PRPAREDNESS AND RESPONSE

Introduction

Facing disaster by way of mitigation, prevention, preparedness, response, evacuation, relief and rehabilitation has been part of the administrative ethos. India has a long history of rendering relief in an organized fashion in times of drought and famine. The states have antiquated relief code which deals with the general principles of administration of relief. It starts with the responsibility of the Government for combating distress, defining scope of object of such measures etc. India, with a vast agrarian economy in the past had focused on distress relief mainly related to agricultural activities. Preparedness included collection of statistical data on the rainfall, weather conditions, crop pattern activities relating to management of cattle etc. The relief work focused on departmental work and village work for generation of employment during drought. With the changing pattern of disaster and with the introduction of technology, material and new financial terms into disaster management, several modifications have been incorporated in the administrative measures for relief work

The scope of disaster has since changed and so the response thereto. With the constitution of successive Finance Commission under the provision of the Constitution, the measures for relief and the scope of disaster have enlarged. An attempt has been made in the succeeding paragraphs to capture the information relating to timely prediction/forecasting of different kind of disasters and development of Standard Operating Procedures (SOPs) for responding such disasters.

Institutional Arrangements

Forecasting about climate change is pre requisite for taking preparedness measure to respond to the disaster is the most important element of disaster management. The Ministry of Environment & Forest (MoEF), Ministry of Earth Sciences (MoES), Ministry of Science & Technology (MST), Ministry of Agriculture (MoA), Ministry of Water Resources (MWR), Ministry of Human Resource Development (MHRD), Ministry of Non-conventional Energy (MNES), Defence Research & Development Organization (DRDO), Ministry of Defence (MoD), Ministry of Health and Family Welfare (MoHFW), Indian Space Research Organization (ISRO) and Indian Meteorological Department (IMD) promote and undertake climate and climate change related research in the country.

Government of India has designated the offices as given in the Box 1.1 as the nodal agencies for early warning of different natural hazards:

Box 1.1: Disaster wise nodal agencies for Forecast

Disasters	Agencies
Cyclone	Indian Meteorological Department
Tsunami	Indian National Centre for Oceanic Information Services
Floods	Central Water Commission
Landslides	Geological Survey of India
Avalanches	Snow and Avalanche Study Establishment
Heat & Cold Waves	Indian Meteorological Department

India Meteorological Department (IMD)

Modernized meteorological observations and research in India was initiated more than 200 year ago, since 1793, when the first Indian Meteorological observatory was set up at Madras (now Chennai). IMD was formally established in 1875 with a network of about 90 weather observatories for systematic observation and research.

India Meteorological Department's tradition of monitoring weather and climate spans more than 135 years giving it a sound and useful dataset to fall back upon for environmental assessment. Ozone monitoring network was started as a globally pioneering effort as early as in 1954 realizing that this trace gas plays a very important role in atmospheric chemical mechanisms. It also started radiation measurements about 50 year back and currently maintaining 45 stations in the country for providing exclusive countrywide dataset for assessment of solar energy resources.

A network of 10 Global Atmosphere Watch Stations (GAW, formerly Background Air Pollution Monitoring Network or BAPMoN) consisting of Allahabad, Jodhpur, Kodaikanal, Minicoy, Mohanbari, Port Blair, Pune, Nagpur, Srinagar and Vishakhapatnam, is maintained by IMD as per WMO protocols and standards since 1974 to generate data and information on the exchange of trace materials between the atmosphere and the earth's surface, making atmospheric turbidity and air quality measurements to quantify trends and acid rain threats.

Atmospheric monitoring: There are 25 types of atmospheric monitoring networks that are operated and coordinated by the IMD. This includes meteorological, climatologically, environment, air pollution and other specialized observation of atmospheric trace constituents. It maintains 559 surface meteorological observatories, about 35 radio-stations and 64 pilot balloon stations for monitoring the upper atmosphere. Specialized observations are made for agro meteorological purposes at 219 stations and radiation parameters are monitored at 45 stations. There are about 70 observatories that monitor current weather conditions for aviation. The IMD collects meteorological data over oceans by an establishment of cooperation fleet of

Voluntary Observing Ships (VOF) comprising merchant ships of Indian registry, some foreign merchant vessels and a few ships of the Indian Navy. These ships, while sailing on the high seas, function as floating observatories. Records of observations are passed on to the IMD for analysis and archival.

Forecast of Rainfall

India receives 80 per cent of its annual rainfall during the southwest monsoon season of June to September. Rainfall over the country during this season shows a wide range of spatial variation due to orographic influences and preferential occurrence of rain-bearing systems in certain regions. India has a very extensive rain gauge network and rainfall monitoring over the country.

The real-time monitoring and statistical analysis of district wise daily rainfall is one of the important functions of the IMD at New Delhi. Based on the real time daily rainfall data, weekly district wise, sub-division wise and state wise rainfall distribution summaries are prepared regularly by the Rainfall Monitoring Unit. Maps showing weekly and cumulative rainfall figures in 36 meteorological subdivisions of the country are prepared. This information is very important to many user agencies, particularly for agricultural planning.

Forecasting System - Background

India Meteorological Department (IMD) follows a two-stage forecasting strategy for long range forecasting of the south-west monsoon season rainfall over the country as a whole. The Long Period Average (LPA) of the south-west monsoon season rainfall over the country as a whole for the period 1951-2000 is 89cm. The first long range forecast for the south-west monsoon season (June-September) rainfall is issued in April and the forecast update is issued in June.

From 2007 onwards, IMD has been using the following statistical models for preparing quantitative and probabilistic forecasts of the south-west monsoon rainfall (June – September) for the country as a whole:

a. A 5- parameter statistical ensemble forecasting system requiring data up to March, for the first forecast in April.

b. A 6- parameter statistical ensemble forecasting system requiring data up to May for the forecast update in June. Three of these 6-parameters are same as that used for April forecast.

For preparing the first stage forecast for the 2011 South-west monsoon rainfall for the country as a whole presented here, the 5-parameter statistical ensemble forecasting system has been used.

Operational Statistical Forecast System: In the IMD's Ensemble Statistical Forecasting system for April forecast, the following 5 predictors are used. The model error of the April forecasting systems is ±5%.

Table 1.1: Model error of the April forecasting systems

S.No	Predictor	Period
1	North Atlantic Sea Surface Temperature	December + January
2	Equatorial South Indian Ocean Sea Surface Temperature	February + March
3	East Asia Mean Sea Level Pressure	February + March
4	NW Europe Land Surface Air Temperature	January
5	Equatorial Pacific Warm Water Volume	February + March

The 5-parameter ensemble statistical forecasting system was also used to prepare probability forecasts for five pre-defined rainfall categories. These are deficient (less than 90% of LPA), below normal (90-96% of LPA), normal (96-104% of LPA), above normal (104-110% of LPA) and excess (above 110% of LPA). The forecasted probabilities in percentage based on this system for the above 5 categories are 6%, 30%, 53%, 10% and 1% respectively.

Experimental Forecasts: IMD has an experimental dynamical forecast system. The experimental ensemble dynamical forecast for the 2011 south-west monsoon rainfall was computed as the ensemble average of 10 member forecasts with forecasted sea surface temperatures (SST) as boundary SST forcing.

In addition, IMD takes into account the experimental forecasts prepared by the national institutes like Indian Institute of Tropical Meteorology, Pune, Indian Institute of Science, Bangalore, Space Applications Centre, Ahmedabad, National Aerospace Laboratories, Bangalore, Centre for Mathematical Modelling and Computer Simulation, Bangalore, National Centre for Medium Range Weather Forecasting, Noida and Center for Development of Advanced Computing, Pune.

Operational/experimental forecasts prepared by international institutes like the National Centers for Environmental Prediction, USA, International Research Institute for Climate and Society, USA, Meteorological Office, UK, the European Center for Medium Range Weather Forecasts, UK , the Experimental Climate Prediction Center, USA, and World Meteorological Organization's Lead Centre for Long Range Forecasting - Multi-Model Ensemble were also taken into account.

The experimental forecasts from majority of the statistical and dynamical models suggest below normal to normal monsoon season rainfall over the country as a whole.

Sea Surface Temperature Conditions over the equatorial Pacific & Indian Oceans: The El Niño conditions that were originated since June, 2009 peaked in December 2009 and then started to weaken to reach ENSO-neutral conditions in May, 2010. This continued till mid June when weak La Nina conditions emerged. The La Niña conditions strengthened subsequently and become moderate to strong during mid-August 2010 to early February 2011. The La Nina conditions since have weakened to

weak to moderate strength as of mid-March 2011. The latest forecasts from a majority of the dynamical and statistical models indicate strong probability for the present La Niña conditions to continue till June. Subsequently the La Nina conditions are expected to weaken further to reach ENSO- neutral conditions. However, it may be mentioned that the climate forecasts prepared at this time of the year has large uncertainty.

It is important to note that in addition to ENSO events, other factors such as the Indian Ocean Sea surface temperatures (SSTs) have also significant influence on Indian monsoon. Recent forecasts from some coupled models suggest possibility of the development of a weak negative Indian Ocean Dipole event during the second half of the year, which may not have much impact on the Indian monsoon.

As the extreme sea surface temperature conditions over Pacific and Indian Oceans particularly ENSO conditions over Pacific (El Nino or La Nina) are known to have strong influence on the Indian summer monsoon, IMD is carefully monitoring the sea surface conditions over Pacific and Indian oceans.

Forecast for the 2011 South-west monsoon rainfall: IMD's long range forecast for the 2011 south-west monsoon season (June to September) is that the rainfall for the country as a whole is most likely to be Normal (96-104% of Long Period Average (LPA)). There is very low probability for season rainfall to be deficient (below 90% of LPA) or excess (above 110% of LPA).

Quantitatively, monsoon season rainfall is likely to be 98% of the LPA with a model error of ± 5%. The LPA of the season rainfall over the country as a whole for the period 1951-2000 is 89 cm.

IMD will update the above forecast in June 2011 as a part of the second stage forecast. Along with the update forecast, separate forecasts for the monthly (July and August) rainfall over the country as a whole and seasonal (June-September) rainfall over the four geographical regions of India will also be issued. Forecast for the rainfall over the country as a whole during the second of the season (August + September) will be issued in July and that for September will be issued in August.

Forecasting and Warning of Cyclones

IMD is the nodal agency in the country to monitor and predict the cyclonic disturbances and issue the warning and advisory bulletins. IMD, New Delhi also acts as a Regional Specialized Meteorological Centre (RSMC) for providing tropical cyclone advisories to the World Meteorological Organization (WMO)/ Economic and Social Cooperation for Asia and the Pacific (ESCAP) Panel member's countries viz Bangladesh, Myanmar, Thailand, Sri Lanka, Maldives, Pakistan and Oman. IMD, New Delhi also works as a Tropical Cyclone Advisory Centre (TCAC) for international civil aviation as per the requirement of International Civil Aviation Organization (ICAO).

The cyclone warning is issued to State Government officials in four stages: i.e.

I. Pre-cyclone watch issued 72 hours in advance,
II. Cyclone alert issued at least 48 hours in advance,
III. Cyclone warning issued at least 24 hours in advance, and
IV. As post landfall outlook issued at least 12 hours in advance of expected time of landfall.

IMD has prepared roadmap for cyclonegenesis and further intensification, monitoring and prediction.

Flood Forecasting – Central Water Commission

The flood forecasting and warning system is used for alerting the likely damage centre well in advance of the actual arrival of floods, to enable the people to move and also to remove the moveable property to safer places or to raised platforms specially constructed for the purpose.

A beginning in scientific flood forecasting was made in November, 1958 by CWC (then known as Central Water & Power Commission) when a Flood Forecasting Centre was set up at its Headquarters, at Delhi for giving timely Forecasts and Warnings of the incoming floods to the villages located in the river areas around the National Capital, Delhi. The network has been expanding and by now the Flood Forecasting Network of the CWC covers the entire major flood prone inter State basins in the country.

The flood forecasting involves the following four main activities:

(i) observation and collection of hydrological and hydro meteorological data,
(ii) transmission of Data to forecasting centres,
(iii) analysis of data and formulation of forecast, and
(iv) Dissemination of forecast.

On an average 6000 forecasts at various places in the country are issued during the monsoon seasons every year. The analysis of the forecasts issued during the last 25 years (1978 to 2002) indicates that accuracy of forecasts has consistently increased from around 81% to 98%. Forecast is considered accurate if forecast water level is within $\pm$ 15 cm of actual water level of the inflow forecast (i.e. discharge) and is within $\pm$ 20% of actual discharge.

In monitoring the floods, severity of floods are placed in the following four categories by the CWC

(i) Low Flood stage – It is that flood situation when the water level of the river is flowing between warning level and danger level of the forecasting stations.

(ii) Medium flood stage – The River is called in medium floods when its water level is at or above the danger level of the forecasting station but below 0.50 of its highest flood level (HFL)

(iii) High flood state – When the water level of the river is below the HFL but within 0.50 m of the HFL of the forecasting stations.

(iv) Unprecedented flood stage – The river is called in unprecedented floods when it attains water level equal to or above its previous HFL at any forecasting stations.

A computerized monitoring system has been developed under which daily water levels as observed at 0800 hours and forecasts issued by field units are transmitted to CWC headquarters in New Delhi. Based on the compilation of all such data received from field divisions, daily water level and flood forecast bulletins in two parts for stage and for inflow forecasting stations respectively.

Study of Land Contour by GSI: Geological Survey of India (GSI) studies the shape and material of the land getting inundated and generates data on area, shape, slope, infiltration and permeability of soil of the basin, drainage pattern, landform and longitudinal and cross profiles of the channels. On the basis of these studies, GSI produces flood hazard maps indicating Prohibitive, Restricted, Cautionary and Flood Free Zones. Significant flood related studies and recommendations made by GSI are as follows:

- Brahmaputra Valley - a comprehensive geo-environmental data base for environmental management and flood control generated,
- Lower Banas sub-basin - selective irrigation to prevent rise of groundwater table recommended,
- Kandi basin in West Bengal- GSI recommended construction of small weirs to reduce impact of flood,
- Mokameh Tal area in the Ganga Flood plain - rejuvenation of existing drainage channels to reduce flood problem recommended,
- Lower Damodar Basin- diversion along artificial canals and re-excavation of old river channel recommended,
- Landslide zonation map for Himalayan region,
- The contribution of snow melting to annual flood.

GSI's flood related studies are used by Central Water Commission, Water Resource Development Project Authorities, Urban and Rural Planning Authorities, Ministry of Environment and Forest, Ministry of Agriculture, etc.

Avalanche warning – Defence Research & Development Organization

(DRDO)

DRDO was formed in 1958 with the amalgamation of the then already functioning technical development establishments of the Indian Army and the Directorate of Technical Development and projection with the Defence Science Organization. DRDO was then a small organization with10 establishment or laboratories. Over the years it has grown as multi directionally in terms of the Variety of disciplines, number of laboratories, achievements and stature.

Today network of more than fifty laboratories are deeply engaged in developing Defence technologies. Center for Snow and Avalanche Study Establishment (SASE) is one of the laboratories of the DRDO located at Chandigarh with its primary function to do research in the field of snow and avalanches and to provide avalanche control measures and forecasting support to Armed forces. The SASE is the nodal agency for issuing advisories and warnings about the avalanche in the country.

Disaster Management Support (DMS) – Indian Space Research Organization (ISRO)

The Space activities in the country started during early 1960s with the scientific investigation of upper atmosphere and ionosphere over the magnetic equator that passes over Thumba near Thiruvananthapuram using small sounding rockets Realising the immense potential of space technology for national development, Dr. Vikram Sarabhai, the visionary leader envisioned that this powerful technology could play a meaningful role in national development and solving the problems of common man.

The objective of ISRO is to develop space technology and its application to various national tasks. ISRO has established two major space systems, INSAT for communication, television broadcasting and meteorological services, and Indian Remote Sensing Satellites (IRS) system for resources monitoring and management. ISRO has developed two satellite launch vehicles, PSLV and GSLV, to place INSAT and IRS satellites in the required orbits. Accordingly, ISROhas successfully operationalised two major satellite systems namely Indian National Satellites (INSAT) for communication services and Indian Remote Sensing (IRS) satellites for management of natural resources; also, Polar Satellite Launch Vehicle (PSLV) for launching IRS type of satellites and Geostationary Satellite Launch Vehicle (GSLV) for launching INSAT type of satellites.

The Disaster Management Support (DMS) Programme of ISRO, provides timely support and services from aero-space systems, both imaging and communications, towards efficient management of disasters in the country.. The DMS programme addresses disasters such as flood, cyclone, drought, forest fire, landslide and Earthquake. These include creation of digital data base for facilitating hazard zonation, damage assessment, etc., monitoring of major natural disasters using satellite and aerial data; development of appropriate techniques and tools for decision support, establishing satellite based reliable communication network, deployment of

emergency communication equipments and R&D towards early warning of disasters.

To support the total cycle of disaster (emergency) management for the country in near real time, the database creation is addressed through National Database for Emergency Management (NDEM), a GIS based repository of data. NDEM is envisaged to have core data, hazard-specific data and dynamic data in spatial as well as spatial form.

Airborne ALTM-DC data acquisition is being carried out for the flood prone basins in the country. The development of flight model of C band DMSAR is nearing completion. SAR data was acquired over selected basins using Development model of DMSAR. Towards providing emergency communication for disaster management activities and at the behest of Ministry of Home Affairs, ISRO has set up a satellite based Virtual Private Network (VPN) linking the National Control Room at MHA with DMS-DSC at NRSC, important national agencies, key Government Offices in Delhi and the Control Rooms of 22 multi-hazard-prone States. Further ISRO has developed and deployed INSAT Type-D terminals (portable satellite phones), INSAT based Distress Alert Transmitter (DAT) for fishermen, Cyclone Warning Dissemination System (CWCS) and DTH based Digital Disaster Warning System (DDWS) in disaster prone areas.

As part of R&D support to DMS for remote sensing applications, work on Tropical Cyclone Track intensity and landfall prediction, Earthquake Precursor studies, Coastal Vulnerability mapping and Early Warning of Landslides are being carried out.

The DMS programme is also supporting the many international initiatives by sharing data and information. Through International Charter "Space and Major Disasters" and Sentinel Asia (SA) initiative for supporting disaster management activities in the Asia-Pacific region, ISRO is providing IRS datasets and other information for use during major calamities.

Radiological and Nuclear Emergencies

Department of Atomic Energy (DAE) is the nodal agency for providing the necessary technical inputs to the National or local authorities for responding to any nuclear or radiological emergency. The Ministry of Home Affairs (MHA) is the nodal ministry to coordinate with the various response agencies in the event of any nuclear or radiological disaster in the public domain. A Crisis Management Group (CMG) has been functioning since 1987 at DAE for this purpose. This Group is chaired by the Additional Secretary, DAE, and has on board expert members from different units of DAE and Atomic Energy Regulatory Board (AERB). Each member has an alternate member and CMG is backed by resource agencies of various units of DAE.

Based on the radiological conditions and their consequences, emergencies at nuclear facilities are categorized as emergency standby, personnel emergency, plant emergency, on-site emergency and off-site emergency. As a basic regulatory requirement, emergency preparedness exists at all nuclear and radiation facilities to respond to any on-site or off-site emergency in their areas. But to handle radiological

emergencies arising from a transport accident or from the movement or handling of 'orphan source' (radioactive sources that have lost regulatory control is called 'orphan sources') or due to malevolent acts like explosion of an RDD, Radiation Exposure Device (RED) or IND any time or anywhere in the country, a network of 18 units of Emergency Response Centers (ERCs) has been established by Bhabha Atomic Research Center, DAE. These ERCs are equipped with radiation monitoring instruments, protective gear and other supporting infrastructure.

Installation of Radiological Detection Equipment

As a part of preparedness measure Radioactive Detection Equipments (RDE's) are being installed at entry and exit points in the country. On the initiatives of MHA and in consultation with the various Stakeholders, the Bhabha Atomic Research Centre (BARC) and Electric Corporation of India Limited (ECIL) a technical survey of the entry and exit points in a phased manner was undertake for installation of the RDE's. The survey for installation of RDEs at 29 entry/exit points has been identified by BARC (12 seaports, 14 airports and 3 international borders).

The responsibility of installation of these RDE's rest with the concerned Ministries and Departments as the responsibility for allocating funds for prevention, mitigation etc. for Disaster rests with the concerned Central Ministries and Departments. As such Ministry of Shipping, Ministry of Civil aviation and Ministry of Home Affairs are taking necessary action to carryout installation of RDE's in the time bound manner in consultation with BARC and ECIL. The ports / land crossing identified for the purpose are given as follows in Box 1.2.

Box 1.2: The port/land crossing identified for the purpose of installation of RDE

Areas of installation	Location	Ministry responsible
International Airports	IGIA New Delhi, NSCBA, Kolkata, Mumbai, Chennai, Goa, Ahmedabad, Hyderabad, Amritsar, Kalicut, Trivandrum, Guwahati, Cochin, Bangalore and Lucknow.	Ministry of Civil Aviation
International Sea port	Kandla, Chennai, Mumbai, Haldia, Kolkata, Vizag, Goa, Ennore, Cochin, Tuticorin, Paradeep, JNPT Mumbai.	Ministry of Shipping
Land border crossing	Wagah-Attari, Jogbani and Raxaul.	Ministry of Home Affairs

Epidemic

Three core capacities are essentially required to deal with epidemics. These are

(i) Establishment/strengthening of a laboratory based disease surveillance system to collect baseline data on infectious diseases, monitor disease trends and to detect epidemics in early rising phase,

(ii) Development of epidemiological, clinical, entomological and laboratory capacities to investigate the epidemics to characterize the cases in terms of time, person and place and to understand the transmission dynamics, and

(iii) Development of response capacities to prevent/control the epidemics to reduce the morbidity and mortality to the minimum.

The outbreaks/epidemics are usually investigated by the district or state Rapid Response Teams. Several central/regional institutes like National Centre for Disease Control (formerly National Institute of Communicable Diseases), Delhi; National Institute of Virology, Pune; National Institute of Cholera and Enteric Diseases, Kolkata; Vector Control Research Centre, Puducherry and other ICMR institutes provide epidemiological, laboratory and entomological support to the states for investigation and control when the outbreaks/epidemics are widespread and states request for assistance. Also there is increasing collaboration with Department of Animal Husbandry in managing emerging zoonotic diseases such as avian influenza and Crimean Congo Hemorrhagic fever.

Preparedness

Annual Conference of Relief Commissioners and Secretaries of States and UTs: An annual Conference of Relief Commissioners, Secretaries, to the Department of Disaster Management of States and UTs is organized before the onset of south west monsoon to review the status of preparedness for ensuing Monsoon and to discuss other disaster management related issues. The representatives of various Central Ministries, Organizations rendering Emergency Support Functions besides representatives of Central Para-Military Forces also participate.

Issue of guidelines: Necessary guidelines in the form of checklist as given in Box 1.3, for taking necessary preparatory measures are issued to the State for their guidance and appropriate action. Instructions are also issued for creating reserves of essential items required during rescue and relief phase.

Trigger Mechanism

This mechanism has been developed to activate the disaster response system automatically after receiving warning signals of a disaster happening or likely to happen or on receipt of information about the incident. The responders are required to undertake activities as per the SOPs issued in respect of such disasters. There may be scenario where early warning signals could be available and there may happen a disaster without any early warning.

Box 1.3: Guidelines on Preparedness/Response- (Checklist for preparedness by state/district agency)

- Vulnerability assessment
- Dissemination of warning
- Emergency Response activities
- Coordination
- Rapid Damage Assessment
- Maintenance of essential services
- Stocking of essential commodities
- Medicines
- Drinking water
- Shelter/Camps
- Pre- Contract
- Evacuation Plan
- Activating Control Rooms
- Search & Rescue Team
- Communication
- Identification of Nodal Officer
- Status of SDRF
- Preparedness Drill

Crisis Management Plan (CMP) and Standard Operating Procedures (SOPs)

In accordance with National Crisis Management Plan 2003 of the Cabinet Secretariat, MHA has formulated its CMP 2004 and circulated it to all States and UTs. The CMP of MHA comprises of two parts; Part-I deals with aspects, which are common to all contingencies situations and Part-II about the individual Standard Operating Procedures (SOPs) for dealing with specific crisis situation. SOPs are preparedness plan which emerges and activates the procedure for response on receipt of calamity or receipt of figure of impending disaster. It identifies the financial and administration powers to the people made responsible for the procedure.

The CMP of MHA is reviewed periodically. It was last reviewed in 2009 and was circulated to all Ministries and Departments of Central Government as well as States and UTs. An SOP for management of Natural Disasters formulated by this Ministry has also been circulated vide this Ministry's letter No.32-35/2003-NDM-I dated 21-04-2009.

The State Governments have been advised to formulate the similar kind of the CMP and SOPs. MHA has conducted number of training workshops for the States and UTs for assisting them in formulation of the SOPs.

Role and Responsibility of Central and State Governments

Ministry of Home Affairs is the nodal Ministry for management of natural disasters (other than drought, hailstorm and pest attack, which are handled by Ministry of Agriculture) on behalf of the Government of India. Disaster Management Division (DM Division) performs the function in the Ministry of Home Affairs.

The Central and State Governments are jointly responsible for undertaking relief, rehabilitation, preparedness, mitigation and response measures. The basic responsibility for undertaking these measures in the event of a disaster rests with the concerned State Government. The Central Government supplements the efforts of the State Governments by providing logistic and financial support in case of natural calamities of severe nature. The logistic support includes

deployment of aircrafts and boats, specialist teams of Armed Forces, Central Paramilitary Forces and personnel of National Disaster Response Force (NDRF), arrangements for relief materials & essential commodities including medical stores, restoration of critical infrastructure facilities including communication network and such other assistance as may be required by the affected States to meet the situation effectively.

DM Division of MHA closely monitors the disaster and disaster like situation to facilitate strategic interventions in the form of logistic and financial support by the Government of India to augment the resources of the affected States and UTs to deal effectively with each disaster situation. For this purpose close liaison is made with the affected States on the one side and the concerned Central line Ministries such as Ministry of Health, Ministry of Defence Ministry of Civil Aviation, Food and Civil Supplies etc on the other.

Inter Agency Co-ordination Mechanism

Co-ordination at the Central and the State level is achieved by way of various committees involving all departments that are working in Disaster management. A response set-up across the country may be viewed in Figure 1.1.

Cabinet Committee on Management of Natural Calamities

It is constituted to

- Oversee all aspects relating to management of natural calamities including assessment of the situation and identification of measures considered necessary to reduce its impact,

- Examine and implement programmes for reducing the adverse impact of natural calamities,

- Monitor and suggest long term measures for prevention of such calamities in the future; and,

- Formulate and recommend programmes for public awareness for building up society's resilience to natural calamities.

The Committee is to be serviced by Ministry of Home Affairs in all cases except in cases relating to Drought Management and Epidemics when it is serviced, as the case may be, by the Department of Agriculture and Cooperation and Department of Health and Family Welfare.

National Crisis Management Committee (NCMC)

At the Centre, under the Chairmanship of the Cabinet Secretary the NCMC has been constituted in the Cabinet Secretariat. The other members of this Committee include

the Secretary to the Prime Minister, Secretaries of the Ministries of Home Affairs, Defence, Information & Broadcasting, RAW, NDMA, Deputy NSA and Director of Intelligence Bureau. Secretary (Security) Cabinet Secretariat is the convener of the NCMC. The NCMC gives direction to the Crisis Management Group as deemed necessary.

Crisis Management Group (CMG)/National Executive Committee

This is a group under the Chairmanship of the Home Secretary comprising the senior officers from the various ministries and other concerned departments. CMG's function is to review contingency plans every year formulated by the Central Ministries/ Departments and the measures required for dealing with a natural disaster; co-ordinate the activities of the Central Ministries and the State Governments in relation to disaster preparedness and relief and to obtain information from the nodal officers on measures relating to the above. The Joint Secretary (DM) is the Convener of CMG for natural disasters.

Role of the State Government

In the context of federal set-up of India, the responsibility to formulate the Governments response to a natural calamity is essentially that of the concerned State Government. However, the Central Government, with its resources, physical and financial does provide the needed help and assistance to buttress relief efforts in the wake of major natural disasters. The dimensions of the response at the level of National Government are determined in accordance with the existing policy of financing the relief expenditure and keeping in view the factors like.

(i) Gravity of a natural calamity,

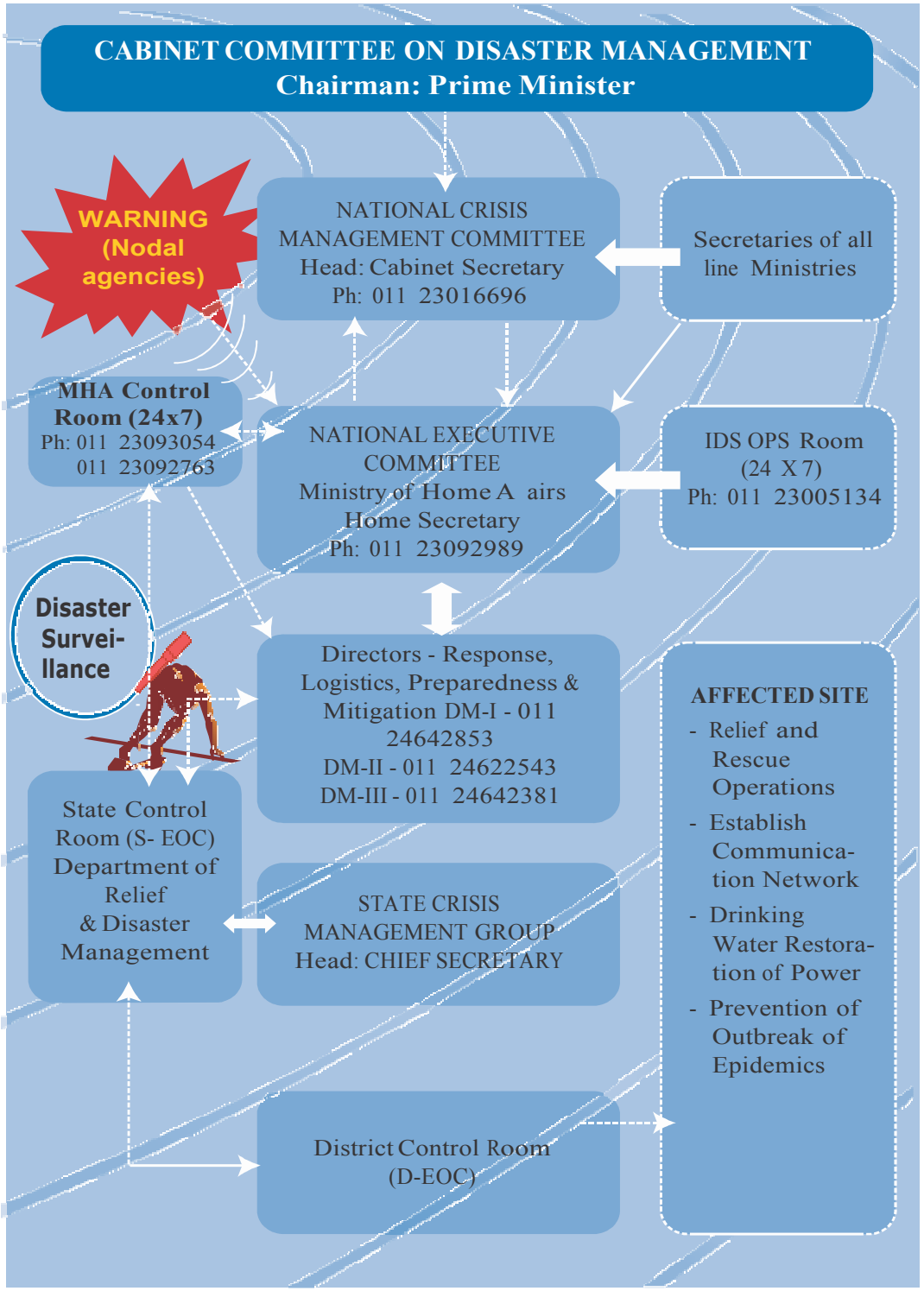
(ii) Scale of the relief operation necessary, and

(iii) Requirements of Central assistance for augmenting the financial resources at the disposal of the State Government.

Most of the States have Relief Commissioners under the Department of Disaster Management, who are in charge of the relief measures in the wake of natural disasters. In the absence of the Relief Commissioner, the Chief Secretary or an Officer nominated by him is in overall charge of the Relief operations in the concerned State.

At the state level, the State Relief Commissioner supervises and controls relief operations through Collectors or Deputy Commissioners, who are the main functionaries to coordinate the relief operation at district level. The State Governments are autonomous in organizing relief operations in the event of natural disasters and in developing the long-term rehabilitation measures. The State Government's efforts are supplemented by central Government based on the recommendations of the Finance Commission.

Figure 1.1: Response set up across the country



State Crisis Management Group (SCMG)

There is a State Crisis Management Group (SCMG) under the Chairmanship of Chief Secretary and Relief Commissioner. This Group comprises senior officers from the Departments of Revenue/relief, Home, Civil Supplies, Power, Irrigation, Water Supply, Panchayat (local self- government), Agriculture, Forests, rural Development, and health, Planning, Public Works and Finance.

The SCMG is required to take into consideration the guidance received, from time to time, from Government of India and formulate action plans for dealing with different natural disasters. It is also the duty of the Relief Commissioner of the State to establish a Emergency Operation Center (Control Room) at State headquarters as soon as a disaster situation develops. Besides having all updated information on forecasting and warning of disaster, the EOC would also be the contact point for the various concerned agencies.

Role of District Administration

The district Administration is the focal point for field level organizations. It is responsible for implementation of all government contingency plans. Considerable powers have therefore been wrested upon the District Collector to carry out operations in the shortest possible time.

The District Administration in the country is required to prepare an advance Contingency Plan depending on the type of disaster likely to affect the district. Contingency Plans are to follow a framework as laid down nationally which comprises type of preparedness, the relief material required to be mobilized and the concerned departments that need to work together and provide an efficient feedback and monitoring system.

The District Magistrate exercises coordinating and supervisory powers over functionaries of all the Departments at the district level in the event of emergencies. During actual operations for disaster mitigation or relief, the powers of the Collector are considerably enhanced, generally, by standing instructions or orders on the subject, or by specific Governments orders, if so required. Sometimes, the administrative culture of the State concerned permits, although informally, the collector to exercise higher powers in emergency situations and the decisions are later ratified by the competent authority.

District Relief Committee: The district level Relief Committee consisting of official and non-official members including the local Legislators and the Members of Parliament reviews the relief measures.

Role of Sub-district Administration

A District is sub-divided into sub-divisions and Tehsils or Talukas. The head of a sub-division is called the Sub-Divisional Officer (SDO) while the head of a Tehsil is

generally known as the Tehsildar (Talukdar or Mamlatdar in some States). Contact with the individual villages is through the village Officer or Patwari who has one or more villages in his charge. When a disaster is apprehended, the entire machinery of the District, including officers of technical and other Departments, swings into action and maintains almost continuous contact with each village in the disaster threatened area. In the case of extensive disasters like drought, contact is maintained over a short cycle of a few days. The entire hierarchy right from the Central Government (the Department of Agriculture and Cooperation in the Ministry of Agriculture and irrigation) to the District level is connected by means of a telecommunication system.

Control Rooms

National Emergency Operation Centre (NEOC)

The National Emergency Operation Centre (NEOC) in the Ministry of Home Affairs functions 24X7 to monitor the disaster or disaster like situation. Based on the feedback received from National Forecasting Agencies viz Indian Meteorological Department, Central Water Commission, Snow & Avalanche Study Establishment etc. advisories to the concerned States/UTs are issued from time to time for keeping watch on the developing situation and take necessary measures such as evacuation of the vulnerable persons, operation of relief camps, pre positioning of essential commodities etc.

During the south west monsoon, daily situation reports (sitreps) are prepared based on the feedback received from the affected States and concerned Central Ministries and organizations, and are sent to all concerned. During the calamities of severe nature, special situation reports are also prepared and issued to all concerned. NEOC also issue SMS alerts to the concerned officers in MHA, PMO and Cabinet Secretariat. These reports are also uploaded on the website *www.ndmindia.nic.in*..

State Control Room

There is a State Level Control Room set up whenever a disaster situation develops. The Control Room is responsible for:

(i) Transmitting information about the development of a crisis as a result of natural disaster on continued basis to the Central Relief Commissioner.

(ii) Receiving instructions and communicating them to appropriate agencies for immediate action.

(iii) Collection and submission of information relating to implementation of relief measures to the Central Relief Commissioner; and

(iv) Keeping the State level authorities apprised of the developments on a continuing basis.

Mock drill by NDRF, Mangalore

District Control Room

Likewise in the wake of natural disasters, a Control Room is set up in the district for day-to- day monitoring of the rescue and relief operations on a continuing basis, operationalising the contingency plan and keep close liaison with the State Headquarters, NGOs and other agencies dealing with disaster management and relief.

National Disaster Response Force (NDRF)

Task and role of NDRF: The main task of NDRF is to provide specialist response in case of disasters which broadly covers:

- NBC disasters (Decontamination of the area and personnel)
- Removal of debris
- Extrication of victims- live or dead
- First medical response to victims
- Extend moral support to victims
- Assistance to civil authorities in distribution of relief material
- Co-ordination with sister agencies
- Capacity building
- Providing assistance to foreign countries, if asked

Specialized equipment for NDRF Battalions: In NDRF has been equipped with latest and state of the art equipments required for the rescue and relief works. 310 different types of equipments have been authorized to NDRF which broadly consist of Medical First Responder (MFR) Equipments, Collapsed Structure Search & Rescue

(CSSR), water rescue, CBRN equipments, specialist vehicle etc. The details of such equipment may be visited at *www. ndmindia.nic.in*

Box 5.4: Rescue and relief measures leading to further disasters - Tamil Nadu experience

Inadequate planning and preparation in rescue and relief may lead to further disasters. – "42 persons die in a stampede at Chennai flood relief camp - They came in droves seeking relief from their tragedy, instead they fell victim to another tragedy as a stampede on Sunday (18th December 2005) at a relief camp for flood victims in Chennai which left 42 people dead and 40 injured. Hundreds of people ran for cover following a sudden downpour and fell on each other, crushing women and children in their wake. The tragedy occurred at 4.30 a.m. as a crowd of around 4,500 - largely poor people - gathered in front of the locked gate of Arignar Anna Corporation Higher Secondary School at K.K. Nagar in west Chennai to receive food and other relief goods. The K.K. Nagar relief camp in the school was one of 141 such camps in and around Chennai distributing relief to victims of floods caused by unprecedented rains in different parts of the state since October".

(Source: Extract from a box from the 2 ARC Report on Crisis Management)

Other activities of NDRF: NDRF is engaged in following other activities beside search and rescue operation undertaken during emergency situation.

- Conducting familiarization exercise in order to acquaint personnel with vulnerability of their area of responsibility to different disasters

NDRF in action for rescue operation - Bihar floods

- To conduct mock exercises in coordination with other stake holders for well coordinated response during disasters.
- To conduct community awareness program for capacity building.
- To organise demonstrations and exhibitions as part of community awareness.
- To undergo different kinds of training in order to increase the skill and expertise of NDRF personnel.
- To train State Disaster Response Force (SDRF), community and NGO'S in disaster management.

Major Operational Achievements of NDRF: In the previous years, NDRF has proved its efficacy with its commendable performance during various disasters including the drowning cases, building collapses, landslides, devastating floods and Cyclones. NDRF has saved 1, 41,257 human lives and retrieved 362 dead bodies of disaster victims in various response operations in the country.

Table 1.2: NDRF : Response Activities

Year	No. of Activities
2007	20
2008	25
2009	23
2010	17
Total	**85**
Victims Rescued	1.41 Lakhs
Dead bodies retrieved	330

Source: NDMA

State Disaster Response Force (SDRF)

The States/UTs have also been advised to set up their own Specialist Response force for responding to disasters on the lines of National Disaster Response Force vide Ministry of Home Affairs letter dt 26th July 2007 and vide this Ministry's letter dated 08 March 2011. The Central Government is providing assistance for training of trainers. The State Governments have been also advised to utilize 10% of their State Disaster Response Fund and Capacity Building Grant for the procurement of search and rescue equipment and for training purposes of the Response Force.

Policy for Acceptance of External Assistance

The present policy of Government of India is to not issue a formal appeal on behalf

of the Government, either directly or through any other agency, to attract relief. However, relief donated on a voluntary basis are accepted and acknowledged as a sign of international solidarity. There is no objection to NGO's issuing appeals for donations provided it is clear that the appeals are not at the instance of the Government of India. In the case of UN organisations and agencies (like OCHA) such appeals would imply endorsement by member countries and they are advised against appeals for international assistance.

Drought Relief Measures

Management of drought has now been outlined in much elaborated manner in the drought manual issued by ministry of Agriculture and cooperation.

Following drought declaration, planning and implementation of drought relief and response measures is initiated. It is necessary that these measures are undertaken promptly so that it would mitigate the hardship faced by the people. Though these measures are sector specific, they require immense inter department coordination. Implementing these measures would require a continuous flow of information from the village level to the highest level of decision making in the State and a responsive administrative structure. It would also require careful financial planning so that the implementation of these measures could be undertaken on a sustained basis.

Contingency crop planning: Ministry of Agriculture, Government of India, Indian Council of Agricultural Research (ICAR), State Government agriculture departments and agricultural universities need to prepare the contingency crop plan and disseminate it among farmers with the help to support agencies, mentioned below. The alternative crop planning involves choosing suitable crops and / or crop varieties, alternative crop strategies, mid season's corrections and crop life saving measures.

Relief employment: The most important relief component is the generation of employment provision during the drought period. As soon as drought is declared, it is therefore, necessary for the State Governments to immediately start relief employment programmes and provide work to those who need employment within a radius of five kilometers.

Most State Governments have their own food for work programme. The Government of India has started the National Rural Employment Guarantee Scheme (NREGS), providing 100 days of employment to one person per family on demand. The scheme has been extended to the entire country. A large number of public works and watershed programmes could be supported through the NREGAS. These programmes together can create substantial employment to tide over the hardship and deprivation caused by drought.

Water resource management: Water resource management in the drought affected areas is one of the most critical tasks of relief operations. It requires diverse measures such as augmentation of water supply, rationing of water use, and efficient utilization and management of water resources, in both urban and rural areas. Shortage of water is one of the earliest indicators of drought, affecting the entire society, rural and urban. Assessing the demand for water and its total availability in a specific region, therefore, is extremely important for meeting the needs of different user groups.

Food security Food security is one of the most important objectives of drought management. It is provided through food for work programmes, which are started by the State Governments to provide relief employment. Wages on these relief employment works are paid in the form of food grains, on a full or partial basis.

The National Rural Employment Guarantee Scheme (NREGS), extended to all the districts across the country, guarantees employment opportunities in the rural areas by providing work that taps labour intensive community assets. It assures manual work to one person per family for a maximum of 100 days in a year.

Relief through tax waivers and concessions: The primary objective of the tax waivers and concessions would be to help people meet their basic entitlements. The State Government can take a conscious decision to provide a number of tax waivers and concessions when a drought is declared. These tax waivers and concessions should be decided on the basis of the entitlement needs of certain segments of the population and the fiscal implications of such a relief to the State Government. Each State Government may decide on tax waivers and concessions to the people affected by drought, depending on fiscal situation of the State and severity of the drought.

Cattle camps and fodder supply: State Governments need to support their farmers in protecting their cattle population during a drought situation by providing necessary assistance for fodder, feed, and cattle health. During a drought situation, every measure needs to be taken to save useful cattle. When cattle wealth is seriously depleted the recovery is very slow. While sheep and goats have a potential for rapid growth, perhaps 25% a year or more, the growth of cow, buffaloes and camels is much slower, rarely more than 1-2% a year in a sustained manner. It is necessary to provide support to farmers for fodder so that they do not engage in distress selling of their cattle.

Health and hygiene: In a drought situation, health issues are largely related to contamination of water and spread of infection among the workers participating in public works programmes. People have less immunity in drought situations due to poor levels of nutrition. Necessary precautions need to be taken to prevent the spread of any water borne epidemic and other infectious diseases.

Institutional response: Drought management requires a strong institutional structure to monitor and provide a timely response to drought. While it is primarily the responsibility of the State Government to manage drought, the Central Government also plays an important role in monitoring drought and providing financial assistance to the States. The district administration headed by the Collector plays the most critical role in responding to drought on the ground. At the Central level, the Ministry of Agriculture is the department responsible for drought monitoring and management.

Role of Panchayati Raj institutions: It is necessary to involve the Panchayati Raj Institutions (PRIs) – Zila Parishads, Panchayat Samitis and village Panchayats in the implementation of drought management programmes.

Financing relief expenditure: In post independent India, financing relief expenditure has largely been arranged through the Finance Commission appointed under Article 280 of the Constitution. In the earlier phases the role of the Commission was restricted to suggesting the pattern of financial assistance by the centre. Subsequently the recommendations were enlarged to cover the "scheme of financing relief expenditure".

Information management and media coordination: The Central and State Governments should provide information on all aspects of drought to the people and media. It is necessary to inform the people about the severity and impact of drought and the measures being taken to alleviate the drought situation.

Conclusion

The preparedness and response phase in the Disaster management cycle are critical in reducing the impact of disasters. The involvement of multi-various stakeholders, therefore, need to ensure efficient inter-departmental coordination and need to constantly review and improve the systems in place. It has to be kept in mind to ensure that the focus on these two areas help in bringing a tangible improvement in handling the disasters.