For any early warning report received from North-East Space application Centre (NESAC), Umiam, Meghalaya, the same should be intimated to Executive Engineer,Water Resource,

PWD State Roads/ Rural Roads and Supdt. of Police, Addl. SP, SDO Civil Sadiya and Margherita and all CircleOfficers.

- Circle officers will have village vulnerability map with them so that they can pass message to respective Gaon Buras/ LR Staff and PRI members without fail. Superintendent of Police will accordingly inform Officers- in- Charge of Police Stations and In-Charge of Out Posts. Circle Officers will also keep contact with the representative members of vulnerable villages.
- All concerned Departmental Heads, Circle Officers and their Officers, Gaon Buras should keep their mobiles on switch on mode round the clock.
- The Water Resource dept. as well as the PWD(State and Rural Roads)should take steps to maintain a strong liaison between their officials and their manpower at he field level and keep the District Administration well informed on any emergency situation that may arise.
- Deputy Commissioner will utilize services of SDIPRO for issuing pressure lease for informing the public on various issues related to Disaster,making people aware about warnings(only in case of emergency). The contact nos. of SDIPRO and DPO(DM) should be circulated to all concerned persons so that they can get the required information in need of the hour.

This protective process embraces measures which enable governments, communities and individuals to respond rapidly to disaster situations to cope with them effectively. Preparedness includes the formulation of viable emergency plans, the development of warning systems, the maintenance of inventories and the training of personnel. It may also embrace search and rescue measures as well as evacuation plans for areas that may be at risk from a recurring disaster. Preparedness therefore encompasses those measures taken before a disaster event which are aimed at minimizing the loss of life, disruption of critical services, and damage when the disaster occurs. All preparedness planning needs to be supported by appropriate legislation with clear allocation of responsibilities and budgetary provisions.

Mitigation embraces all measures taken to reduce both the effect of the hazard itself and the vulnerable conditions to it in order to reduce the scale of a future disaster. Therefore mitigation activities can be focused on the hazard itself or the elements exposed to the threat. Examples of mitigation measures which are hazard specific include modifying the occurrence of the hazard, avoiding the hazard by siting people away from the hazard and by strengthening structures to reduce damage when a hazard occurs. In addition to these physical measures, mitigation aims at reducing the physical, economic and social vulnerability to threats and the underlying causes for this vulnerability.

MAIN MITIGATION STRATEGIES

- Mapping of the flood prone areas is a primary step involved in reducing the risk of the region. Historical records give the indication of the flood inundation areas and the period of occurrence and the extent of the coverage. Warning can be issued looking into the earlier

marked heights of the water levels in case of potential threat.

- The onset of storm is extensive and often destructive. A hazard map will illustrate the areas vulnerable to the storm in any given year.
- Land use control will reduce the danger of life and property when waters inundate the flood plains. In areas where people already have built their settlements, measures should be taken to relocate to better sites so as to reduce vulnerability. No major development should be permitted in the areas which are subjected to high flooding. Important facilities should be built in safe areas.
- Construction of engineered structures in the flood plains and strengthening of structures to withstand flood forces and seepage. The buildings should be constructed on an elevated area. If necessary build on stilts or platform. They should be wind and water resistant. Protect river embankments. Communication lines should be installed underground. Provide strong halls for community shelter in vulnerable locations.
- Flood Control aims to reduce flood damage. Measures such as reforestation, protection of vegetation, clearing of debris, conservation of ponds and lakes, etc.
- Structural measures include storage reservoirs, flood embankments, drainage channels, anti-erosion works, etc. and non-structural measures include flood forecasting, flood proofing, disaster preparedness.

Ajay Singh Tomer

Ajay Singh Tomer is an Indian Administrative Service officer of the 2012 batch. He did his graduation in Manufacturing Science and Engineering from Indian Institute of Technology, Kharagpur in 2005. After completing his graduation he worked first in the field of finance and then in the field of operations management. He has extensively travelled abroad and has visited UK, Scotland, Saudi Arabia, UAE, Bahrain and Singapore among other countries. After working for nearly four years, he quit his lucrative job in the private sector and came back to India to serve the nation. In the field of Disaster Management, the author has extensive experience being part of Loss Prevention Team in Schlumberger Inc. He has done basic survival training like CPT, Fire prevention and Control, Helicopter Training, Survival in sea and desert among others. The paper is written on the basis of his field experience of one year during his district training in the district Tinsukia, Assam.

Disaster Management - The Bharuch Story

Surabhi Malik, IAS

Chapter 7

INTRODUCTION

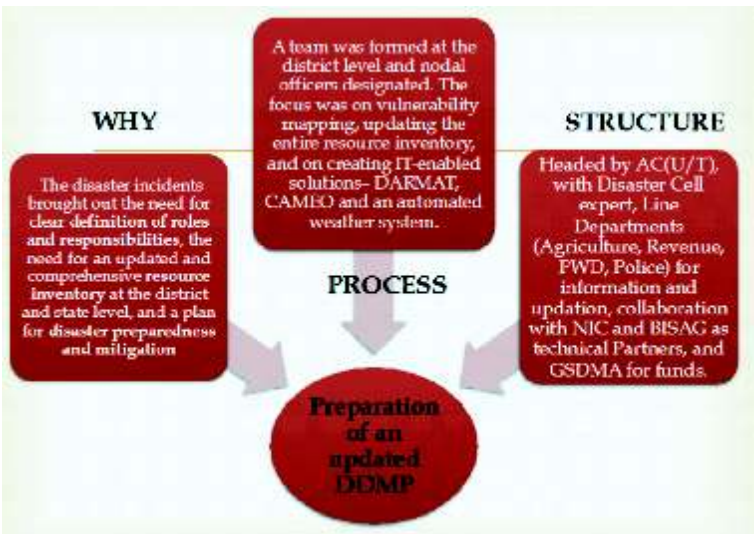
Disaster threatens sustainable economic development worldwide. In the past twenty years, earthquakes, floods, tropical storms, droughts and other calamites have killed millions of people, inflicted injury, disease and caused homelessness and misery to around one billion others in the world. These have caused damage to infrastructure worth millions of rupees. Disaster destroys decades of human effort and investments, thereby, placing new demands on society for reconstruction and rehabilitation. Disaster management thus requires a multi-disciplinary and proactive approach. The community, civil society organizations, media and the proverbial man on the street, everyone has to play a role in case such exigency occurs.

DISTRICT DISASTER MANAGEMENT PLAN: OBJECTIVE

The objective of a Disaster management plan is to localize a Disaster and contain its effect to the greatest extent so as to minimize its impact on life, environment and property. Response to any disaster, in the absence of a well-defined plan, would be arbitrary, leading to overemphasis of some actions and absence of other critical actions. A formal plan for Managing Disaster is therefore necessary. This Disaster management plan has a strong preparedness focus which aims at reducing our vulnerability to disasters and at the same time, it includes a plan of action/response mechanism for dealing with earthquakes, floods, cyclones, epidemics,

industrial and chemical accidents, road accidents and fires. Thus, this process should necessarily involve:

- Verification of contact details of all stakeholders
- Highlighting the vulnerable and low-lying villages and key infrastructure like power stations, oil and natural gas pipelines, electricity cables, power substations, storm water drains, etc.
- Putting in place a centralised, updated and comprehensive resource inventory with names and contact numbers of nodal people on the SDRN and IDRN.
- Updating the plan for community awareness especially in high disaster-prone areas like flood-vulnerable villages and villages on the peripheries of industrial clusters.
- Building a rationalised Communication Flow plan before, during and after the disaster with an aim to simplify procedures, reduce multilateralism and reduce response time.



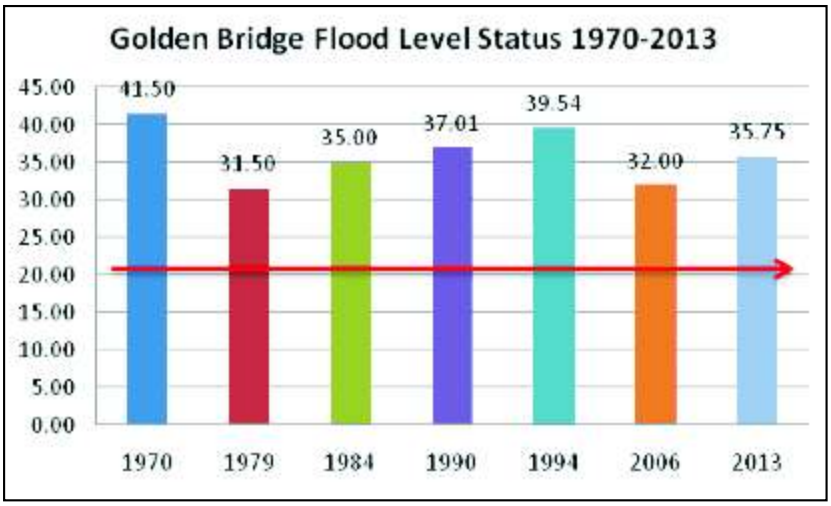
FLOODS AND RAINFALL

BHARUCH district faces a number of hazards, which pose the threat of disaster. The threat (risk) and possible impact (vulnerability) which can be actualized from these hazards ranges from minor impacts affecting one village to events impacting larger than the state alone.

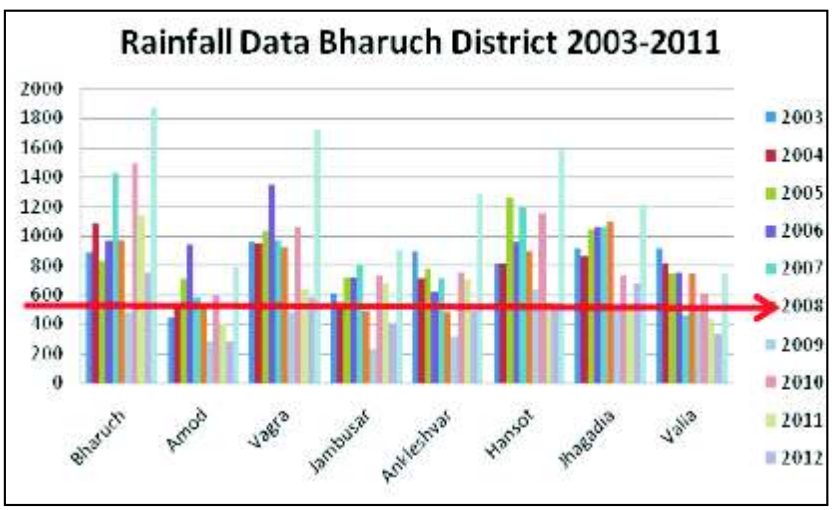
Vulnerability

Disasters arising out of natural calamities like floods are a real and serious threat in Bharuch district due to the presence of river Narmada, Dhadhar and Kim as well as check dams like Pigut on Tokari Khadi and Baldewa on kaveri khadi in Valia taluka and Dholi on Madhumati khadi in Jhagadia taluka. The flooding may occur as a result of heavy monsoons or even

cyclones. In the past, the areas of Bharuch and Ankleshwar talukas have been regularly and severely affected by flooding of the Narmada River. In the year 1994, certain low-level areas of even Valia taluka had been affected by Kim River.



The above figure cites the past years in which the water level of river Narmada at the Golden Bridge has reached truly catastrophic limits. The red line indicates the danger level (i.e. 24 feet or 7.315 metres.) The figure below indicates the rainfall data for Bharuch district.



The average annual rainfall is 640 mm (depicted by red line).

Disaster faced: floods (22nd-26th sept 2013)

Due to heavy rainfall across Bharuch district as well as the catchment area of Narmada River since 22nd September 2013, a serious flood situation had arisen in Bharuch. Narmada river was flowing 9.5 feet above the danger level as measured at the Golden Bridge on 24th

September and on an average, 458.75 mm of rainfall was registered during 22nd to 25th December. A natural way of this rainwater being diverted to the river was hence not possible.

A total of 10 human casualties were registered during this disaster situation in Bharuch district. Water ingress was recorded in 77 housing societies of Bharuch city and its outskirts. 46 different roads of the length of 307 km under the Panchayat department were found damaged; and at the same time, 82 km of State highways were also damaged at seven different locations. In all, 35139 people were evacuated and accommodated in temporary shelters and 74 relief camps. 6502 Livestock was also relocated.

For rescue operations, 4 Teams from NDRF were called. 6 fire-fighter teams from Ahmadabad Municipal Corporation, 2 teams from Rajkot Municipal Corporation were also called with their rescue equipment for timely rescue operations. All teams were promptly deployed wherever required in the district. The road between Aamod and Jambusar had been cut off by floodwater, necessitating our seeking the Army's help; their heavy vehicle was deployed for rescue work in Jambusar and Aamod Taluka.

In total, 163 Medical & paramedical teams were directed to take quick & prompt action for preventive measures for health and sanitation in affected areas. At the same time, the distribution of cash dole assistance was also undertaken by deploying 34 teams. A total of 37 buildings found dangerous during inspection by the teams of R & B Engineers were also evicted as a precautionary measure.

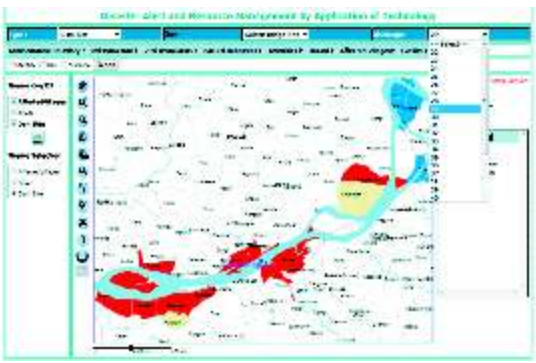
Representatives of Oil/Gas pipeline operators like ONGC, IOCL, GSPC, GAIL and Reliance were called by District Administration and instructions were issued to them for safe operation of their respective lines. Instructions were also issued to Disaster Prevention and Management Centre in Ankleshwar, Disaster Management Centre in Dahej and various Industries' Associations to take proper measures and precautions for safety. Parts of the National Highway passing through Bharuch district were found damaged at various locations, resulting in heavy traffic jam on the National Highway. Hence, from 25th September 2013, the toll collection at Narmada Bridge was withdrawn till further communication.

Moreover, during the course of this disaster, storm water accumulated near 220 KV substation of GETCO near Haldarava village, and due to absence of any way to drain off this water, power supply to Bharuch city was cut off. On 25th September 2013, rainwater was manually drained off with the help of JCB machines. A similar situation occurred in the 66 KV Substation in Palej causing shutdown of operations there. For this purpose, a heavy-capacity dewatering pump was provided and operations were restored immediately.

Apart from medical teams deployed, cleaning operations were conducted very promptly, with the help of JCBs for shifting debris, spraying and fumigation of affected societies and villages as a preventive measure, chlorination of water and providing food packets with the help of local industrialists and philanthropists.

Steps taken to augment preparedness

The large-scale DDMP updation exercise being carried out in Bharuch is a way to improve its preparedness measures. One of the most important parts of this updation exercise is the building of a GIS-based databank, which reflects the key vulnerabilities and resources of the district in a layered and multi-tiered format. This is being done along with a technology partner, and BISAG (Bhaskaracharya Institute for Space Applications and Geo-informatics), which is instrumental in developing a software program called **DARMAT** (Disaster Alert and Resource Management by Application of Technology) as it has previously done in Rajkot district.



The software is a query-based platform, and one can enter the water level in a drop-down menu, and obtain the areas flooded and vulnerable villages as highlighted on a map. These areas are identified according to proximity with the river and vulnerability to flooding and this allows the District Administration to reduce delays in response and planning. Alongside, additional layers highlight the relief shelters, schools, hospitals, Primary Health Centres and other vital installations falling within these areas or in safe regions, allowing us to formulate strategies for evacuation and relief well in time.

AUTOMATED WEATHER SYSTEM (AWS)

The Automated Weather System is a wireless GSM / GPRS enabled station, and is useful for collection of weather data based on certain parameters. Along with collection of data, it automatically transmits this data to a central server, making real-time information available at your fingertips. This uses a low energy consumption system, which helps it run for days without charging.

The Parameters measured Include:

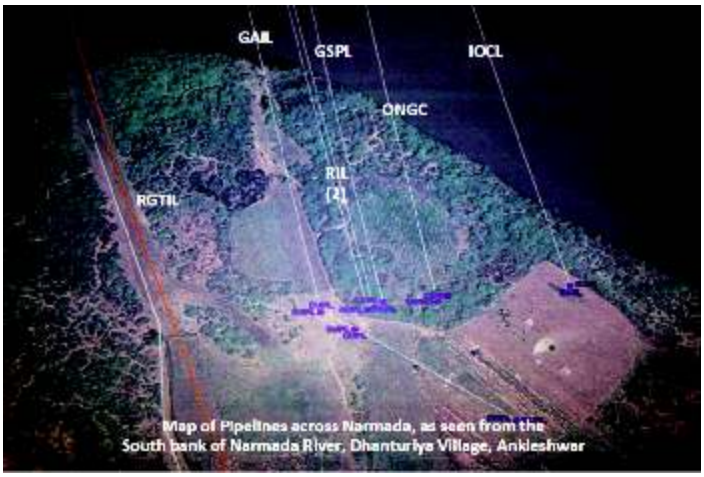
- Temperature(Range- 40 to 123.8 ° C)
- Relative Humidity(Range 0 to 100%)
- Wind speed(Range 0 - 250 K mph)
- Wind Direction(Range 0 to 359 °)
- Rainfall(Range -100mm / hour)

One can set trigger levels for these parameters and as soon as these trigger levels are breached, automatic smses can be sent to a pre-decided list of people, informing them about the possibility of a natural disaster. As per pre-defined preparatory roles of these people, preventive measures like evacuation, etc. can be undertaken promptly, to reduce loss of human lives and other damage. Hence, as a part of comprehensive up gradation of preparedness measures undertaken by the District Administration, Bharuch, talks are on to establish these weather stations in each of the 9 Talukas of the District as well as the river sites of Narmada and Dhadar Rivers. This will go a long way in reducing response time to emergencies that arise. This can be used both for Agricultural Operations and as **an Early Warning System For Disaster Management** and Risk Reduction.

PIPELINES PROFILE

There are total 7 pipeline operators in the district, two of which operate Oil pipelines (IOCL and

ONGC) and the remaining five operate gas pipelines (RIL, RGTIL, GSPL, GAIL, Gujarat Gas) of which Gujarat Gas is a city gas distribution network.



Map of Pipelines across Narmada, as seen from the South bank of Narmada River, Dhanturiya Village, Ankleshwar

Vulnerability

The vulnerability of the pipelines to disaster occurs because these pipelines are laid across the Narmada at the narrowest margin between the riverbanks. In case of floods, this area is most vulnerable to erosion and washing away since all the water pressure gets concentrated at this narrow section. This leads to riverbank erosion, which exposes the pipelines, causing them to vibrate and run the risk of damage or rupturing.

Also, Pipelines in Bhadbhut sector are laid at varying distances from each other. Companies technically assess safe distances by themselves, and the final permission to lay pipelines is granted by Chief Controller of Explosives (PESO) or the PNGRB. The PNRGB(Technical Standards and Specifications including Safety Standards for Natural Gas Pipelines) Regulations, 2009 mention safe distance between pipelines but no special provisions for high-density pipeline corridors especially laid through rivers or water bodies are given. There is also the issue of safe distances vis-à-vis other critical installations, especially in high-density pipeline corridors (E.g. GAIL's pipeline is appx. 50 meters from Torrent power's Transmission Tower.

In the event of oil leakage, the vulnerable villages are given as below:

Vulnerable Villages

- Villages Immediately abutting pipelines: *Bhadbhut (3835), Dhanturiya (4717).*
- Downstream Villages in case of oil Leakage:
  - ***Bharuch**: Kasava (1336), Mahegam (1235),*
  - ***Ankleshwar**: Kolodra (1663), Suva (1920), Ambetho (1552), Jageshwar (1571), Rahiad (1694), Lakhigam (4938).*
- Total vulnerable population: 24,661.

(Population figures of villages stated in brackets)

Disaster Faced: Pipeline Explosion & Oil Leakage

- On 25th August 2013, there was explosion in the DUPL natural gas pipeline of GAIL and breakage in the 26" gas pipeline of RIL. This was followed by incident of oil leakage in the ONGC pipeline on 28th August 2013.
- District Administration issued an order of immediate shutdown of all pipelines in Bharuch District. District Crisis Group (DCG) Meeting was called on 26th August 2013; all pipeline operators were asked to verify structural safety of their pipelines and submit safety undertakings.
- On 31st August 2013, a show-cause notice was issued to ONGC by the District Administration for non-compliance of safety conditions and failing to give notice of incident. GPCB also issued notices to GAIL, RIL for failing to intimate the concerned authorities about the incident and lapses in safety procedures.
- On 1st September 2013, an Independent High-Level Technical team, i.e. M/S CEIL, Mumbai appointed by Energy & Petrochemical Department. Crude oil trapped in river section was displaced by ONGC. ONGC also conducted churning of oil in affected area by boats up to 13th Sept 2013
- Review and policy meeting was organized by GSDMA on 22nd November 2013 to discuss policy vacuum and multiplicity of laws and agencies granting ROU to pipeline operators.

Policy Recommendations

- Pipeline operators laying their pipelines across river-beds should be made stakeholders in plans to protect riverbanks from erosion. Laying pipelines through an overhead corridor above the river can be considered where possible.
- Right of User permissions to Telecom and Power Towers are granted by the Central Govt. without local consultation. An NOC can be obtained from the concerned District Authority in these cases to ensure safe distances.
- Technical safety standards should be specified statutorily for high-density pipeline corridors, especially across riverbeds in areas where floods occur.

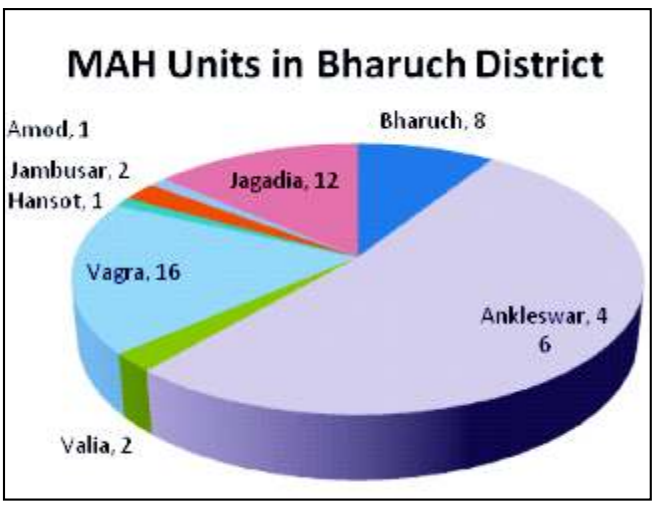
- It must be made mandatory for all pipeline operators to inform both the District Administration and any other installations on either side of their pipeline when undertaking repair work or relaying pipelines.
- The exact location of laying pipelines across a riverbed must be approved carefully by the Irrigation Department after undertaking a hydrodynamic survey of the area and the erosion on riverbanks. This should be avoided in the narrowest part of the river where water pressure and flow during floods is maximum.
- All oil pipeline operators must necessarily have the wherewithal to immediately deal with incidents of oil leakage (for cleaning and disposal) e.g. OSD sprays, boats to churn the oil, etc. and must adhere to OISD-GDN-200 (Guidelines for preparation of Oil Spill Response Contingency Plan) of OISD.

CHEMICAL HAZARD

Chemical Industries are engaged in storing, handling, manufacturing, transporting and using large and bulk quantities of various hazardous chemicals. Many of these chemicals are toxic, highly reactive, explosive, flammable, or poisonous or have a combination of these characteristics. Due to these properties and impact of disasters such as nature of natural calamity as well as manmade, they have the potential to cause harm to human beings, other living creatures, plant, property and the environment in general as resulting emergencies of fire, explosion, toxic release, radioactive poisoning, etc.

Vulnerability

Bharuch is one of two districts in Gujarat to lie in AA Category, i.e. Highly Hazardous. There are 88 Major Accident Hazard Units (MAH) units in Bharuch, as shown in the figure below.

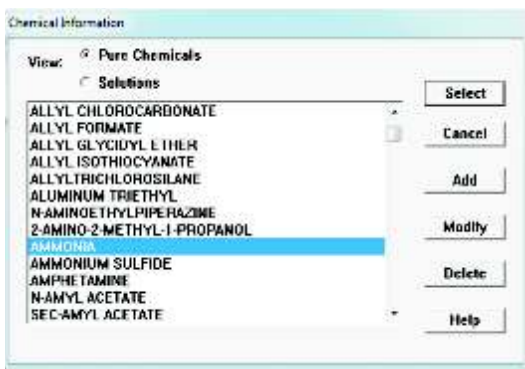


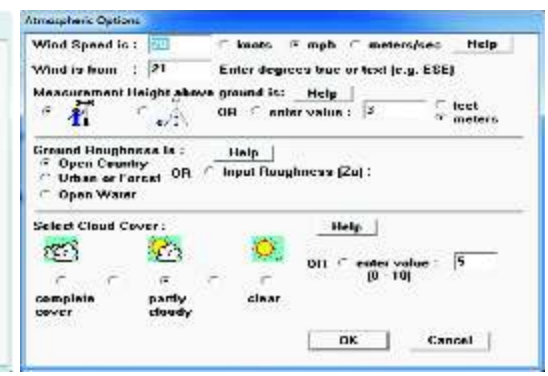
The details of chemicals stored/manufactured in Bharuch, which have off-site consequences, are as follows:

The seriousness of Chemical And Industrial Disasters can be assessed from the above statistics. Besides, Bharuch stores both Chlorine and Ammonia, which are highly hazardous and have toxic endpoints of up to 40 kms. A sudden explosion can have grave and immediate off-site consequences, and it is important to reduce our response time in these cases so that correct succour can reach promptly and to maximum affected people.

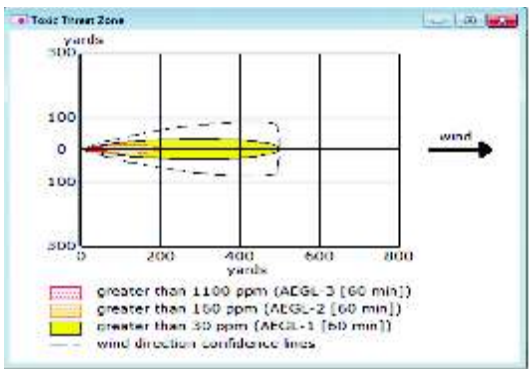
Steps Taken to Augment Preparedness

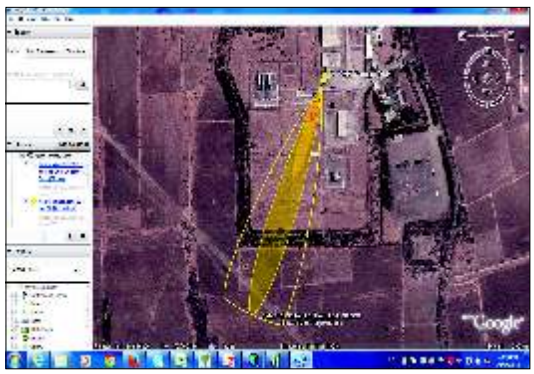
The District Administration felt the need for setting up of a GIS-based system for Chemical and Industrial Disaster Management through open source software like CAMEO, MARPLOT and ALOHA. CAMEO means Computer Aided Management of Emergency Operations. This is computer software used for emergency planning, emergency response and managing chemical inventory at the concerned facility. This software stores all necessary information about chemical industries in a district, their location, category and quantity of stored chemicals, on-site emergency plans, safe routes for evacuation, details of safety officers and nodal people working in different factories, etc. Whereas MARPLOT locates the site where the emergency has arisen, ALOHA estimates the distance and direction of chemical dispersion and its concentration within the area.





To use this software, the concerned chemical is selected in the software and certain necessary parameters like wind speed and direction are entered. Then, based upon the properties and toxic endpoints of the chemical (which are pre-fed into the system), the spread and dispersion of the leaked chemical/toxic gas is estimated through modelling.





As shown in the diagrams above, this spread can also be seen on google maps, which makes it expedient to relay necessary help/support on the ground or relay essential information. However, in the case of Chemical and Industrial disasters, merely generation of this software is not sufficient. Sometimes, the effects of toxic gases are so sudden and severe that even 15 minutes is too late for evcuation. In these cases, IEC is of paramount importance. Hence, it is essential that villagers be made aware of the chief toxic chemicals stored near their places of residence and they be trained in first aid and know whether to remain indoors with shut doors and windows or evacuate as soon as possible.

CONCLUSION

Thus, dealing with a disaster situation first-hand provides key lessons. First, the roles of coordination, information gathering, documentation and consistent reporting cannot be emphasized enough. It is important to relay information to the people and the media to check any rumormongering, which may create panic. One cannot also underestimate the immense learning that comes from being a team leader in the preparation of a Disaster Management Plan, and by incorporating technological solutions into a planning exercise to ensure better preparedness and Disaster Risk Reduction. It is immensely satisfying that all the above systems have already become functional in Bharuch.

In the current climate change scenario, natural calamities have become the order of the day and it is the duty of the Government to spearhead the movement to be better prepared to face disasters, to reduce our vulnerability to them by putting in place adaptation and mitigation techniques. This must be done keeping in mind the geographical context of every district/state; and adequate dovetailing of other government schemes can be done to create efficiency. Indira Awas Yojana can incorporate plans to allow for earthquake-resistance, building codes

and by-laws in coastal areas and zones of high seismological activity can be accordingly tweaked. Protection embankments can be built along riverbanks where floods are frequent; and CSR initiatives of Industries can be utilised for this purpose. Afforestation can be conducted under MNREGS in hilly areas to prevent soil erosion due to riverine action and floods. Finally, ensuring community engagement and stakeholder ship in Disaster Management is very important for developing sustainable and long-term solutions.

Surabhi Malik

Surabhi Malik is an IAS officer of the 2012 batch, and borne on the Punjab cadre after doing her initial training in Gujarat cadre. She was posted as Supernumerary Assistant Collector in Bharuch during her probation, where she gained experience in Disaster Management. Surabhi completed her Bachelors (Hons.) degree in Economics from Lady Shri Ram College for Women, Delhi University and her M.Sc in Economics from the London School of Economics and Political Science as a Commonwealth Scholar from India. She enjoys reading, writing poetry, photography and badminton in her spare time.

A Study of Disaster Management of Cyclone 'Phailin' in Ganjam District

Vineet Bhardwaj, IAS

INTRODUCTION

Ganjam is a coastal district in Southern Odisha. The district constitutes of 3 subdivisions, 22 blocks and 23 Tahasils. The district extends from 19.4 degree north latitude to 20.17 degree north latitude and 84.7 degree east longitude to 85.12 degree east longitude spreading over the geographical area 8205.48 Sq. Km. It is 5th largest district in Odisha and 93th largest in India in terms of total area. The population of the district is about 3 lakhs. Ganjam is the most populous district out of total 30 districts in Odisha and it is 83th most populous district in India.

Ganjam is one of the largest districts of the state and hence administratively challenging. Chhatrapur is the headquarter of the district while Berhampur is the biggest town of the district with a population over 3 lakhs. Being a coastal district, it has had a history of natural disasters – mainly cyclones and floods.

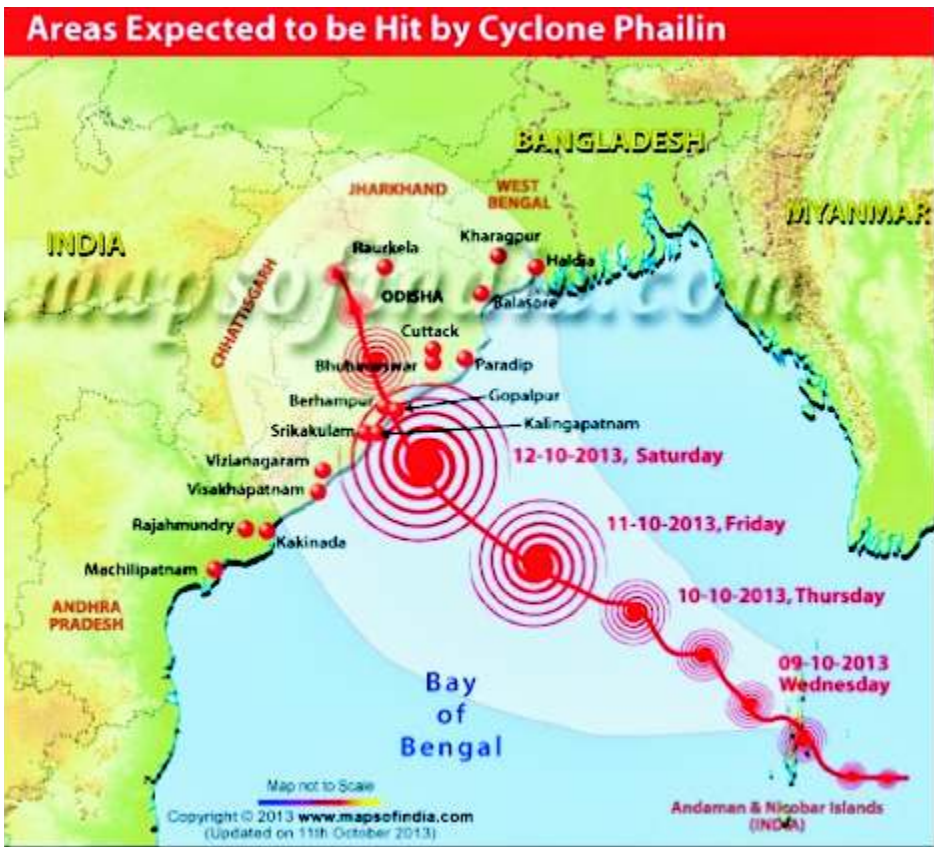
Chapter 8

Ganjam District Profile

Area	8206 sq km
Population	35 lakhs
Poulation Density	429
Blocks	22
Tahasils	23
Gram Panchayats	475
Villages	3212

THE DISASTER

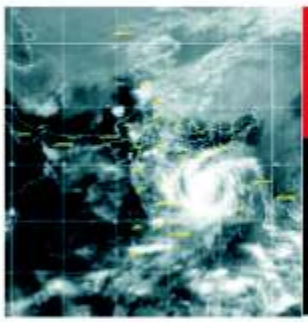
On 8th October 2013, a warning was issued by the Indian Meteorological Department that a depression had formed over the North Andaman Sea and that a cyclone of very high intensity was expected to hit the eastern coast of India on 12th October 2013. The path of the cyclone passed through Gopalpur beach in Ganjam District of Odisha.



The cyclone was named 'PHAILIN' and its intensity was predicted to be comparable to that of the 'Super Cyclone' which had hit the coast of Odisha in 1999 and had resulted in death of around 10,000 people. Such a warning immediately caused a panic situation all over Odisha and especially in Ganjam District.

WHEN THE SKY FALLS

CYCLONE PHAILIN – a Thai word for sapphire, pronounced pie-leen – is expected to make landfall at approximately 6pm at Gopalpur in Odisha's Ganjam district on Saturday



210-220 kmph is its expected wind-speed as per IMD

Satellite images showed the storm in the Bay of Bengal to be about half the size of India

SEVERITY IN QUESTION

1999 REDUX?

Some experts liken intensity to that of Category 5 Hurricane Katrina that devastated the US Gulf coast in 2005. But IMD says it's a "very severe cyclonic storm" with wind speeds of 210-220 kmph. US Navy's Joint Typhoon Warning Centre predicts 315 kmph gusts. 1999 super-cyclone brought winds of 300 kmph

MASSIVE EVACUATIONS

260,000 people in both states were moved to safer ground on Friday. Cyclone warnings broadcast through loudspeakers and on radio and TV. Panic buying saw many shops stripped of food in Odisha's capital Bhubaneswar. 100% overnight evacuation planned in Odisha and Andhra's coastal districts. Paradip port stops operations

EXPECTED DAMAGE

Sea expected to rise by 8-10 feet in Ganjam, Khurda, Puri, Jagatsinghpur and Srikakulam districts; strong gales with heavy to very heavy rainfall of up to 25 cm expected

Cyclone likely to extensively damage crops, thatched dwellings and old buildings; disrupt power, water, rail services

DISASTER RELIEF

23 NDRF units deployed in affected districts, 28 on standby

18 IAF helicopters, 4 transport aircraft, 300 army personnel, navy diving teams all on standby

People in Ganjam district watch the rough sea
REUTERS PHOTO

Category 4 storms are those with wind speeds between 225-279 kmph. In a category 5 storm, winds exceed 280 kmph. We'll know what category Phailin is today

The Cyclone was followed by heavy rains with the consequent overflowing of rivers in the district. This resulted in flood throughout the district. Large tracts of land got submerged in water. The flood not only resulted in huge loss to crops but also hampered the relief operations for the cyclone affected people.

A flooded area of Ganjam District

PREPAREDNESS

The "Depression over Bay of Bengal" was thoroughly tracked and analyzed in GIS at regular intervals on 9th, 10th, 11th and 12th October 2013. The position and movement of the system was intimated to all the Block Development Officers(B.D.Os)/ Tahasildars & Line Department Officers.

A state of emergency was declared in all the coastal districts of Odisha. The Dussera holidays were cancelled and all the government employees were instructed to be present in their respective headquarters during the cyclone period.

The immediate response of the District administration in Ganjam was in the form of a meeting of all the BDOs, Tahasildars called by the Collector. In the meeting, all the possible preparatory measures were discussed and an action plan was chalked out to face the cyclone in the district. The BDOs were made the Nodal Officers for coordinating the preparations in their blocks. The position and movement of the cyclone was intimated to all these officers.

An Inter Agency Coordination Group (IACG) was formed at Collectorate and all the senior officers were appointed as District Nodal Officers for different blocks to oversee preparations. The meeting of District Disaster Management Authority was convened on 9th September 2013. Functioning of round the clock Control Rooms was ensured at district, sub-district and block level.

Evacuation and rescue micro plan was prepared at the district level and accordingly, duties were assigned to all the senior officers of the Collectorate and line departments. Coordination

with the line departments was a big issue and some officers were specifically assigned the duty of ensuring this coordination.

The first challenge before the district administration was to ensure the evacuation of as many people as possible. Based on the information provided by the Indian Meteorological Department, a **Vulnerability Map** of the district was prepared at the district level. The coastal areas along with the areas having a large number of kutcha (or thatched) houses were considered to be more vulnerable.

In Ganjam (along with other coastal districts of Odisha), the State Government has constructed a number of **Multipurpose Cyclone Shelters.** These shelters along with some Government school buildings were designated as 'Official Cyclone Shelters'. The people evacuated from their homes were to be kept in these buildings. Arrangements of food, drinking water, sanitation and medicines were also made at these Official Cyclone Shelters.

A Multipurpose Cyclone Shelter

After the determination of vulnerable areas and designation of Cyclone Shelters, a large scale evacuation drive was started in all the blocks from 10th October with main focus on people living in kutcha houses. It was a tough task as many people were not ready to leave their homes. It took a lot of persuasion skills and local community mobilization to achieve this task.

In my block, I called a meeting of the PRI representatives in the presence of the Hon'ble Member of Parliament of the local constituency. In the meeting all the Sarpanches and Ward Members were requested to mobilize the people and assist the administration in the evacuation process. Panchayat level voluntary teams were also formed in the meeting for different purposes like evacuation, road clearing, maintenance of cyclone shelters etc.

People being taken away to Cyclone Shelters

In the evacuation process, the focus was on the people living in thatched houses as these were more vulnerable. As the time progressed, the evacuation turned out to be quite a difficult task. The people were not willing to leave their homes and it took a lot of persuasion skills to convince them of the necessity of moving out. Also, just moving people to safe locations was not enough; adequate food along with other essential amenities like drinking water and toilets had to be arranged for them.

The cyclone was predicted to land on the Gopalpur port at 9 PM of 12th October. In all the blocks, evacuation had started on 11th October itself. The Village Level Workers (VLW) and the Revenue Inspectors (RI) were the key persons coordinating the evacuation process at the Gram Panchayat level. The PRI members, both at the panchayat and block level were also made a part of this endeavour.

The evacuation continued on 12th October despite the incessant rain and strong winds. As the predictions about the intensity and wind speed of the cyclone kept going up, the administration became restless. As the number of evacuated people started increasing, the existing number of cyclone shelters proved to be insufficient. To meet this demand, I converted all the government school buildings and Anganwadi centres in my block into Temporary Cyclone Shelters. But this came with its own share of problems. The arrangements for food were made only at the 'Designated Cyclone Shelters'. The other schools and Anganwadi kendras were opened at the last minute to accommodate more and people without any fooding arrangements. At these 'last minute shelters' people started demanding food and law and order problems occurred at many such shelters.

Sl. No.	Name of the Block	No. of Cyclone Shelters	No. of persons evacuated
1	Chatrapur	92	44439
2	Ganjam	78	43515
3	Khallikote	123	57439
4	Beguniapada	106	15778
5	Purushottampur	38	20371
6	Hinjilicut	29	7341
7	Polosara	56	25732
8	Kabi Surya Nagar	122	10790
9	Dharakote	52	13721
10	Sanakhemundi	111	12615
11	Jagannathprasad	105	22831
12	Bhanjanagar	149	35926
13	Kukudakhandi	101	15189
14	Digapahandi	152	19022
15	Aska	156	34362
16	Sheragada	128	34222
17	Buguda	94	37326
18	Patrapur	107	5243
19	Bellaguntha	93	11007
20	Sorada	60	13237
21	Chikiti	51	28774
22	Rangailunda	107	55253
23	Berhampur (BMC)	81	27586
	TOTAL	**2191**	**591719**

As the people started gathering in various shelters, they started demanding food and water. Kitchens were arranged in the designated Cyclone Shelters but there was no arrangement for food in other schools, Anganwadi Kendras and other buildings. These were the last minute efforts on our part to save the life of more and more people. The demand for food made the situation more and more chaotic at these centres with every passing minute. We were already facing Law and Order problems even before the cyclone had struck.

On the evening of 12th October, at around 4 PM, phone and mobile connectivity was lost due to strong winds. All the control rooms that we had established in block, tahasil and district

headquarters became useless. We, the officials at the block level, were not able to take guidance and instructions from district head quarter. Now all the decisions had to be taken at the block level itself.

Apart from evacuation we also had to ensure that our rescue teams were ready. Teams of National Disaster response Force (NDRF) and Odisha Disaster Response Force (ODRF) had reached the district. They were sent to the locations which were important according to the Vulnerability Map. Assistance was provided to them by the district administration in the form of vehicles, gensets, diesel etc.

NDRF team gets ready

LANDING OF THE CYCLONE

The cyclone Phailin hit the Gopalpur coast at about 9:00 PM on 12th October. The wind speed was around 260 Km/Hr. The cyclonic storm with tidal waves of 3 to 3.5 meter height ravaged the coastal area of Ganjam. The high speed winds lasted for about 5 hours and caused extensive damage throughout the district. On the next morning, our main focus was on providing basic facilities at the Cyclone Shelters and assessing the damage caused by the cyclone. All surface communication systems, telecommunication, power supply and water supply were totally disrupted. There was a huge loss to vegetation in the district.

Damaged school building

Staff Quarters

Wind was strong enough to turn vehicles on road

Mobile communication was totally disrupted: A damaged Mobile Tower

Heavy crop loss due to winds and flooding

A damaged building in Berhampur University

EMERGENCY RESPONSE SYSTEM

The **Second Administrative Reforms Commission (ARC)**, in its report, acknowledges that normal emergency response system gets overwhelmed in times of a major crisis because of factors such as chaotic situation, lack of resources at hand, collapse of communication and transportation. In such a scenario, organised relief and rescue becomes difficult.

The cyclone 'PHAILIN' created a similar situation in Ganjam district which was made even worse by the fact that it hit the district during night time. After the cyclone hit, our first reaction was to react spontaneously without any thinking or planning. The communication and transportation networks had totally collapsed which made the situation even worse. The emergency response system seemed to crumble under increasing demands from all quarters for deployment of resources. Managing such situation, without any communication with the district headquarters was a huge challenge for the officials at the block level.

The **Second Administrative Reforms Commission (ARC)**, to overcome this situation, stresses on **Standard Operating Procedures (SOPs).** These SOPs should be a part of the Emergency Response Plan and should be prepared with the consultation of all concerned. The report further says that the SOPs should be developed for each disaster not only at the district but also at the community level. Disaster Management Plans at all levels should have handbooks, checklists, manuals with precise instructions for disaster management personnel, search and rescue teams and Emergency Operation Centres. Such manuals, handbooks and checklists were conspicuous by their absence at the block level when the Phailin struck in Ganjam district. Lack of clear instructions lead to chaos and made it difficult to assign responsibilities. Loss of communication with the district headquarters further added to the problem.

The District Emergency Response Plan was clearly not up to the mark. It seemed to be a casual and routine exercise based on assumptions. It failed to assign specific responsibilities to all role players in unambiguous terms. It was also not backed up by mock drills and capacity building.

The **Second Administrative Reforms Commission (ARC)** also recommends 'Unity of Command' as an underlying principle in effective rescue operations. This reduces confusion and leads to better coordination. This principle was followed in letter and spirit during the relief and rescue operations in Ganjam district. The whole machinery of district administration, along with all the agencies of the Union and state government, worked under the leadership of the Collector.

Inspite of the Emergency Response Plan not up to the mark, the rescue and relief operations in Ganjam became successful because of sound judgments and decisions at critical moments by the Collector and other officers. Any plan would have its limitation as each crisis situation would vary from another. Plans are therefore, no substitute for sound judgment at the time of crisis. The **Second Administrative Reforms Commission (ARC)** alsovalidates this point in its report.

The immediate response to 'Phailin' consisted of two categories of activities – rescue and relief. Rescue work included searching for trapped and injured people, taking them out of their

damaged homes. The rescue work also included clearing of trees from the roads to ensure movement of relief materials. The immediate relief work included provision of food, shelter, drinking water and medical facilities.

The emergency response system of Ganjam District, designed for the cyclone PHAILIN, consisted of the following components:

Search and Rescue Measures

Eight units of National Disaster Response Force (NDRF) and Six units of Odisha Disaster Response Force (ODRF) were pre-positioned at strategic and vulnerable places. These teams assisted the local administration and police in evacuating people from low lying and unsafe buildings and moving them to cyclone shelters and relief camps. Apart from these, 130 personnel of Indian Army and 90 personnel of Air Force were deployed in strategic locations of the district.

All the Fire Service personnel were kept alert to meet the pre & post cyclone challenge. Rescue teams were formed in all panchayats out of young volunteers.

Rescue work by the NDRF team

Cyclone Shelters

About 1060 free kitchens were opened in Cyclone Shelters throughout the district to feed around 3.5 lakh of evacuated people. Although preparations were done in advance at the cyclone shelters, we had to face huge shortage of food at these shelters just after the cyclone hit the district. This was because the number of evacuated people was much more than expected and many new temporary shelters had to be opened to accommodate more people. Since these new shelters had no kitchens, people could not be provided with cooked food. In

some of these shelters, dry food like Chura and Gud were provided. In shelters where food could not be provided, people started misbehaving with government officials and police had to be deployed in some places to control the situation.

People being given food at a Cyclone Shelter

Since most of the roads were blocked, supply of food items to the blocks became very difficult. In such a situation, the food material had to be procured locally. Since most of the shopkeepers were not willing to open their shops, Executive Magistrates had to deployed to compulsorily procure items with the help of police.

Drinking Water

The availability of drinking water becomes a major issue after disasters like cyclone or flood. The main sources of drinking water like hand-pumps and wells become polluted and dysfunctional. In some of the villages affected by flood, virtually no source of drinking water left and as a result there was a spread of diarrhoea in these areas due to use of polluted water.

In the district level preparatory meeting for the cyclone, ensuring availability of drinking water throughout the district was one of the first things to be discussed. All the tubewells in the district were made functional before the cyclone and the Self Employed Mechanics (SEMs) in each Gram Panchayat were kept ready for repairing the tubewells damaged by the cyclone. The Rural Water Supply and Sanitation (RWSS) teams were kept ready for disinfection of drinking water sources after the Cyclone. Around 20,000 tube-wells were disinfected. About 450 water tankers were deployed to provide drinking water in areas where it was not available. Water pouches were also distributed in some areas.

Drinking water through water tankers

Health & Sanitation

The Second Administrative Reforms Commission (ARC) has pointed out in its report that more often than not the focus of relief effort is on food, clothing and shelter and aspects of public health and sanitation are often overlooked. Chances of spread of epidemics immediately following a disaster are very high. Therefore, keeping this in mind, ensuring sanitized living conditions with proper medical assistance was kept as the top most priority of Ganjam district administration during the rescue and relief operations.

In order to restore the health services in the affected areas, 312 Doctors, 1196 paramedics were mobilized and 22 camps were set up in the vulnerable areas of the District. Life saving drugs were placed to all institutions including PHCs, CHCs, Panchayat Offices and Cyclone Shelters. Mobile Health Units & ambulances were kept ready for emergency transportation.

Just after the floods, providing sanitation facilities became a big challenge. Toilets in all government buildings were made operational. Temporary and mobile toilets were also arranged at some locations. Cleaning the village streets and removing the garbage and debris was also a huge task. For this purpose, the community members were mobilized to do the cleaning themselves and the labour charges were paid through MGNREGS.

Animal Care

Amidst all the efforts to save human lives, the threat to life and safety of domestic animals was also to be taken care of. A large number of cows and buffaloes were shifted to safe places. Providing fodder to the domestic animals just after the cyclone became very difficult because of the cyclonic rains. About 200 tonnes of cattle fodder were sent to each block to meet any shortage just after the cyclone.

Adequate medicines were provided in all the Veterinary Hospitals and the Veterinary Assistant Surgeons (VAS) were made responsible for looking after the health of the injured cattle in the

block. Teams were formed in each Panchayat to rescue the trapped domestic animals. They were also given the responsibility of removing the dead bodies of animals after the cyclone.

Providing fodder for cattle after the cyclone was a big challenge

Clearance of Roads

The Department of Works, Rural Development Department, Panchayati Raj Department and Housing & Urban Development department took immediate steps for cutting of the fallen trees and clearance of the roads to restore road connectivity. The PWD department was ready with its contingency plan with JCBs, Hydraulic tractors, drivers and other manpower for clearance of roads due to impending cyclone. Range level task forces were also constituted under Forest Divisions and teams were kept ready for emergency services with all tree cutting and related materials.

A blocked road being cleared

Village level teams consisting of volunteers were formed kept ready for cutting the fallen trees and clearing the roads after the cyclone to establish road connectivity. The teams of National Disaster Response Force (NDRF) and Odisha Disaster Response Force (ODRF) were also involved in the task of road clearing. The police and the Fire Service units also helped them in this work.

Most of the roads up to Block level were cleared within 2 days. It was an excellent example of inter-departmental coordination.

Electrical Infrastructure

The electricity infrastructure was completely destroyed by the cyclone throughout the district. Coupled with disruption of mobile communication networks, it made the rescue and rescue work very difficult. Although the mobile towers started functioning within a week of the cyclone, the district was still functioning without mobile connectivity as people were not able to charge their mobile phones in the absence of electricity. Even the District Collectorate had to wait for a week to get electricity. In other offices like blocks and Tahasils, there was no electricity for a month.

Electricity infrastructure in the district was heavily damaged by the cyclone

A total of 218 feeders, 7890 sub-stations, 11204.4 km of LT line & EHT Line, 354746 electric poles and 65 EHT towers were severely damaged. Out of these, 59 feeders, 860 sub-stations, 546.1 km of LT & EHT Line & 11092 electric poles were restored within 15 days of the devastation. Additional technical manpower and materials were mobilized for restoration of electricity. The power supply was restored in all the areas of the District within 45 days.

RECOVERY

While emergency response is vital as it is aimed at saving human lives and providing relief, the ultimate objective of any crisis management is restoration of devastated livelihoods. This restoration should not only encompass social, economic and psychological rehabilitation, but

go beyond by addressing the underlying cause of disaster. Recovery efforts following rescue and relief in any disaster can be classified into short term and long term. The short term activities for recovery are debris clearance, providing semi-permanent shelter and ensuring sanitation and restoring lifelines, while the long term activities involve building a safer and more sustainable livelihood.

People returning from the Cyclone Shelters back to their homes

The recovery process after the cyclone started with three challenges: ensuring sanitation, providing shelter and ensuring food security. For ensuring sanitation, the CDPOs were made the nodal officers to coordinate the cleaning of villages and disinfection of water sources. Also, the cleaning of villages was also carried out under MGNREGS. For providing temporary shelters for those whose houses were damaged, polythene sheets were distributed in the villages. Around 2.62 lakh families were provided with polythene sheets. Also, temporary arrangements were made in Government buildings for people whose houses were completely destroyed.

In view of the extensive devastation, emergent relief was sanctioned for a period of 7 to 15 days in shape of Chuda (Puffed Rice) &Gur (Jaggery) distributed to the people. In addition to dry food, candles, matchboxes, kerosene and other essential materials were distributed.

For ensuring food security of the cyclone affected people, the government decided to give 50 Kg of rice and Rs. 500 in cash to each family. Since it was difficult to identify affected families in a short span of time, it was decided to give the rice and cash to every family in the district. During distribution of this relief material, recording the details of the family who had received the relief was very necessary to prevent duplication. This target was not to be crossed under any circumstance. While BPL families and other families like those covered under the Antyodaya scheme could be easily identified by the cards issued to them, there was no easy way to identify the APL families. This resulted in multiple claims from the same family and in the end, every married person in the district started claiming a separate family for himself. To

overcome this problem, Village Relief Committees were constituted and given the task of identifying the APL families. The number of such APL families in each block was calculated by subtracting the BPL and Antyodaya families from total number of families according to Census 2011. In this way, each Block was given a target number of families based on Census 2011. This target was further divided into sub-targets for villages. Each Village Committee had to select APL families according to the target given to them. But these committees did not do their job properly and were mostly biased. This led to a situation where the discretion of selecting families was given to the Village Relief Committees but the task of handling the complaints was left to the BDO. Since the demand from the APL category was almost twice of what was allowed by the target, BDOs were helpless. There were law and order problems at many places and in some cases police had to intervene. Even after announcement of 25% additional target by the district administration, the situation did not improve and the demands kept coming in.

People taking away 50 Kg bags of rice given as relief

The distribution of cash and rice was supposed to be finished in three days but it dragged on for 20 days. In the end, the government decided to stop the distribution and focus on MGNREGS instead so that people could get money in the form of wages. 'MGNREGS Melas' were organised in each panchayat to mobilize people into working in MGNREGS worksites. Directions were issued to BDOs to immediately start at least one work in each village so that affected people can earn wages to support themselves. Starting these MGNREGS works on war footing helped in two ways – it provided much needed money in the hands of people and at the same time it expedited the restoration work in the affected areas. The types of works that were undertaken were:

- Repair of damaged roads
- Repair of tanks

- Repair of check dams
- Sanitation
- Solid and liquid waste disposal
- Land development

To provide sustainable housing to cyclone affected people in the coastal areas of the district, new houses are being constructed. This assignment is named **'Owner Driven Construction of House (ODCH)' under the Odisha Disaster Recovery Project (ODRP)**. Under this project, all the kutchha houses within 5 Kms of the coastline will be replaced by pukka houses. All these new houses will be cyclone resistant and for this purpose, minimum house design specifications have been provided in the guidelines of the project. The cost of each house will be Rs. 3 lakhs and the sum will be given to beneficiaries as cash grants in six installments. This ambitious project, once completed, will reduce the vulnerability of the coastal areas and strengthen the preparedness of the district for future cyclones in a big way. This is a clear example of mainstreaming risk reduction in the recovery/development process which has been strongly recommended by the **Second Administrative Reforms Commission** in its report onDisaster Management.

LESSONS LEARNT

Clear and Precise Instructions

In the time of disaster, clear and precise instructions should be issued by the district administration to the field officers. Vague instructions lead to confusion which hampers the speed of work.

During a disaster, there is a lot of confusion regarding which department is authorised to pay for what. As a result, officials like BDOs end up paying for things which they are not authorised to do. For example, during the recent cyclone, there was confusion regarding who should pay for the labour charges for loading and unloading of rice. Only now it has been decided that for rice coming from other districts, the unloading charges should be paid by BDO while for rice coming from within the district, unloading charges should be paid by Civil Supplies department.

Briefing the Media

The district administration should not go overboard in informing the media about the steps taken. If measures are announced to the media without providing the field offices resources to implement them, the field officers are not able to defend themselves before the local people. Only those measures should be announced which are actually being implemented.

Take Everyone Along in Planning

The field officers like BDOs and Tahasildars are not made aware of the planning taking place at the district level. They come to know about the planning only when final orders are issued to them. In doing so, the district administration sometimes issues orders which are very difficult to implement at the ground level.

Too much of Reporting

Even while preparing for an impending disaster, the BDOs are required to submit a number of detailed reports in various formats and to various departments. This consumes a lot of time of the Block staff and they are left with little time to concentrate on the actual work on the ground. Based on my experience, I strongly recommend that reporting during disaster management should be short and precise.

Transparent Identification of Beneficiaries

At the time of immediate relief distribution just after the disaster, it is very important to clearly define the criteria for beneficiaries, i.e., who will get the relief material and who will not. Since relief material is available in limited quantities, they can not be given to everyone. Also, just after the disaster it is not possible to enlist the affected persons within such a short time. Therefore, it is essential to clearly define the process by which beneficiaries shall be identified. Otherwise, there may be serious law and order problems. Such law and order problems were witnessed during the relief distribution in Ganjam District.

Don't put undue stress on Human Resource

There is often a lack of concern for Human Resource Management during disasters. For one month, the staff in Blocks and Tahasils had been working day and night without any break or holiday - first during the cyclone and then during the flood. They were completely exhausted and motivation levels had become very low. When the situation is normal, there was no immediate relief material to be provided, and long term restoration would take months, at least the staff should have been allowed to take rest on Sundays.

Cautious with PRI members

PRI members should not be blindly trusted. There is a lot of politics that goes on in the panchayats. The Government gave the responsibility of selecting the beneficiaries in the General category to the Village Relief Committees which were formed just for that purpose and comprised of Panchayat members and other elders of the village. There were many instances where the Village Relief Committees, constituted out of panchayat members, distributed most of the relief to their 'own' people, i.e., people who had voted for them in elections. After this impartial selection, the complaints from the general public were all directed to the Block administration. This was a clear example of a mismatch between responsibility and accountability.

LOOKING FORWARD

The cyclone 'Phailin' was very well managed in Ganjam District. This is testified by the death toll figure of below 20 as compared to about 1000 during the 'Super Cyclone' in 1999 in the district. The efforts of the district administration got recognition at national as well as international level. But at the same time, it was a great learning experience for all the officials of the district. The

comparision of the recommendations of the **Second Administrative Reforms Commission,** in its report on Disaster Management, with the actual management of Phailin in Ganjam district, it appears that we still have a long way to go. It is always better to learn from our mistakes and not to repeat them in future.

The distribution of relief material often raises issues about political discrimination, partisan attitude and certain vulnerable sections getting left out. Total transparency should be followed in distribution and procurement of relief materials. The **Second Administrative Reforms Commission** recommends that it is desirable to constitute vigilance committees of the community to keep a watch over these activities and act as grievance redressal fora.

A system of accountability needs to be evolved during the relief and rehabilitation phase. This system should ensure that the relief material reaches the target groups and that the funds are being utilized efficiently and optimally. Identification of beneficiaries during relief distribution is a big challenge for the administration. Clear accountability should be fixed for anyone involved in the distribution process – government officials, PRI members or NGOs. This point has also been emphasized by the **Second Administrative Reforms Commission**.

Each major disaster is followed by an 'assessment exercise'. Generally, damage assessment is carried out in a casual manner and the figures are usually inflated to get more funds. The **Second Administrative Reforms Commission** emphasizes the need to evolve objective methods of assessing the damage so that there are no allegations of bias, distortions, exaggeration or arbitrary scaling down. Satellite imagery could be used as a tool to validate the reported damages and NDMA could draw up the necessary guidelines for the assessment teams. Damage assessment should be carried out by multidisciplinary teams in a transparent and participatory manner in accordance with guidelines laid down by NDMA.

Policemen, Firemen and the Home Guards are the first responders at the field level during times of a disaster. They should be adequately trained in handling crises/disasters. This has also been recommended by the **Second Administrative Reforms Commission.**

Disruption of essential services is one of the biggest problems faced during any disaster. The **Second Administrative Reforms Commission** recommends that all crisis/disaster management plans should include plans for handling possible disruptions in essential services. All agencies/organizations engaged in the supply of essential services should have their own internal crisis management plans to deal with emergencies. The regulatory authorities of the respective sectors may lay down the required framework for drawing up standard operating procedures and crisis management plans.

The whole disaster management apparatus at the state level as well as at the district level comes into action only when the disaster actually strikes. In times when there is no disaster, hardly any activities take place. Trainings and 'Mock Drills' are conspicuous by their absence during this period. Although a lot of manuals and guidelines have been published, they are

rarely read by anyone when there is no disaster. When the disaster strikes, the officials do not have the time to read the manuals even if they want to do so. Disaster Management should not be a discrete and reactive process but rather a continuous and proactive process. Building capacities of the officials as well as the people is the most important step in this direction. In disaster prone areas regular training and 'mock drills' should be made mandatory. Location specific training programmes for the community should be executed through the panchayats.

One of the important learnings from the management of cyclone in Ganjam was the role of community in disaster management. At some instances, problems came up because community members were not consulted. Managing a crisis is primarily the responsibility of the government but the community, local bodies and voluntary organizations also play a vital role. It is for the administration to coordinate the efforts of all stakeholders such that the synergy generated reinforces and multiplies the resources available and results in a comprehensive and timely response.

Awareness generation programmes should be a part of disaster preparedness. They should be undertaken using tools of social marketing. A responsible media, which is also well informed about all aspects of disaster, is a very powerful tool for sensitizing people. Proactive disclosures about all aspects of disaster management would build a healthy relationship between the media and disaster management agencies. Details of past accidents and disasters and the lessons learnt, should be documented and kept in the public domain. Crisis management awareness needs to be mainstreamed in education. For the purpose, an appropriate component of disaster awareness should be introduced in school, college, university, professional and vocational education.

Any approach towards disaster preparedness should have ultimately two goals: to protect people and structures from disasters and to increase the effectiveness of crisis response and recovery. Systematic preparedness, early warning, quick response and sustainable recovery should be the cornerstones of disaster management. To reduce vulnerability, a strategy that emphasises all four is better than one of mere response.

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Vineet Bhardwajis an IAS Officer of 2012 Batch of Odisha Cadre. When the Cyclone 'PHAILIN' hit the coast of Odisha, the author was undergoing his District Training in Ganjam District of Odisha. This article covers his experiences, as a part of District Administration, in the management of the situation arising out of the cyclone.

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