

STANDARD OPERATING PROCEDURE
FOR
RESPONDING TO
NATURAL DISASTERS
2010



सत्यमेव जयते

GOVERNMENT OF INDIA
MINISTRY OF HOME AFFAIRS
DISASTER MANAGEMENT DIVISION

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ACRONYMS

AH&D	Department of Animal Husbandry & Dairying
AIR	All India Radio
BIS	Bureau of Indian Standards
BMTPC	Building Material Technology Promotion Council
BSF	Border Security Force
CD	Civil Defence
CGWB	Central Ground Water Board
CISF	Central Industrial Security Force
CP	Commissioner of Police
CPMF	Central Para Military Forces
CPWD	Central Public Works Department
CR	Control Room
CRPF	Central Reserve Police Force
CWC	Central Water Commission
DAC	Department of Agriculture & Cooperation
DD	Delhi Doordarshan
DGCD	Director General Civil Defence
DM	District Magistrate
DOS	Department of Space
DOT	Department of Telecommunication
DRDO	Defence Research Development Organisation
DWS	Department of Drinking Water Supply
ECC	Emergency Command Centre
EOC	Emergency Operation Centre
ERC	Emergency Response Centre
ESF	Emergency Support Functions
GSI	Geological Survey of India
HUDCO	Housing and Urban Development Corporation
I&B	Ministry of Information & Broadcasting
IC	Incident Commander
IDS	Integrated Defence Staff
IMD	India Meteorological Department
IO	Information Officer
ITBP	Indo-Tibetan Border Police
MHA	Ministry of Home Affairs
MOD	Ministry of Defence

MOF	Ministry of Finance
MOH	Ministry of Health
MOUD	Ministry of Urban Development
NCMRW	National Centre for Medium Range Weather Forecasting
NDRF	National Disaster Response Force
NDMA	National Disaster Management Authority
NIDM	National Institute of Disaster Management
NRSA	National Remote Sensing Agency
PC	Planning Commission
RD	Department of Rural Development
RT&H	Department of Road Transport & Highways
SAP	State Armed Police
SART	Search & Rescue Team
SDDM	State Department of Disaster Management
SDMA	State Disaster Management Authority
SEMA	State Emergency Management Authority
SFS	State Fire Services
SG	State Government
SOP	Standard Operating Procedures
SPWD	State Public Works Department
SSART	State Search & Rescue Team
MWR	Ministry of Water Resources

Chapter – 1

INTRODUCTION

The world over it has been experienced that a prompt, well-coordinated and effective response mounted in the aftermath of disasters not only minimizes loss of life and property but also facilitates early recovery. The important ingredients of an effective response system are integrated institutional arrangements, state of the art forecasting and early warning systems, fail-safe communication system, rapid evacuation of threatened communities, quick deployment of specialized response forces and coordination and synergy among various agencies at various levels in dealing with any disaster. Most importantly, all the agencies and their functionaries must clearly understand their roles and responsibilities and they specific actions they have to take for responding to disaster or threatening disaster situations.

1.2 All natural disasters except drought, pest attacks and hailstorm will be handled by the Ministry of Home Affairs. Drought, pest- attacks and hailstorm will be dealt with by the Ministry of Agriculture & Cooperation. This SOP will deal with natural disasters such as flood, cyclone, earthquake, landslides, avalanche etc. which fall under the nodal responsibility of Ministry of Home Affairs.

1.3 This SOP lays down, in a comprehensive manner, the specific actions required to be taken by various Ministries and Departments of Government of India and Organisations under the control of Government of India at the National level and concerned State Governments and the district administration for responding to natural disasters of any magnitude and dimension.

1.4 The objectives of the SOP are –

- (a) To provide, in a concise and convenient form, a list of major executive actions involved in responding to natural disasters and necessary measures for preparedness, response and relief required to be taken;
- (b) To ensure that all concerned Ministries, Departments and Organisations of the Government of India, State Governments and District Administrations know the precise measures

- required of them at each stage of the process and also to ensure that all actions are closely and continuously coordinated; and
- (c) To indicate various actions which would be required by the State Governments/UT Administrations within their sphere of responsibilities so that they may prepare and review the Contingency Action Plans accordingly.

1.5 The instructions contained in this SOP should not be regarded as exhaustive of all the actions that might be considered necessary. It will also be necessary for each Ministry, Department and Organization which are required to provide Emergency Support Functions (ESF) and the State Governments/UTs which face one or the other natural disasters to prepare detailed SOPs so as to translate each action point in a number of steps required to be taken by each of them.

1.6 The Central Ministries/Departments/Organisations concerned with these SOPs at national level will be as under:-

Ministries/ Departments

- (i) Ministry of Home Affairs
- (ii) Ministry of Civil Aviation
- (iii) Ministry of Consumer Affairs
- (iv) Ministry of Defence
- (v) Ministry of Environment & Forests
- (vi) Ministry of Health
- (vii) Ministry of Information & Broadcasting
- (viii) Ministry of Power
- (ix) Ministry of Railways
- (x) Ministry of Road Transport & Highways
- (xi) Ministry of Urban Development
- (xii) Department of Animal Husbandry & Dairying & Fisheries
- (xiii) Department of Ocean Development
- (xiv) Department of Telecommunication
- (xv) Department of Water Supply

Organisations under Ministries/ Departments

- (i) National Disaster Management Authority
- (ii) Indian Meteorological Department
- (iii) Central Water Commission

- (iv) Indian Space Research Organisation
- (v) National remote Sensing Agency
- (vi) Geological Survey of India
- (vii) Defence Research and Development Organisation
- (viii) Integrated Defence Staff
- (ix) National Disaster Response Force
- (x) Central Para Military Forces
- (xi) Director General of Civil Defence

1.7 The organizations concerned at the State/UTs level will be as under:-

- (i) State Disaster Management Authority
- (ii) Relief/ Disaster Management Department
- (iii) District Disaster Management Authority
- (iv) District Magistrate
- (v) Police
- (vi) Forest Department
- (vii) Fire and Civil Defence Services
- (viii) Health Services
- (ix) Transport Department
- (x) Public Works Department
- (xi) Veterinary Services
- (xii) Food & Civil Supplies Department

1.8 All Central Ministries concerned, State Governments, District Authorities and other stakeholders will prepare detailed SOPs in consonance with this SOP, National Policy, and various Guidelines issued by NDMA. These SOPs shall prescribe the manner in which various response and relief activities like evacuation, search and rescue, casualty & emergency health management, food, drinking water, sanitation & hygiene, clothing shelter, management of relief camps and restoration of essential services etc. have to be undertaken

1.9 The SOP encompasses the following five phases of disaster management for effective and efficient response to natural disasters.

- (i) **Preparedness Phase** – This phase will include taking all necessary measures for planning, capacity building and other preparedness so as to be in a state of readiness to respond, in the event of a natural disaster. This Stage will also include development of Search & Rescue Teams, mobilization of

resources and taking measures in terms of equipping, providing training, conducting mock drills/exercises etc.

- (ii) **Early Warning Phase** – This phase will include all necessary measures to provide timely, qualitative and quantitative warnings to the disaster managers to enable them to take pre-emptive measures for preventing loss of life and reducing loss/damage to the property. On the occurrence of a natural disaster or imminent threat thereof, all the concerned Agencies will be informed/notified for initiating immediate necessary follow up action.
- (iii) **Response Phase** – This phase will include all necessary measures to provide immediate succor to the affected people by undertaking search, rescue and evacuation measures.
- (iv) **Relief Phase** - This phase will include all necessary measures to provide immediate relief and succor to the affected people in terms of their essential needs of food, drinking water, health & hygiene, clothing, shelter,
- (v) **Restoration Stage** – This phase will include all necessary measures to stabilize the situation and restore the utilities.

1.10 This SOP does not cover long-term measures needed either for mitigation or for rehabilitation/recovery of the affected people and reconstruction of the area.

1.11 This SOP will be reviewed annually.

CHAPTER - 2

INSTITUTIONAL MECHANISM

2.1.1 In our federal system of governance, in the aftermath of a disaster, the primary responsibility for undertaking the rescue, relief and rehabilitation measures rests with the concerned State Governments. The role of the Central Government is supportive, in terms of physical and financial resources and complementary in sectors such as transport, early warning systems, etc.

2.1.2 The Disaster Management Act 2005, lays down a three tier institutional structure for disaster management at the national, state and district levels in the form of NDMA, SDMA and DDMA. National Policy on Disaster Management (NPDM) has further specified the roles and responsibilities of various organizations for disaster response.

NATIONAL LEVEL

National Crisis Management Committee (NCMC)

2.2.1 At the National Level, the Command, Control and Coordination of the disaster response will be overseen by the National Crisis Management Committee (NCMC) under the Cabinet Secretary. NCMC will issue guidelines from time to time as required for effective response to natural disasters. All Ministries/Departments/Agencies at the national level shall comply with the instructions of NCMC. The NPDM prescribes that NCM shall deal with 'major disasters that have serious or national ramifications'.

Ministry of Home Affairs (MHA)

2.2.2 The Ministry of Home Affairs is the nodal agency at the National level for coordination of response and relief in the wake of natural disasters (except drought, pest attack & hailstorm). MHA will provide financial and logistic support to the State Governments, keeping in view, their resources, the severity of the natural disaster and the capacity of the State Governments to respond in a particular situation.

National Executive Committee (NEC)

2.2.3 Section 10(2) (k) of the Disaster Management Act stipulates that the NEC under the Union Home Secretary will 'coordinate response in the event of any threatening disaster situation or disaster'. NEC may give directions to

the concerned Ministries/Departments of the Govt. of India, the State Governments and the State Authorities regarding measures to be taken by them in response to any specific threatening disaster situation or disaster.

Other Central Ministries/Departments

2.2.4 The other concerned Central Ministries/Departments/Organisations will render Emergency Support Functions (ESF) wherever Central intervention and support are needed by the State Governments. List of ESF Ministries/Departments along with their roles & responsibilities is given at Annexure- III.

STATE LEVEL

State Executive Committee (SEC)

2.3.1 It will be the primary responsibility of the State Government to respond to natural disasters and provide relief to the affected people. Section 22(2) (G) of the Disaster Management Act stipulates that the SEC under the State Chief Secretary shall 'coordinate response in the event of any threatening disaster situation or disaster'. SEC shall give directions to any Department of the State Government or any other authority or body in the State regarding actions to be taken in response to any disaster.

2.3.2 Department of Relief/ Disaster Management shall be the nodal department for disaster management and Secretary of the Department /Relief Commissioner shall implement the decisions of the SEC pertaining to State level Response to natural disasters.

2.3.3 Disaster response being a multi-agency function, other Departments of the State Governments will provide emergency support in their relevant domains at the State/District levels.

DISTRICT LEVEL

District Disaster Management Authority (DDMA)

2.4.1 Section 30(2)(xvi) of the Disaster Management Act stipulates that the DDMA under the chair of the Collector or District Magistrate or Deputy Commissioner, as the case may be and the co-chair of the elected representative of the local authority, shall 'coordinate response to any threatening disaster situation or disaster'. The Collector/District Magistrate/ Deputy Commissioner, as the head of administration at the district, shall be

the focal point in the command and control for disaster response at the district level, in accordance with the policies/guidelines/instructions from the national and state levels. Depending on the nature of disaster and response he will be the Incident Commander himself or delegate the responsibility to some other officer.

2.4.2 All the Departments/Agencies of the Central and State Governments in the District/City involved in response and relief will work in accordance with the directions of the Incident Commander.

2.4.3 The lower administrative units of Districts viz; Subdivisions under the administrative control of a Sub-divisional Magistrate/Officer and Blocks and Tehsils under the administrative control of the Block Development Officers/Tehsildars will coordinate the functioning of the various departments in their respective jurisdiction.

2.4.4 The Incident Command Teams at Subdivision and Block levels under SDO/SDM or BDO/Tehsildar as the case be will be responsible for all response and relief works.

Mechanism for International Assistance

2.4.5 As a stated policy of the Government of India no appeals shall be made seeking foreign aid for disaster response. However if the foreign national governments voluntarily offer assistance as a goodwill gesture in solidarity of the disaster victims, the Ministry of Home Affairs will coordinate with the Ministry of External Affairs for obtaining and channelizing such assistance.

2.4.6 All national and international non- government agencies while rendering emergency support functions on the ground will function under the overall command of the State Government through the Incident Commander.

CHAPTER - 3

PREPAREDNESS

EMERGENCY OPERATIONS CENTRES (EOCS)

3.1.1 Emergency Operation Centres/Control rooms will be set up at National, State and district levels with requisite facilities. The EOCs/Control Rooms already in existence at these levels will be suitably upgraded.

Objectives of the Emergency Operations Centre

3.1.2 The EOCs/Control Rooms at National, State and District levels will be the nerve centres for coordination and management of disasters. The objectives of the EOCs shall be to provide centralized direction and control of any or all of the following functions:

- Receive and process disaster alerts and warnings from nodal agencies and other sources and communicate the same to all designated authorities.
- Monitor emergency operations
- Facilitate Coordination among primary and secondary ESF Ministry/Departments/Agencies.
- Requisitioning additional resources during the disaster phase
- Issuing disaster/incident specific information and instructions specific to all concerned;
- Consolidation, analysis, and dissemination of damage, loss and needs assessment data;
- Forwarding of consolidated reports to all designated authorities.

Location of EOC

3.1.3 The EOC will be set up at a suitable location and the building should be disaster resistant so as to withstand the impact of disasters and remain functional during the emergency phase.

Communication Network of EOCs

3.1.4 Under the National Communication Plan being implemented by the Government of India, the EOCs at all the three levels shall have a fail proof communication network with triple redundancy of NICNET of NIC, POLNET of Police and SPACENET of ISRO in addition to the terrestrial and satellite based communication to ensure voice, data and video transfer.

3.1.5 Under the network, the EOCs/Control Rooms of all the States will be directly connected with the NEOC/ Control Room of MHA at the National level. The district EOCs/ Control Rooms will be connected with the respective State EOCs/Control Room. All these control rooms will function on 24x7 basis and will be functional round the year. Suitable personnel will be selected and imparted training in the operation of Control Rooms will be posted to man these EOCs/Control Rooms.

National Integrated Operations Centre (NIOC)

3.1.6 The National Integrated Operations Center is being maintained and run on 24 x 7 basis at MHA, North Block, New Delhi with latest and state of the art equipments. A SOP on Issuing Alerts and Electronic Messaging in the Event of Disaster Situations is at Annexure -V.

Back up NIOC

3.1.7 An alternate NIOC has been established at National Disaster Management Authority (NDMA) which is a mirror image of the National IOC and will be a back up to handle any eventuality if for any reason the NIOC at MHA becomes non-operational.

SEOC and DEOC

3.1.8 State Governments and District Administration shall set up State Emergency Operation Centre and District Emergency Operation Centres and provide adequate manpower for manning them on 24x7 basis round the year and arrange training for the EOC Staff on EOC operations. State Governments and District Administration shall develop SOP/ Protocol for activation of SEOCs and DEOCs during emergency/disasters

NATIONAL DISASTER RESPONSE FORCE (NDRF)

3.2.1 For the purpose of specialized response to disasters/ emergencies both natural and manmade NDRF has been constituted comprising of 8 battalions drawn from Central Para-Military Forces. Each NDRF battalion has 18 Specialized Search & Rescue Teams including doctors, paramedics and dog squad.

3.2.2 The general direction and control of NDRF is vested with NDMA while the command and supervision of the Force is vested in Director General of Civil Defence and NDRF appointed by the Central Government.

Requisitioning of NDRF Teams

3.2.3 Each NDRF Battalion/Team has been assigned respective areas of responsibility in terms of States/UTs and Districts. The NDRF Battalion/Teams can be requisitioned by the State Governments/ District Administration directly in cases of rapid onset disasters where early warning/alerts is not available and through the Director General, NDRF and NDMA in cases where sufficient lead time is available. The State Governments/ District Administration will maintain close liaison with the NDRF Commanders earmarked to the respective States/Districts for rapid deployment in case of threatening disasters situation/ disasters.

National Disaster Mitigation Resource Centres (NDMRCs)

3.2.4 The NDMRCs will be co-located with the NDRF battalions. These will also serve as repositories for NDMR bricks of relief stores for the disaster affected people, in each of the eight NDRF locations. These will cater to the emergent requirements especially for the first 72-96 hours. These stores will supplement the reserves maintained by the respective states/UTs. In addition, these centres will assist in running mock drills and capacity development programmes. During disasters, they will act as facilitators to the states/UTs in deployment of central resources and provide much needed additional link to the centre

Regional Response Centres (RRCs)

3.2.5 15 Regional Response Centres have been set up at various strategic locations across the country by the CPMFs. The RRCs are equipped with minimum Cache of equipment to deal with floods, cyclone, earthquakes etc. NDRF Teams can be prepositioned in these RRCs for quick deployment when disaster is imminent. The State Government at the time of need can requisition the assistance from these RRCs. The locations of RRCs is at **Annexure - I**

State Disaster Response Force (SDRF)

3.2.6 State Governments/SDMAs shall be primarily responsible for taking preparedness measures and building response capacity as per their

vulnerability to various natural disasters and constitute State Disaster Response Forces on the pattern of NDRF.

Training and Equipping of SDRF

3.2.7 Training and equipping of Search & Rescue Teams of SDRFs shall be undertaken by the State Governments in consultation with the NDMA and MHA. Each SAR Team will be trained for search, rescue and evacuation in collapsed structure and medical first response. Some units of the select SAR Teams will also be trained and equipped for deep-water rescue, slithering and industrial accidents. The Teams will also have dog squads and appropriate measures will be taken for procurement and training of dogs and dog handlers.

3.2.8 Each of the SAR Teams will operate on self-sustaining basis. The organizational structure, qualification requirements of personnel and lists of equipment for SAR Teams shall be similar to NDRF Teams. DG, NDRF shall provide the details of the same to all States/UTs.

3.2.9 Besides the SAR Teams, the Police/ Armed Police/Forest Protection Force will also be imparted general training in search and rescue at the time of induction and as a part of refresher training. This will cover gazetted officers, subordinate officers and other ranks.

3.2.10 The training institutions imparting training to Police/ Armed Police/Forest Protection personnel or fire training institutions will be declared as nodal training institutions in search and rescue. Appropriate faculty will be created and trained in these nodal training institutions.

State Disaster Mitigation Resource Centres (SDRMCs)

3.2.11 State Government shall also set up Resource Centres based on their requirements to pre-position essential supplies. The States shall be responsible to constantly evaluate their own capabilities to handle that situation and project the anticipated requirements for the central resources well in time. Memorandum of Understanding may be entered into by the neighboring States for assisting each other during natural calamity. Inter-State assistance and cooperation shall be encouraged.

FIRE & EMERGENCY SERVICES

3.3.1 The Fire Services in the States/ UTs will be strengthened and will be made multi-hazard response units. These will be appropriately equipped depending upon their location and area of operation.

CIVIL DEFENCE

3.4.1 Civil Defence volunteers will be enrolled for voluntary services in accordance with the provisions of the Civil Defence Act. The services of CD volunteers should be utilized during response to natural disasters.

3.4.2 Civil Defence training institutions at the National and State levels will be set up/upgraded to cater to the training of Civil Defence volunteers in relevant areas of disaster response.

ARMED FORCES

3.4.3 Establishment of NDRF should progressively reduce deployment of the Armed Forces. Armed Forces would be deployed only when the situation is beyond the coping capacity of State Government and NDRF.

EMERGENCY SUPPORT FUNCTIONS (ESFs)

3.5.1 Disaster response is a multi-agency function. There will be one Lead or Primary Agency which will be responsible for managing and coordinating the response while other agencies will support and provide assistance in managing the incident. Each ESF will be headed by a lead Ministry /organisation responsible for coordinating the delivery of goods and services to the disaster area, and is supported by numerous other organizations. These ESFs will form integral part of the Emergency Operation Centres (EOCs) and each ESF should coordinate its activities from the allocated EOC. Extension teams and workers of each ESF will be required to coordinate the response procedures at the disaster affected site.

ESF Plan at National Level

3.5.2 An Emergency Support Function Plan will be prepared at the National level clearly indicating the areas of responsibility of each of the agency concerned that will provide mutual assistance in terms of resources, equipments, manpower etc during disasters. The name, address and telephone numbers of Nodal Officers of the Department/Agencies will also be included in the plan. The ESF plans will be reviewed from time to time.

3.5.3 In the immediate aftermath of a major natural disaster requiring central government assistance to States/UTs, the MHA will activate the ESF Plan to identify requirements and mobilize and deploy resources to the affected area to assist the State in its response actions.

3.5.4 Each ESF is headed by a primary agency, which has been selected based on its authorities, resource and capabilities to support the functional area. The designated primary agency, acting as the Lead agency will be assisted by one or more support agencies (secondary agencies) and will be responsible for managing the activities of the ESF and assisting the State/UT in the rescue and relief activities in the State/UT. The list of ESFs at the national level is at Annexure – III.

Preparation of ESF Plans in States

3.5.5 Based on the ESF Plan at national level, the State Governments shall designate Primary and Secondary Departments/Agencies for each ESF and mandate them for making plans for providing emergency support at the State and districts levels.

INCIDENT COMMAND SYSTEM (ICS)

3.6.1 ICS is a management system to organize various emergency functions in a standardized manner while responding to any disaster. Under ICS an incident commander and officers trained in different aspects of incident management, such as logistics, operations, planning, safety, media management, etc. form a specialist incident management team and manage the disaster/emergency.

3.6.2 Though India has a well established robust administrative structure right from national level to village level with coordinating officials at each level for managing disasters, there is a need to strengthen and professionalize the same by incorporating the principles of the ICS with suitable modifications.

3.6.3 As per the Government of India policy on disaster management ICS will be integrated into the existing system and Incident Command Teams shall be put in place in each district by imparting training in different facets of incident management to district level functionaries. The emphasis will be on the use of technologies and contemporary systems of planning and execution with connectivity to the joint operations room at all levels.

Incident Command Teams (ICTs)

3.6.4 Headquarter ICTs will be constituted at National level by the MHA. The State Governments will constitute one Headquarter team in each State Capital. Further State Governments will constitute ICTs for the State and at each District. The members of these teams will be imparted specialized training in the ATIs/designated Training Institutes. These Teams will be deployed at the district level by the concerned District Magistrate or designated authority. The State level ICTs will be deployed on the request of the district authority.

PRE-CONTRACT FOR ESSENTIAL COMMODITIES

3.7.1 All the State Governments will ensure storage and availability of essential commodities including medicine in the vulnerable districts well before the monsoon and cyclone periods. They will also enter into pre-contract with the suppliers of essential commodities, medicines, tents, boats etc. on an annual basis for supply of these items at pre-decided rates within stipulated time framework. A nodal officer will be nominated for this purpose.

MEDICAL PREPAREDNESS

3.8.1 The State Governments will identify the hospitals, team of doctors and para-medics including mental health and psycho-social service provider at sub-divisional and district levels, who will be deployed at short notice. Their names, addresses, telephone numbers, mobile numbers, email etc. will be made available to the district and State control rooms. The list will be updated annually. The stock of medicines, accessories and equipment for each of identified teams at the district and sub-divisions will be decided in advance as per needs.

ANIMAL CARE

3.9.1 Animals both domestic as well as wild are exposed to the effects of natural and man-made disasters. It is necessary to devise appropriate measures to protect animals and find means to shelter and feed them during disasters and their aftermath, through a community effort, to the extent possible. It is pertinent to note that many communities have shown compassion to animals during disasters, and these efforts need to be formalized in the preparedness plans of the Departments of Animal Husbandry at the Centre and the States.

DISTRICT LEVEL PREPAREDNESS FOR RESPONSE

Vulnerability assessment

3.10.1 Each district will make its vulnerability assessment and identify potential hazards. While making such assessment, the risk involved and capacity to respond will be taken into account.

3.10.2 The local community will be informed about their vulnerability to potential hazard/disasters through the representatives of Panchayati Raj Institutions/Local Self-Government and NGOs.

Contact Details

3.10.3 A comprehensive directory of officers involved in disaster management at various levels will be prepared for National and State levels giving their names, addresses, telephone numbers, mobile numbers, email address, Fax numbers. Such directory will be widely circulated and updated annually.

Review

3.10.4 Annual review of the preparedness measures will be done at the National, State, District and sub-Divisional levels. Annual review will ensure that all loose ends are tied up so that response during natural disasters is efficient, effective and timely. The review will also include pre-arrangements for essential commodities required for response and relief and emergent basis.

3.10.5 The decentralization of authority is an important feature of good management of natural disasters. As such, the States will also review in their

annual meeting, the present levels of delegation of powers to the Relief Commissioners, Additional Relief Commissioners and District Magistrates.

Mock Drills

3.10.6 Search and Rescue Teams at the National and State Levels will carry out mock drills on various disasters situation annually. For floods and cyclones, these will be carried before the monsoon and cyclone period, tentatively in March and September for cyclones and June for floods. For earthquakes, landslides etc., such drills can be done in the month of March itself.

3.10.7 At the district and State levels, mock exercises will be carried out for testing the effectiveness of all the preparedness machinery including manpower and equipment.

RESOURCE INVENTORY – IDRN

3.11.1 Government of India has launched India Disaster Resource Network (IDRN), which is a web enabled resource inventory for disaster management. The State Governments will ensure that necessary entries have been made in the Web-portal and updated at-least once in a month by the designated District Authorities.

Floods/cyclone shelters

3.11.2 In the vulnerable districts, adequate numbers of floods/cyclone shelters will be constructed and identified for providing shelter to the evacuated people. These shelters should provide sufficient thermal comfort, fresh air and protection from the climate and ensure dignity, health, safety and well-being of the people. Such shelters will also be equipped with all essential necessities including medicines and sanitation. The design & construction of the shelter should be in accordance with safe building practices.

AWARENESS GENERATION

3.12.1 A Nation wide multi-media awareness campaign will be carried out by the Government of India. Similarly State Governments will also carry out awareness campaigns in their State right up to village level. To create awareness among new generation, inputs on disaster management will be included in the school syllabus all over the country. Seminars/workshops will be conducted specifically for media personnel and public representatives viz. M.Ps, and MLAs, Members of Municipal Councils, Zila Parishads etc.

3.12.2 The States will ensure appropriate awareness programme to solicit community response, which will in turn reduce the burden on administration to a considerable extent.

CHAPTER-4

EARLY WARNING

Nodal Agencies for Early Warning

4.1.1 Following are the Nodal agencies in the Government of India mandated for early warning of different natural hazards:

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

4.1.2 These agencies shall be responsible for keeping track of developments in respect of specific hazards assigned to them and inform the designated authorities/agencies at National, State and District levels about the impending disasters. All these agencies have developed guidelines for early warning of disasters.

CYCLONE

4.2.1 Indian Meteorological Department (IMD) has a developed detailed procedure for Four Stage Warning of Cyclone

1. Pre-Cyclone Watch

Pre-cyclone watch is an early warning issued about 72 hrs. in advance of the commencement of bad weather. This is issued by the IMD HQrs. to all designated authorities including the Cabinet Secretary and other senior officers of Govt. of India and the Chief Secretaries of concerned Maritime States, media and all Cyclone Warning Centres (CWS) of IMD.

2. Cyclone Alert

Cyclone Alert is issued to all designated authorities/Agencies as far as possible, 48 hours before the expected commencement of adverse weather.

3. Cyclone Warning

Cyclone warning are issued to all designated Authorities/Agencies including the Chief Secretaries of the maritime States and the District Magistrates/Collectors of the coastal districts and the immediate interior districts expected to be affected by the cyclone. Cyclone Warning is also issued to the designated railway officials and defence personnel. After initial warning , cyclone warning are issued to above officials twice a day by high priority telegrams based on 0830 IST and 1730 IST charts till the weather improves.

4. Post Landfall Outlook

Post landfall outlook is issued at least 12 hours in advance of the landfall by concerned CWCs. On the basis of this outlook, the concerned Meteorological Centre will also issue cyclone warnings for the interior areas.

Cyclone Warning Dissemination System (CWDS)

4.2.2 250 Cyclone Warning Dissemination System (CWDS) receivers have been established in vulnerable coastal areas using INSAT/METSAT. The system is being used extensively on operational basis during cyclone. The cyclone warning message is originated from Advanced Cyclone Warning Centres (ACWC) Chennai, Kolkata and Mumbai whenever a storm is observed. Warning messages are received in local languages directly by CWDS receivers located in areas likely to be affected by the cyclone.

4.2.3 In addition Cyclone Warning is disseminated through the following means:

- (i) Police Wireless
- (ii) Warnings through All India Radio (AIR) Bulletins
- (iii) Doordrshan News
- (iv) Press Bulletins
- (v) Aviation Warning

TSUNAMI

4.3.1 In the aftermath of the Indian Ocean Tsunami of 26 December 2004, the Ministry of Earth Sciences has set up an Indian Tsunami Early Warning Center at the Indian National Centre for Ocean Information Services (INCOIS) Hyderabad. The Center is mandated to provide advance warnings on Tsunamis likely to affect the coastal areas of the country. INCOIS has developed a detailed protocol for issuing Tsunami Watch, Alerts and Warnings.

Earthquake Information Bulletin contains information about origin time, latitude and longitude of the epicenter, name of geographical area, magnitude and depth of an earthquake. This message also contains preliminary evaluation of tsunami potential based on the magnitude. No immediate action is required.

Tsunami Warning (RED) contains information about the earthquake and a tsunami evaluation message indicating that tsunami is expected. This is the highest level wherein immediate actions are required to move public to higher grounds. Message also contains information on the travel times and tsunami grade (based on run-up estimates) at various coastal locations.

Tsunami Alert (ORANGE) contains information about the earthquake and a tsunami evaluation message indicating that tsunami is expected. This is the second highest level wherein immediate public evacuation is not required. Public should avoid beaches since strong current are expected. Local officials should be prepared for evacuation if it is upgraded to warning status. Message also contains information on the travel times and tsunami grade at various coastal locations

Tsunami Watch (YELLOW) contains information about the earthquake and a tsunami evaluation message indicating that tsunami is expected. This is the third highest level wherein immediate public evacuation is not required, Local officials should be prepared for evacuation if it is upgraded to warning status. Message also contains information on the travel times and tsunami grade at various coastal locations.

Tsunami cancellation (GREEN) will be issued if the tsunami warning was issued on the basis of erroneous data or if the warning

center determines from subsequent information that only an insignificant wave has been generated. In addition, tsunami warning may be cancelled on a selective basis when a significant wave that has been generated clearly poses no threat to one or more of the areas the warning center warns, either because of intervening continents or islands which screen them or because the orientation of the generating area causes the tsunami to be directed away from these areas.

Tsunami All Clear (GREEN) bulletin indicates that the ‘Tsunami Threat’ is passed and no more dangerous waves are expected.

A copy of the SOP on Early Warning of Tsunami is at Annexure – II.

FLOOD

4.4.1 Central Water Commission has developed a network of flood forecasting stations and issues Daily Flood Bulletins to all designated Authorities/Agencies of the Central Government and State Governments/ district Administration during the South East Monsoon season for all the major river basins in the following categories:

- | | |
|---------------|---|
| Category IV: | Low Flood (Water level between Warning Level and Danger Level) |
| Category III: | Moderate Flood (Water Level below 0.50m. less than HFL and above Danger Level) |
| Category II: | High Flood (Water Level less than Highest Flood Level but still within 0.50m. of the HFL) |
| Category I: | Unprecedented Flood (Water Level equal and above Highest Flood Level (HFL)) |

LANDSLIDE

4.5.1 Geological Survey of India issues alerts and warnings to all designated authorities and agencies of the Central Government and State Governments/ district Administration for landslides in the following categories.

- Category IV: Landslides of small dimensions that occur away from habitations and do not affect either humans or their possessions.
- Category III: Landslides which are fairly large and affect infrastructural installations like strategic and important highways and roads, rail routes and other civil installations like various appurtenant structures of hydroelectric and irrigation projects.
- Category II: The landslides that may occur on the fringes of inhabited areas and result in limited loss of life and property.
- Category I: Landslides of large dimensions that are located over or in close vicinity of inhabited areas like urban settlements or fairly large rural settlements. Activity on these slides can result in loss of human lives, dwellings on large scale.

AVALANCHES

4.6.1 Snow and Avalanche Study Establishment (SASE) of the Defence Research and Development Organisation (DRDO) Chandigarh is responsible for issuing alerts and warnings to all designated authorities and agencies of the Central Government and State Governments/ district Administration for avalanches in the following category:

- Low: Generally favourable condition. Triggering is possible only with high additional loads and on very few extreme slopes. Valley movement is safe. Movement on slopes with care.
- Medium: Partly unfavourable condition. Triggering is possible on most avalanche prone slopes with low additional loads and may reach the valley in medium size. Movement on slopes with extreme care. Valley movements with caution. Avoid steep slopes. Routes should be selected with care.

High: Unfavorable condition. Triggering possible from all avalanche prone slopes even with low additional loads and reach the valley in large size. Suspend all movement. Airborne avalanches likely.

All Round: Very unfavorable condition. Numerous large avalanches are likely from all possible avalanche slopes even on moderately steep terrain. Suspend all movements. Airborne avalanches likely.

EARTHQUAKE

4.7.1 Early warning or prediction of earthquake is not possible. However it is possible to detection and monitor the earthquakes and the after shocks. IMD is the nodal agency of Government of India responsible for monitoring seismic activity in and around the country. IMD is responsible for quickly estimating the earthquake source parameters immediately on occurrence of an earthquake and disseminate the information to all the user agencies including the concerned State and Central Government agencies responsible for carrying out relief and rehabilitation measures. IMD shall also transmit earthquake information to public information channels, press, media etc. and posts in its Website.

4.7.2 IMD is also responsible for monitoring under- sea earthquakes which could generate tsunamis on the Indian coastal regions. IMD shall disseminate to all concerned user agencies including the Indian National Centre for Ocean Information Services (INCOIS), Hyderabad for issue of tsunami Alerts and Warnings.

4.7.3 IMD operates an Earthquake Operational Centre on a 24X7 basis with the operational responsibility of keeping a round-the-clock watch of seismic activity in and around the country. The Centre shall retrieve waveform data from remote field stations either in real time or through VSAT / dial up communication facilities, data analyses and quick dissemination of earthquake information to various user agencies including State and Central Government departments dealing with relief and rehabilitation measures.

4.7.4 The earthquake information is transmitted to public information channels, press, media etc. and posted on IMD's Website. The Duty officer

of IMD is available at 011-24619943 / 24624588 for earthquake related information. The information on recent significant earthquakes can also be obtained from an Interactive Voice Recording System (IVRS) through the following number: 011-24657879

DISSEMINATION OF DISASTER WARNING

National Level

4.8.1 NEOC, MHA shall be responsible for collection, assimilation and dissemination of information in terms of issuing alerts when a disaster is likely to occur or is imminent, or when it has actually taken place.

4.8.2 Once information is received of an imminent disaster or a disaster having occurred, NEOC, MHA will generate alert messages/disaster warnings to the concerned authorities as per this SOP.

4.8.3 Warnings of impending, imminent or actual disaster situations may reach NEOC, MHA from various sources in a number of ways. NEOC, MHA will confirm the exact position in this regard from the nodal officers of official sources/agencies before issuing Alert messages.

4.8.4 Upon receipt of weather warnings or reports of actual disasters, NEOC, MHA will activate “call up actions”. Each disaster situation will have different parameters in terms of severity, early warning and time available for response. Therefore, different stages for different events shall be standardized for issuance of Alert messages.

4.8.5 In the case of a sudden onset of a disaster situation like earthquake, there will be no early warning or watch period; whereas for other disasters such as cyclones, floods etc. there would be an early warning and a watch period.

4.8.6 The dissemination of warning and other messages/information will be made through different mediums of communications. Both the latest technology and conventional methods will be used for dissemination of information upto the user levels.

Electronic Messaging System (EMS)

4.8.7 The NEOC, MHA has developed an SOP for issuing of different categories of alerts to all decision makers at the national level. A copy of the SOP is at Annexure – V.

State Level

4.8.8 SDMAs/States shall periodically review the radio network system particularly of coastal areas for effective dissemination of warnings for cyclone and floods.

4.8.9 SDMAs/States shall review the capacity of the Radio Station Transmitter and take steps in association with the concerned authorities to enhance its capacity to the extent that fishermen in deep sea be able to listen the weather forecasting, whether warnings on precautionary measures.

4.8.10 SDMAs/ States shall also ensure that radio network system in the State has back up of powerful transmitters through generator sets for uninterrupted daily warnings of forecasting.

4.8.11 SDMAs/States shall post a team of police wireless operators, along with the system fully independent and competent to transmit messages, in the regional offices of the IMD from where bulletins on the status of development of cyclonic system are generated. The State Governments shall institutionalize the arrangements in advance and issue necessary orders.

CHAPTER-5

TRIGGER MECHANISM

5.1.1 This Trigger Mechanism prescribes the manner in which the disaster response system shall be automatically activated after receiving early warning signals of a disaster happening or likely to happen or on receipt of information of an incident. Activities envisaged in this SOP under the response Phase shall be initiated simultaneously without loss of time to minimize the loss and damage and mitigate the impact of disaster.

5.1.2 The objective of having a trigger mechanism for natural disasters is to have a suo- motto activation mechanism for spontaneous response to set in motion command, control and management of the situation.

There shall be two types of situation with different trigger mechanisms for natural disasters:

- (i) Situation I – Where Early Warning signals are available
- (ii) Situation II- Where Disaster occurs without early warning

Where Early Warning signals are available

5.2.1 At the National Level Nodal Agencies have been designated for generating/forecasting of events of natural disasters. Onset of disaster shall be indicated through forecasting by the Nodal Agencies in respect of their respective hazards to NEOC, MHA as per laid down protocol.

5.2.2 Based on the forecasts from Nodal Agencies, NEOC, MHA shall be the sole authority responsible to issue Watch, Alerts and Warning to SEOC, DEOC, State & District level designated authorities.

5.2.3 As soon as the Watch/Alerts/warning has been issued by the NEOC to the SEOC, DEOC and other designated authorities, SEOC and DEOC shall be fully activated.

5.2.4 SEOC and DEOC shall activate State/District /Sub-Division/Block level administrative machinery to respond to the situation with available manpower and resources.

5.2.5 First and foremost task shall be informing the community likely to be affected by the disaster through a warning system and undertake evacuation. There shall be only one responsible agency/officer designated and authorized to issue the warning in respect of a disaster at State and District levels to avoid miscommunication and as also indiscriminate warning may result in non-responsiveness of the people.

5.2.6 Dissemination of warning to common people may range from alarms (fires), sirens (industrial disaster), to public announcement system like radio, television, loud speakers, hoisting of flags (cyclones, floods, and landslides).

5.2.7 Once the warning is issued it shall be followed-up by subsequent warnings and De-warning in order to keep the people informed of the latest situation.

5.2.8 While warning is issued warning messages shall be user friendly: The warning protocols shall be designed in simple and local languages easily understandable to a common man.

5.2.9 DDMA shall take pre-emptive measures of evacuation. A comprehensive Standing Order, listing all necessary pre-emptive measures based on the warning, will be prepared at the district and the State level.

5.2.10 Thereafter, follow up action shall be undertaken by all concerned at all levels as envisaged under Response Phase.

5.2.11 Standing Order will be reviewed annually and widely circulated among all concerned. The evacuation drill with community participation at the Sub-Divisional and district levels before onset of the monsoon and cyclone period will be carried out.

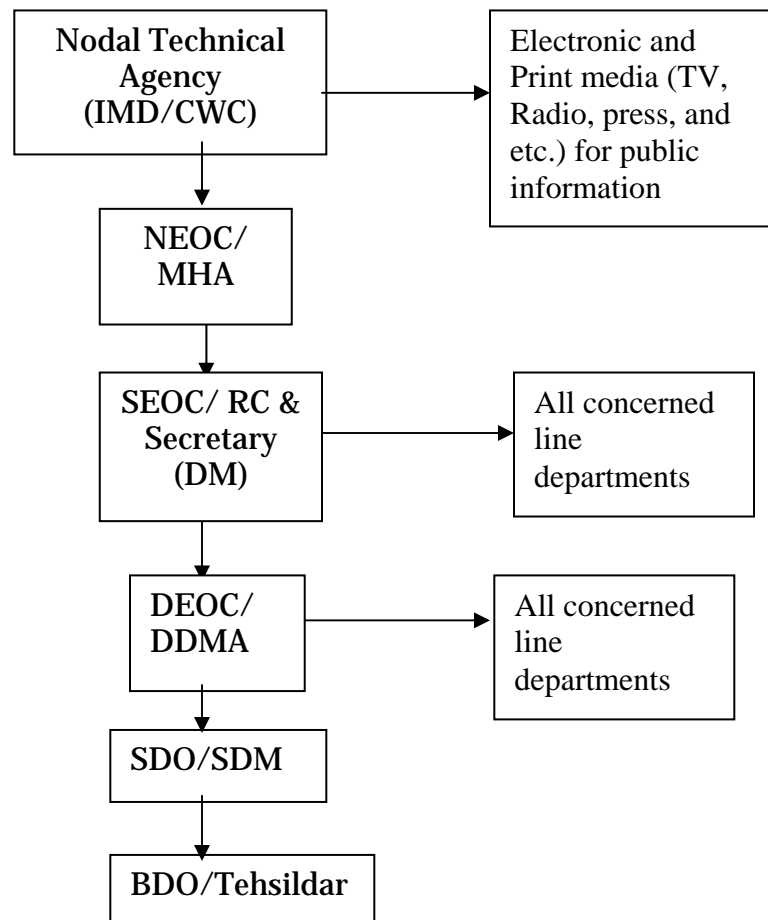
Where Disaster occurs without early warning

5.3.1 In disaster situations where no early warning signals are available, the primary objective of the trigger mechanism shall be to mount immediate rescue and relief operations and set the process in as quickly as possible. The following procedure shall be followed in such situations:

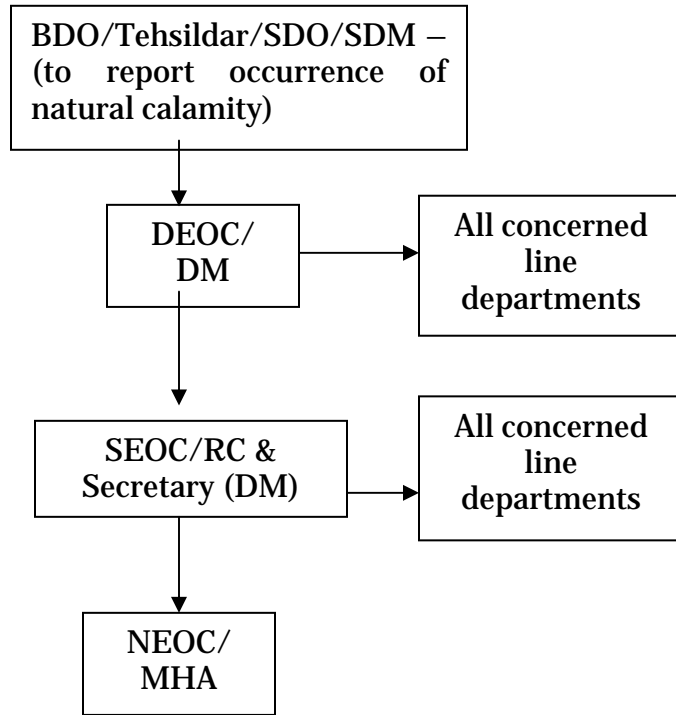
1. The field functionary at ground zero shall inform the DEOC, District Magistrate of the incident.
2. DEOC shall be fully activated for managing the incident.
3. DEOC/District Magistrate shall inform the SEOC/ SDMA, SEC and seeks assistance if required.
4. SEC is activated and NEOC is informed. FIR is submitted to NEOC.

5. Quick Response Teams (QRTs), Search and Rescue Teams, medical and Para-medical teams shall be deployed
6. District Magistrate shall review the situation and activate coordination, command and control
7. Incident Command Teams shall be deployed
8. Meeting of DDMA shall be convened to review situations
9. Team for rapid assessment of damage shall be deployed
10. Line Departments/agencies shall begin work for restoration of power, tele-communication, surface transport etc
11. Arrangements shall be made for supply of food material, drinking water etc
12. Thereafter, follow up action shall be undertaken by all concerned at all levels as envisaged under Response and Relief Phases.

5.4.1 Information flow chart in Case I: where early warning signals are available



5.5.1 Information Flow Chart in Case II: Where Incident happens without any early warning signals



CHAPTER - 6

RESPONSE TO NATURAL DISASTERS

NATIONAL LEVEL

6.1.1 Following shall be the sequence of action at the national level:

NEOC shall discharge the following functions:

1. On receipt of information either from State/District or from Early Warning Agencies or any other reliable sources, National Emergency Operation Centre, MHA shall be activated as per laid down protocol.
2. It shall send alerts/warning to all designated authorities
3. NEOC shall collect all relevant information and apprise the status to the designated authorities
4. It shall activate ESFs if the situation warrants central assistance to States/UTs
5. It shall prepare Daily Situation Report

National Crisis Management Committee (NCMC)

1. On direction of the Cabinet Secretary, meeting of the NCMC shall be convened.
2. NCMC will take stock of the situation.
3. It shall give necessary directions to NEC, MHA, other Central Ministries/ Departments/ Agencies and State Governments.

National Executive Committee (NEC)

1. JS(DM), MHA shall take order from Union Home Secretary for convening the meeting of NEC
2. NEC shall assess the situation and give directions to the concerned Ministries/Departments of the Govt. of India, the State Governments and the State Disaster management Authorities regarding measures to be taken by them in response to any specific threatening disaster situation or disaster.
3. NEC shall coordinate response of various agencies

4. It shall depute a team of Officials to visit the affected States for on the spot assessment of the situation and coordinate with State Governments.
5. It shall mobilize resources and dispatch them to concerned States.
6. It shall monitor and review the situation on a regular basis

Role of the Nodal and Other Central Ministries/ Departments

1. On activation of national ESF Plan, the concerned Ministry/Department shall depute the designated officials to NEOC for coordination of response measures.
2. Ministries/Departments shall coordinate with their counterparts and make assessment of immediate needs in their respective sectors.
3. Ministries/Departments shall provide resources both in terms of men and material for assistance of the States on request of NEC.

STATE LEVEL

6.2.1 Following shall be the sequence of action at the State level:

SEOC shall discharge the following functions:

1. On receipt of information either from NEOC/DEOC or from Early Warning Agencies or any other reliable sources, State Emergency Operation Centre, shall be activated fully as per laid down protocol.
2. SEOC shall issue alerts/warning to all designated authorities at the State level and Districts including for Public Information to AIR/Doordarshan/Press.
3. SEOC shall send First Information Report to NEOC, MHA and thereafter Daily Situation Report till situation normalizes.
4. SEOC shall collect all relevant information and appraise the status to the designated decision making authorities.
5. It shall arrange Meetings of SEC
6. It shall activate ESFs of State if the situation so warrants

State Disaster Management Authority (SDMA)

1. Meeting of the SDMA shall be convened on the direction of Chief Minister
2. SDMA will take stock of the situation.

3. SDMA shall give necessary directions to SEC, Deptt. Of Disaster Management and other Departments/agencies of the State Government and concerned DDMAAs.
4. SDMA shall decide on Inter-State assistance and cooperation.

State Executive Committee (SEC)

1. Secretary (DM) shall convene the meeting of SEC
2. SEC shall assess the situation and give directions to the concerned Departments/agencies of the State Govt. and DDMAAs concerned regarding measures to be taken by them in response to any specific threatening disaster situation or disaster.
3. SEC shall coordinate response of various agencies
4. SEC shall requisition NDRF or Armed Forces if the situation so demands.
5. SEC may depute a team of Officials to visit the affected Districts for on the spot assessment of the situation and supervise the response & relief measures.
6. SEC shall mobilize resources and dispatch them to concerned Districts.
7. SEC shall monitor and review the situation on a regular basis
8. SEC shall keep the NEC and NDMA informed of the situation.
9. SEC shall constantly evaluate their own capabilities to handle that situation and project the anticipated requirements for the central resources well in time.
10. SEC shall deploy State level Incident Command Team on the request of the DDMA as and when required.
11. In the event of calamity of severe nature, the SEC will consider appointment of Senior Officers, delegate powers and assign specific areas for timely and effective, efficient management of disasters.
12. SEC will also take necessary steps to pool the resources for better management of crisis situation. This includes the pooling of food grains funds and other resources available in the districts under various Government schemes. However, these resources will be reimbursed to the respective schemes/Departments once the situation becomes normal.

Role of Other Departments/Agencies

1. On activation of State ESF Plan, the concerned Department/Agency shall depute the designated officials to SEOC for coordination of response measures.

2. Departments/Agencies shall coordinate with their National counterparts and mobilize central assistances, such as specialized manpower, equipments, materials etc. to meet immediate needs in their respective sectors.
3. Departments/Agencies shall provide resources both in terms of men and material for assistance to the DDMA's.

DISTRICT LEVEL

6.3.1 Following shall be the sequence of action at the District level:

DEOC shall discharge the following functions:

1. On receipt of information either from NEOC/SEOC or from Early Warning agencies or field functionaries from Sub-divisions, Blocks, Tehsils or any other reliable sources, District Emergency Operation Centre shall be activated fully as per laid down protocol.
2. DEOC shall issue alerts/warning to all designated authorities at the District level.
3. DEOC shall send First Information Report to SEOC and NEOC, MHA and thereafter Daily Situation Report till situation normalizes.
4. DEOC shall collect all relevant information and appraise the status to the designated decision making authorities.
5. DEOC shall maintain all records and documents related to the response
6. It shall activate ESFs of District if the situation so warrants

District Disaster Management Authority (DDMA)

1. DDMA shall assess the situation and give directions to the concerned Line Departments/Agencies at the District level regarding measures to be taken by them in response to any specific threatening disaster situation or disaster.
2. DDMA shall take such other action as may be necessary for coordinated response to natural disasters. These may include the following:
 - a. Assessing situations based on reports received from various sources and giving directions to different agencies for immediate response, relief and restoration of critical infrastructure
 - b. Reviewing the resources and capacities of different agencies to deal with the situations and giving directions for pooling available manpower, equipments

and resources available with different agencies for speedy and effective response

- c. Requisitioning assistance from NDRF/ Armed Forces/ other specialized agencies, if necessary
- d. Coordinating with civil society and Non-Governmental Organizations for supplementing the efforts of government agencies
- e. Monitoring and reviewing the situations on a regular basis

First Response

6.3.2 In disasters where there are no early warning signals available, the community members will be the first responder. However, immediate support and assistance shall be available from other important first responders like the police, State Disaster Response Force (SDRFs), Fire and Medical Services. Other important responders will be the Civil Defence, Home Guards and youth organizations such as NCC, NSS and NYKS drawn from local units.

First Information Report

6.3.3 DEOC shall send First Information Report immediately to SEOC, NEOC and all designated authorities/agencies. FIR shall invariably give an account of the severity of the disaster, damage & loss caused, locally available capacities, priority. The FIR shall briefly summarize,

- (i) Severity of the disaster
- (ii) Actions being taken locally
- (iii) Local coping capacities (including locally available resources)
- (iv) Immediate priorities for external relief required and approximate quantities for the same
- (v) Best logistic means for delivering relief
- (vi) Forecast of possible future developments including new risks.

6.3.4 The First Information Report on occurrence of natural calamity shall be sent to SEOC, NEOC and MHA, Government of India within maximum 24 hours of occurrence of calamity. A standardized format for the same is at Annexure – IV.

Daily Situation Report

6.3.5 A standardized form for reporting of situation report on daily basis has been prepared for the District, State and National levels. This format will be used uniformly for all the States. The State Governments shall submit

situation report to the MHA on six hourly basis during first three days thereafter daily till the situation come to normal.

Air dropping of food in inaccessible areas

6.3.6 Airdropping of food and essential commodities shall be undertaken in the inaccessible areas. The State Governments/ district authorities will liaise with Air Force Authorities and the NEC, Ministry of Home Affairs, Government of India for requisitioning the helicopters.

6.3.7 The agencies for preparing food packets for airdropping and items as well quantity to be included in the food packets will be communicated by the district administration in advance.

Rapid Damage Assessment

6.3.8 Rescue & relief operations shall be based on ground assessment of damage and losses. Preliminary assessment shall be carried out immediately within 24 hours for planning the response. Teams shall be constituted of officials drawn from various sectors to make assessment on the basis of on the spot visits, aerial surveys and information collected from primary and secondary sources.

A suggestive list of Assessment Tools and Checklists are at Annexure – II.

Immediate repair of infrastructure

6.3.9 The Departments/Agencies of the State Governments responsible for various infrastructural facilities such as electricity, drinking water, telecommunication etc shall repair the damage caused by the disaster and will take immediate steps to restore damaged essential services so that rescue & relief operations are conducted smoothly.

Disposal of dead bodies

6.3.10 The State Government/District authorities shall earmark authorities responsible for disposal of bodies in event of mass casualties. The process of identification and handing over to next of kin shall be followed. Mass burial/disposal of bodies shall be done as a last resort. Local religious & cultural practices shall be honoured while disposing dead bodies

Disposal of carcasses

6.3.11 The State Government/District authorities shall earmark authorities responsible for disposal of carcasses in event of mass destruction. The process to be followed for mass disposal of carcasses shall be decided by Department of Animal Husbandry.

Information and Media Management

6.3.12 During disaster situations, the dissemination of accurate information through electronic and print media is very important. Regular press briefings shall be made by District Magistrate/Collector or his authorized representative at pre-designated time as a single source of information from Government.

CHAPTER – 7

RELIEF

7.1.1 In the aftermath of disasters the affected people must be looked after for their safety, security and the well being and provided food, water, shelter, clothing, medical care etc. so as to ensure that the affected people live with dignity. State Governments shall be responsible for providing prompt and adequate relief assistance to the victims of disasters. The minimum standards of relief shall be laid down by the NDMA and by the SDMA's in terms of sections 12 and 19 respectively.

FOOD & NUTRITION

7.2.1 People affected by disasters may be deprived of food and therefore food aid shall be provided to sustain life. The following measures shall be taken:

1. Where necessary free distributions of food shall be made to those who need the food most.
2. The food distribution will be discontinued as soon as possible.
3. Wherever possible dry rations shall be provided for home cooking.
4. Community Kitchen for mass feeding shall be organised only for an initial short period following a major disaster particularly where affected people do not have the means to cook
5. While providing food assistance, local food practices shall be kept in mind and commodities being provided must be carefully chosen, in consultation with the affected population.
6. Foods must be of good quality, safe to consume, and appropriate and acceptable to recipients.
7. Rations for general food distributions shall be adopted to bridge the gap between the affected population's requirements and their own food resources
8. Food distributed should be of appropriate quality and fit for human consumption
9. Food should be stored, prepared and consumed in a safe and appropriate manner at both household and community levels
10. Food should be distributed in a responsive, transparent, equitable manner
11. NGOs, CBOs and other social organizations should be involved for

- supplementing the efforts of the Government.
12. The nutritional needs of the population should be met and malnutrition and micronutrient deficiencies of identified at risk groups addressed.

WATER

7.3.1 Water supply is invariably affected in natural disasters. Safe drinking water might not be available particularly in hydro-meteorological disasters. The following measures shall be taken by the State Governments/ district administration:

1. The State Governments shall identify alternative sources of water and make necessary arrangements for supply to the affected population.
2. The State Governments shall ensure that affected people have adequate facilities and supplies to collect, store and use sufficient quantities of water for drinking, cooking and personal hygiene.
3. It shall be ensured that drinking water supplied conforms to the prescribed quality standards
4. It shall be ensured that water made available for personal and domestic hygiene should not cause any risk to health.

HEALTH

7.4.1 During post disaster phase many factors increase the risk of diseases and epidemics. These include poverty, insecurity, overcrowding, inadequate quantity and quality of water, poor environmental and sanitary conditions, inadequate shelter and food supply.

Medical Response

7.4.2 Medical response has to be quick and effective. The execution of medical response plans and deployment of medical resources warrant special attention at the State and District level in most of the situations. The following measures shall be taken by the States/Districts:

1. A mechanism for quick identification of factors affecting the health of the affected people shall be established for surveillance and reporting.
2. An assessment of the health and nutritional status of the affected population shall be done by experts with experience of emergencies and, if possible, local knowledge.

3. The voluntary deployment of the nearest medical resources to the disaster site, irrespective of the administrative boundaries, will be warranted.
4. Mobile medical hospitals and other resources available with the Central Government shall be provided to the States/UTs.
5. Adequate supply of medicines, disinfectants etc. shall be made.
6. Where necessary inoculation shall be done.
7. Vaccination of the children & pregnant women shall be undertaken.
8. Vector-borne diseases are a major cause of sickness and death in many disaster situations. Vector control measures shall be undertaken.
9. Water borne diseases may cause sickness and deaths and therefore adequate measures shall be taken to prevent such outbreaks.

MENTAL HEALTH SERVICES

7.5.1 Disasters cause tremendous mental trauma to the survivors. Psycho-social support and mental health services should be made available immediately in the aftermath of disaster so as to reduce the stress and trauma of the affected community and facilitate speedy recovery. The following measures shall be undertaken by States/UTs:

1. A Nodal Mental Health Officer shall be designated for each affected District.
2. Rapid needs assessment of psycho-social support shall be carried out by the Nodal Officer/ Health Department.
3. Trained man power for psycho-social and mental health services shall be mobilized and deputed for psycho-social first aid and transfer of critically ill persons to referral hospitals.
4. Psycho-social first aid shall be given to the affected community/ population by the trained community level workers and relief and rescue workers.
5. Psycho-social first aid givers shall be sensitized to local, cultural, traditional and ethical values and practices.
6. Psycho-social support and mental health Services shall be arranged in relief camps set-up in the post disaster phase.
7. Where large number of disaster victims have to be provided psycho-social support a referral system for long term treatment shall be followed.
8. The services of NGOs and CBOs may be requisitioned for providing psycho-social support and mental health services to the survivors of the disasters.

9. Community practices such as mass prayers, religious discourse etc. should be organized with four preventive and promotive mental health services.

CLOTHINGS & UTENSILS

7.6.1 During disasters, people lose their clothings and utensils. The following measures shall be taken by State/District authorities:

1. The people affected by the disaster shall be provided with sufficient clothings, blankets etc. to ensure their dignity, safety and well-being.
2. Each disaster-affected household shall be provided with cooking and eating utensils

SHELTER

7.7.1 In a major disaster a large number of people are rendered homeless. In such situations shelter becomes a critical factor for survival of the affected people in the initial stages of a disaster. Further, shelter becomes essential for safety and security and for protection from the adverse climatic conditions. Shelter is also important for human dignity and for sustaining family and community life in difficult circumstances. The following measures shall be taken by State/District authorities for providing shelter to the affected people:

1. Disaster affected people who have lost their dwelling units or where such units have been rendered damaged/useless shall be provided sufficient covered space for shelter.
2. Disaster affected households shall be provided access to appropriate means artificial lighting to ensure personal security.
3. Disaster-affected households shall be provided with necessary tools, equipment and materials for repair, reconstruction and maintenance for safe use of their shelter.

RELIEF CAMP

7.8.1 The following steps shall be taken for setting up relief camps in the affected areas:

1. Adequate numbers of buildings or open space shall be identified where relief camps can be set up during emergency.

2. The use of premises of educational institutions for setting up relief camps shall be discouraged.
3. One member of the Incident Command Team of the district trained in running and management of relief camps will be deputed for management of relief camps.
4. The requirements for operation of relief camps shall be worked out in detail in advance.
5. Agencies to supply the necessary stores will be identified in the pre-disaster phase.
6. The temporary relief camps will have adequate provision of drinking water and bathing, sanitation and essential health-care facilities.
7. Adequate security arrangements shall be made by local police
8. Adequate lighting arrangements shall be made in the Camp Area including at water points, toilets and other common areas.
9. Wherever feasible, special task forces from amongst the disaster affected families will be set up to explore the possibility of provision of food through community kitchens, provision of education through the restoration of schools and anganwadis.
10. Efficient governance systems like entitlement cards, identification cards, bank accounts for cash transfers etc shall be developed.

Sanitation and Hygiene

7.8.2 Sanitation services are crucial to prevent an outbreak of epidemics in post disaster phase. Therefore a constant monitoring of any such possibilities will be necessary. It should be ensured that disaster-affected households have access to sufficient hygiene measures. Soap, detergents, sanitary napkins and other sanitary items should be made available to ensure personal hygiene, health, dignity and well-being. In the relief camps, toilets should be sited, designed, constructed and maintained in such a way as to be comfortable, hygienic and safe to use

Provision of Intermediate Shelters

7.8.3 In the case of devastating disasters, where extreme weather conditions can be life-threatening or when the period of stay in temporary shelters is likely to be long and uncertain, the construction of intermediate shelters with suitable sanitary facilities will be undertaken to ensure a reasonable quality of life to the affected people. Such shelters shall be designed to be cost effective and as per local needs.

Management of Relief Supplies

7.8.4 Speedy supplies of relief materials shall be ensured in relief operations. A supply chain management system shall be developed. Standard Protocols shall be put in place for ensuring the procurement, packaging, transportation, storage and distribution of relief items. A mechanism shall be developed for receiving donations in cash or kind and their distribution.

TRANSPARENCY IN RELIEF

7.9.1 SDMAs/DDMAs shall take all appropriate measures for transparency in the relief operations. Affected people shall be apprised of the nature and quantum of relief admissible to them. Proper formats will be developed to acknowledge the receipt of relief materials and their further distribution.

ANNEXURE-I

LIST OF REGIONAL RESPONSE CENTRES

Sl. No.	Present Locations	Name of States	Name of CPMF
1.	Itanagar	Arunachal Pradesh	ITBP
2.	Gaucher	Uttaranchal	ITBP
3.	Matli	Uttaranchal	ITBP
4.	Kullu	Himachal Pradesh	ITBP
5.	Sarhan	Himachal Pradesh	ITBP
6.	Pithoragarh	Uttaranchal	ITBP
7.	Rekong Peo	Himachal Pradesh	ITBP
8.	Gangtok	Sikkim	ITBP
9.	Kolkata	West Bengal	BSF
10.	Visakhapatnam	Andhra Pradesh	CISF
11.	Hyderabad	Andhra Pradesh	CRPF
12.	Allahabad	Uttar Pradesh	CRPF
13.	Guwahati	Assam	BSF
14.	Mundali	Orissa	CISF
15.	Mokama	Bihar	CRPF

Indian National Centre for Ocean Information Services

Hyderabad

Tsunami Early Warning System

Decision Support System and Standard Operating Procedure

Decision Support system is the set of rules to be followed for issue of tsunami bulletins. These rules are appropriately coded in the form of software that automatically generates bulletins by accessing the real-time data from the observing network as well as the model scenario database.

The standard operating procedure (SOP) is the set of routine activities to be followed by the staff at the tsunami warning centre for observation, evaluation, confirmation, and dissemination of bulletins.

The Early Warning Centre continuously monitors the seismic activity in the two tsunamigenic source regions of the Indian Ocean through the network of national and international seismic stations. This network enables us to detect any tsunamigenic earthquakes within a time period of 10 minutes of occurrence.

Water-level data is also monitored continuously from the network of national and international tide gauges and DOARS. This network enables confirmation or cancellation of a tsunami. All the datasets are continuously monitored in the Early Warning Centre using a custom-built software application that generates alarms/alerts in the warning centre whenever a pre-set threshold is crossed.

Tsunami bulletins are then generated based on pre-set decision support rules and disseminated to the concerned authorities for action, following the SOP.

The flow chart of the SOP is given in figure below:

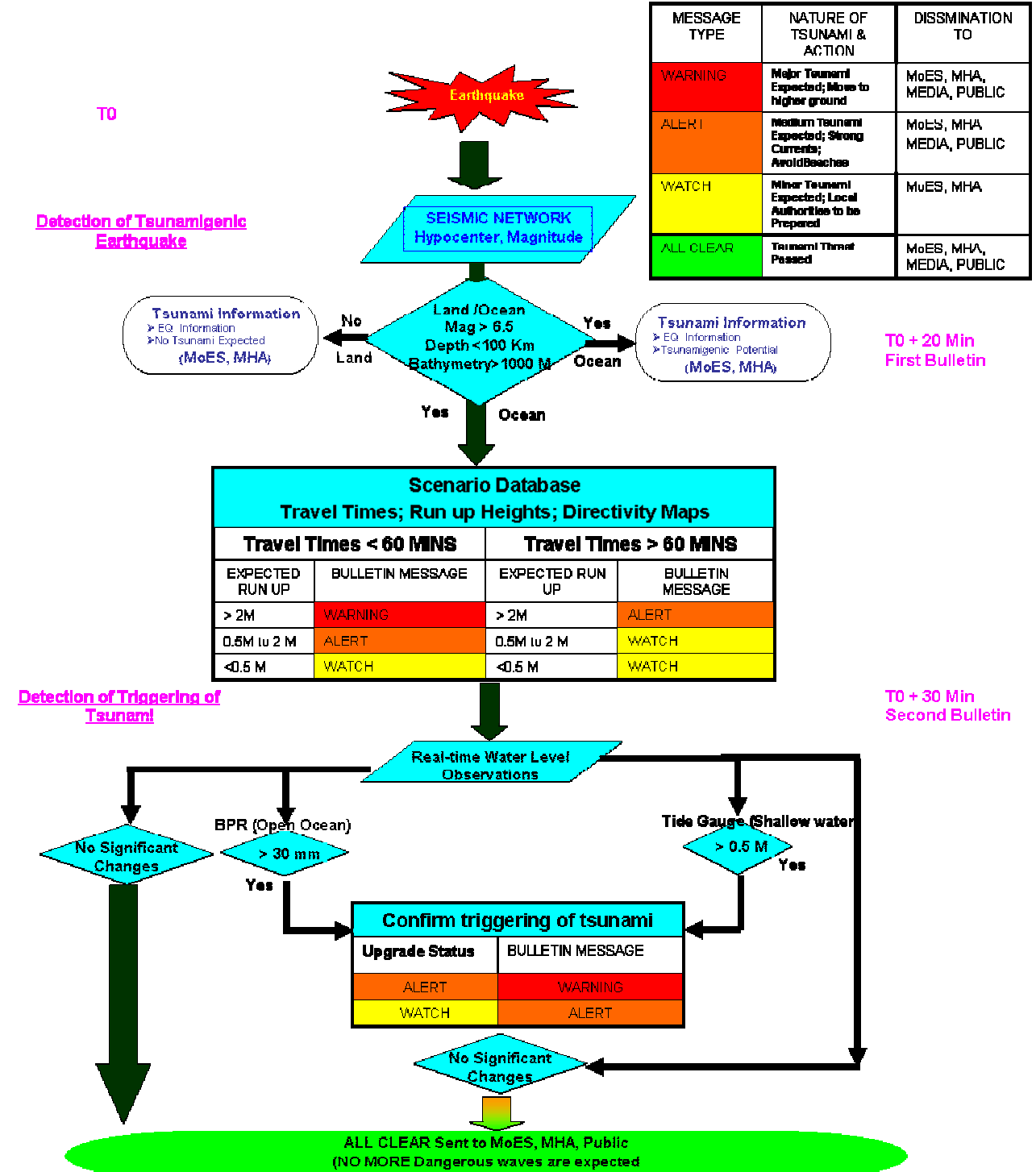


Figure 29: Flow chart of Decision Support System and Standard Operating Procedure

The criteria given below is followed for generation of different types of advisory bulletin messages (Warning/Alert/Watch) for a particular region of the coast based on the earthquake parameters, available warning time (i.e. time taken by the tsunami wave to reach the particular coast) and expected run-up from pre-run model scenarios.

- **Warning/Alert/Watch** : Based on earthquake parameters, region's proximity to the earthquake zone (Travel Times) and expected run-up from pre-run model scenarios
- **Warnings to Far Source Regions:** Issued only after confirmation of tsunami triggering based on real-time water-level observations and correction of scenarios. This will reduce possibility of false warnings

The warning criteria are based on the premise that coastal areas falling within 60 minutes travel time from a tsunamigenic earthquake source need to be warned based solely on earthquake information, since enough time is not available for confirmation of water levels from BPRs and Tide Gauges. Those coastal areas falling outside the 60 minutes travel time from a tsunamigenic earthquake source are put under a watch status and upgraded to a warning only upon confirmation of water-level data, eg. If a tsunamigenic earthquake happens in the coast of the Northern Indonesia, parts of the Andaman & Nicobar Islands falling within 60 minutes travel time of a tsunami wave are put under 'Warning' status. Other areas are put under 'Watch' Status and upgraded to a 'Warning' only if the BPRs or tide gauges reveal significant change in water level. This implies that the possibility of false alarms is higher for areas close to the earthquake source; however for other regions since the warnings are issued only after confirmation of water-level data, the issue of false alarms doesn't arise. To reduce the rate of false alarms even in the near source regions, alerts are generated by analyzing the pre-run model scenarios, so that warnings are issued only to those coastal locations that are at risk.

Category of tsunami advisory bulletins, time-line for generation, content of the alert and dissemination contact information is detailed below:

Types of TWC Tsunami Bulletin Messages:

Earthquake Information Bulletin (T+20 Min) contains information about origin time, latitude and longitude of the epicenter, name of geographical area, magnitude and depth of an earthquake. This message also contains preliminary evaluation of tsunami potential based on the magnitude. (e.g. earthquake occurring on land or earthquake with $< M6.5$ or earthquake occurring > 100 Km depth or earthquake occurring in very shallow water column, etc. No tsunami is expected; for larger magnitude earthquakes in the ocean, a qualitative statement on the tsunamigenic potential may be given). No immediate action is required. Bulletins provided to Ministry of Home Affairs (MHA).

Tsunami Warning (T+30 Min) (RED) contains information about the earthquake and a tsunami evaluation message indicating that tsunami is expected. (eg. For earthquakes with $> M6.5$ occurring in the Ocean within a depth of < 100 Km, a tsunami warning will be issued for those areas falling within 60 minutes travel time from the earthquake source and if expected run up is > 2 m). This is the highest level wherein immediate actions are required to move public to higher grounds. Message also contains information on the travel times and tsunami grade (based on run-up estimates) at various coastal locations from pre-run model outputs. Information provided to Ministry of Home Affairs (MHA) and public.

Tsunami Alert (T+30 Min) (ORANGE) contains information about the earthquake and a tsunami evaluation message indicating that tsunami is expected. (eg. For earthquakes with $> M6.5$ occurring in the Ocean within a depth of < 100 Km, a tsunami alert will be issued for those areas falling within 60 minutes travel time from the earthquake source and if expected run up is between 0.5 to 2 m as well as for those areas falling above 60 minutes travel time from the earthquake source and if expected run up is > 2 m). This is the second highest level wherein immediate public evacuation is not required. Public should avoid beaches since strong current are expected. Local officials should be prepared for evacuation if it is upgraded to warning status. Message also contains information on the travel times and tsunami grade (based on run-up estimates) at various coastal locations from Pre-run model outputs. Information provided to Ministry of Home Affairs (MHA) and public.

Tsunami Watch (T+30 Min) (YELLOW) contains information about the earthquake and a tsunami evaluation message indicating that tsunami is

expected. (eg. For earthquakes with $> M6.5$ occurring in the Ocean within a depth of < 100 Km, a tsunami watch will be issued for those areas falling within 60 minutes travel time from the earthquake source and if expected run up is < 0.5 m and for those areas falling above 60 minutes travel time from the earthquake source and if expected run up is 0.5 to 2 m). This is the third highest level wherein immediate public evacuation is not required, Local officials should be prepared for evacuation if it is upgraded to warning status. Message also contains information on the travel times and tsunami grade (based on run-up estimates) at various coastal locations from Pre-run model outputs. Information provided to Ministry of Home Affairs (MHA).

Tsunami Information Bulletins contains information on tsunami confirmation (wherever a tsunami warning already exists) or Upgradation (Watch to Alert to Warning or bringing new areas under Watch) or Cancellation (withdraw Watch or Alert or Warning) or observed water level heights or new estimates of travel time and tsunami grade (generated by inverting observed water-level data) and any other additional information that becomes available during the course of the event.

Tsunami cancellation (GREEN) will be issued if the tsunami warning was issued on the basis of erroneous data or if the warning center determines from subsequent information that only an insignificant wave has been generated. In addition, tsunami warning may be canceled on a selective basis when a significant wave that has been generated clearly poses no threat to one or more of the areas the warning center warns, either because of intervening continents or islands which screen them or because the orientation of the generating area causes the tsunami to be directed away from these areas. To maintain credibility the warning center will use the terminology “non-destructive tsunami” in the cancellation message whenever applicable.

Tsunami All Clear (GREEN) bulletin indicates that the ‘Tsunami Threat’ is passed and no more dangerous waves are expected.

Standard Operating Procedure

An explanation of the Standard Operating Procedure (SOP) followed at the Tsunami Warning Centre is listed below:

Evaluation of Tsunami based on Earthquake Parameters

Time Line: T0 to T0 + 30 min

Occurrence of a tsunamigenic earthquake (T0)

- Detection of seismic wave
- Determination of hypocenter and magnitude (T0 + 15 Min)

Qualitative Evaluation of Tsunami

- Estimation of tsunamigenic potential based on hypocenter, magnitude and water depth at epicenter
- Dissemination of tsunami information bulletins (T0 + 20 Min)

Quantitative Evaluation of Tsunami

- Identification of coastal areas to be warned based on travel times and estimated water levels
- Dissemination of tsunami information bulletins (T0 + 30 Min)

Detection of Earthquake (Determination of Hypocenter and Magnitude)

The seismic network established by IMD as part of Tsunami Warning System enables rapid detection of earthquakes occurring in both the known tsunamigenic zones of the Indian Ocean, viz., the Andaman-Sumatra-Java subduction zone and the Makran subduction zone. A reasonable estimate of hypocenter and magnitude is available within 15 minutes (maximum T0 + 15 Min) from the occurrence of the earthquake (T0).

Qualitative Evaluation of Tsunami

After detecting an earthquake of $M \geq 6.5$, in any of the two tsunamigenic zones, Tsunami Warning Center sends a message (Earthquake Information Bulletin) of such an occurrence to Ministry of Home Affairs (MHA) and Secretary, Ministry of Earth Sciences (MoES). In case this earthquake is located in Sumatra-Andaman Tsunamigenic zone, the Andaman & Nicobar administration is also informed (T0 + 20 Min). The following rules are used for evaluating the tsunamigenic potential of an earthquake.

- Earthquakes of all magnitudes occurring on land will not have potential to trigger a tsunami.
- Earthquakes of all magnitudes occurring at depth greater than 100 km will not have potential to trigger Tsunami.
- The earthquakes in ocean, which have shallow focus, less than 100 km within the magnitude range $6.5 \leq M \leq 7.0$, have potential to trigger a small local tsunami (within 100 to 300 km from epicenter).
- The earthquakes in ocean, which have shallow focus, less than 100 km within the magnitude range $7.0 \leq M \leq 7.5$, have potential to

- trigger a destructive local tsunami (within 100 to 300 km from epicenter).
- The earthquakes in ocean, which have shallow focus, less than 100 km within the magnitude range $7.5 \leq M \leq 7.8$, have potential to trigger a destructive regional tsunami (with in 1000 to 1500 km from epicenter).
 - The earthquakes in ocean, which have shallow focus, less than 100 km and magnitude greater than M7.8, have potential to trigger an ocean-wide destructive tsunami (above 1000 km from epicenter).

The Tsunami Information bulletin with qualitative evaluation of tsunamigenic potential as above, will be disseminated to the Ministry of Earth Sciences (MoES), Ministry of Home Affairs (MHA) with the time line $T_0 + 20$ minutes.

Quantitative Evaluation of Tsunami

The tsunami affect is evaluated quantitatively using the numerical model outputs. The closest scenario is selected for quantitative tsunami forecast from scenario database using above earthquake parameters. The coastal regions to be warned are identified based on tsunami wave travel time and expected water level height (Figure 30) as follows:

- Coastal regions falling within 1hr travel time, with expected water level > 2 m are placed under 'Warning' status, with expected water level in between 0.5 m to 2 m are placed under 'Alert' status and those regions with expected water level less than 0.5 m are placed under 'Watch' status.
- Coastal regions falling above 1hr travel times, with expected water level > 2 m are placed under 'Alert' status, with expected water level in between 0.5 to 2 m are placed under 'Watch' status.

The Tsunami 'Warning', 'Alert' and 'Watch' bulletins with quantitative evaluation are sent to the Ministry of Earth Sciences (MoES), Ministry of Home Affairs (MHA) with the time line $T_0 + 30$ minutes.

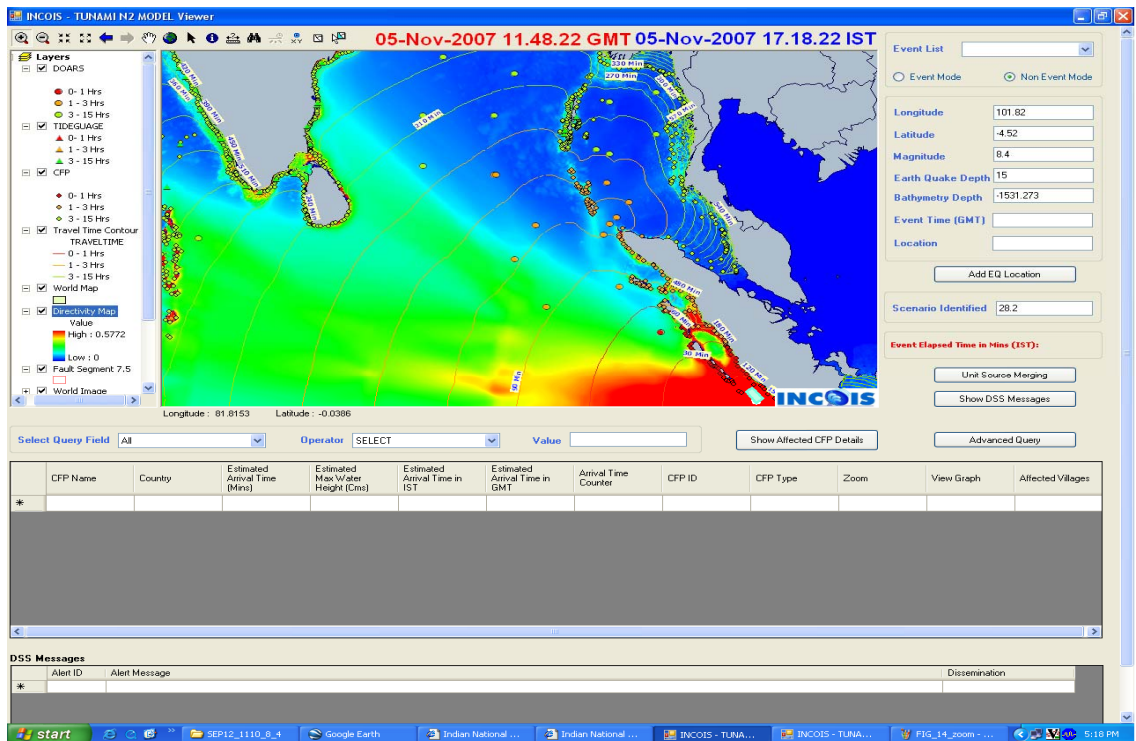


Figure 30: Criteria for Generation/Dissemination of Quantitative Tsunami Information (Warning / Alert / Watch) bulletins

II Detection and Re-Evaluation of Tsunami based on observed water levels **Timeline: T0 + 30 Minutes PLUS**

- **Detection of triggering of tsunami based on open ocean / shallow water level observations**
 - Identification of tsunami arrival at BPRs / at tide station locations
 - Correction of the estimated water levels of closest scenario
 - Estimation of possible inundation levels at vulnerable coastal regions
 - Monitoring and grading of tsunami wave propagation and tsunami activity at various coastal regions using BPRs as well as tide data and coastal Radars observations
 - Dissemination of Tsunami Information Bulletin – Up gradation/Cancellation/ALL CLEAR along with water level observations and modeling results

Detection and Re-evaluation of Tsunami

Detection of Tsunami through Bottom Pressure Recorder (BPR) gauge

Each Bottom Pressure Recorder (BPR) is designed to detect and report tsunamis on its own, without instructions from land. The tsunami detection algorithm in the DOARS software works by first estimating the amplitudes of the pressure fluctuations within the tsunami frequency band and then testing these amplitudes against a threshold value. The amplitudes are computed by subtracting predicted pressures from the observations, in which the predictions closely match the tides and lower frequency fluctuations. The predictions are updated every 15 seconds, which is the sampling interval of the BPRs.

Background oceanic noise determines the minimum detection threshold. based on past observations, a reasonable threshold for the deep ocean is 3 cm (or 30 mm). If the amplitudes exceed the threshold, the BPRs goes in to a rapid reporting mode to provide detailed information about the tsunami. It remains in this mode for at least three hours.

The BPR's near to the earthquake source will also detect/pick up the signals due to the passage of seismic wave in addition to the tsunami wave. To distinguish between the signals due to seismic wave and tsunami wave detected by BPR's the tsunami wave arrival time can be checked by overlying the numerical modeling result over the observed data.

Detection and Monitoring progress of Tsunami through Tide gauge

For each tide station at coastal region the predicted tide value is calculated by the computation of harmonic constituents and is used to compute the residual from the tide observations. The residual is very useful to detect the amplitudes of tsunami waves ranging from 0.5 to 2 m and above. To identify tsunami arrival in real time tide water level data observations, the numerical modeling results are overlaid on the tide residuals to check the tsunami wave arrival at that tide gauge location.

Dissemination of Confirmed Tsunami Information Bulletin

The triggering of tsunami is confirmed with real time observations if they are showing more than the threshold values. The ‘Confirmed’ Tsunami Information Bulletin is generated with observed water levels. The identified coastal areas, which are under ‘Watch’ status, will be upgraded to either ‘Warning’ or ‘Alert’ status. If the observations are not showing more than the threshold values then ‘Tsunami Cancellation Bulletin’ will be sent to MoES, MHA and authorized people with the water level observations.

‘Confirmed Tsunami Information Bulletin’ will be sent to MoES, MHA and local Authorities after $T_0 + 30$ minutes, as and when the real-time water-level observations are available (not later than $T_0 + 60$ minutes).

Re-Evaluation of Tsunami

The numerical modeling results are corrected / adjusted “on-the-fly” by a real-time water level observation data. The model requirement in this case is the solution must provide the best fit to the observations.

Real time water level data assimilation and inversion is done to get the best fit model scenario automatically, where initial conditions are determined from an approximated solution in terms of source magnitude and location. An effective implementation of the inversion is achieved by using a discrete set of Green’s functions – Unit sources to form a model source. The algorithm chooses the best fit to a given DOARS data among a limited number of unit solution combinations by direct sorting, using a choice of misfit functions.

Then the closest scenario is selected or selected scenario will be corrected for quantitative tsunami forecast from scenario database using above earthquake parameters. If real time water level observations show the significant water level changes above the thresholds, accordingly the coastal regions that fall above 1hr travel times, which are under ‘Alert’ status will be upgraded to ‘Warning’ and those under ‘Watch’ status will be upgraded to ‘Alert’ status.

Parallely, the real time numerical simulation will be initialized using the updated fault parameters to get the inundation levels at vulnerable coastal regions.

As per SOP, warning center sends the Tsunami Warning Bulletin to MOES, MHA and Public; The Tsunami Alert Bulletin to MOES, MHA and Public; Tsunami Watch Bulletin to MOES and MHA. If real time doesn't show any significant water level changes all previously issued bulletins are canceled by issuing 'Cancellation' Bulletin.

In cases where a tsunami Warning/Alert/Watch is issued, the Warning Center continues to monitor the tsunami activity through tide gauge water level observations and other complementary observations. If observations indicate that the tsunami activity has decreased and no more damaging tsunami waves are expected, then Warning Center updates the status and Issues the Tsunami 'ALL CLEAR' bulletin to respective coastal regions.

ANNEXURE-III

RAPID ASSESSMENT

Disaster brings in its wake damages to life, property, infrastructure, economy and environment. For adequate and effective response to disasters it is of paramount importance to assess the extent of physical harm to assets, property and infrastructure which render them less valuable or less effective.

The objective of Rapid Assessment is to determine the precise nature and extent of damage so that Rescue and Relief measures are undertaken in the affected people. The following are the major components to be included in the rapid damage assessment:

- (i) Geographical area impacted
- (ii) Structural damage to buildings, Housing stocks,
- (iii) Damage to roads & bridges, public buildings shops, workshops, stalls etc.
- (v) Damage to water supply lines, electricity supply lines, public utilities
- (vi) Damage to agricultural crops, livestock, etc.

Tools for Rapid Assessment

Aerial surveys

Photographs, video graph/film of the affected area

Satellite imagery

Field reports

TV/Press coverage

Visual Inspection Checklist

- Camera
- Laptop
- Notebook
- GIS Map
- GPS

ANNEXURE-IV

Emergency Support Functions (ESFs) Plan at National Level

In the aftermath of a major natural disaster wherein Central Government's assistance is to be provided to States/UTs the command, control and coordination will be carried out under the ESFs Plan.

NEOC shall activate the ESFs and the concerned Ministry/Department/Agency of each ESFs shall identify requirements in consultation with their counterparts in affected States, mobilize and deploy resources to the affected areas to assist the States/UTs in its response action.

ESFs shall be responsible for the following:

1. They will coordinate directly with their functional counterpart in States to provide the central government assistance required. Request for assistance will be channeled from the district level through the designated State departments/agencies. Based on the identified requirements by the States, appropriate central assistance shall be provided by an ESF Department/Agency to the state or at the state's request, directly to an affected area.
2. The designated authorities for each of the ESF shall constitute quick response teams and assign the specific task to each of the member.
3. The designated authorities for each of the ESF shall identify and earmark the resources i.e. manpower and materials to be mobilized during the crisis.
4. An inventory of all the resources with details shall be maintained by each of the designated authority for each of the ESF.
5. The designated authority for each of the ESF will also enter into pre-contracts for supply of resources, both goods and services to meet the emergency requirements.

6. The designated authority for each of the ESF will be delegated with adequate administrative, legal and financial powers for undertaking the tasks assigned to them.

Primary and Secondary Agencies

The designated primary agency, acting as the Central agency shall be assisted by one or more support agencies (secondary agencies) and shall be responsible for managing the activities of the ESF and assisting the State in the rescue and relief activities and ensuring that the mission is accomplished. The primary and secondary agencies have the authority to execute response operations to directly support the needs of the affected States.

Primary Agency for Each ESF

ESF No.	ESF	Primary Agency	Responsibilities of Primary Agency	Activities for Response
1.	Communication	Ministry of Communication	<ul style="list-style-type: none"> ○ Coordination of national actions to assure the provision of telecommunication support the centre, state and district ○ Coordinate the requirement of temporary telecommunication in the affected areas ○ Provide human services under the Ministry of Communication 	<ul style="list-style-type: none"> ○ Responsible for coordination of national actions to assure the provision of telecommunication support the centre, state and district response elements ○ Coordinate the requirement of temporary telecommunication in the affected areas
2.	Public Health and Sanitation	Ministry of Health and Family Welfare	<ul style="list-style-type: none"> ○ To coordinate, direct and integrate national level response ○ Direct activation of medical personnel, supplies and equipment ○ Coordinate the evacuation of patients ○ Provide human services under the Dept of health. ○ To prepare and keep ready 	<ul style="list-style-type: none"> ○ Provide systematic approach to patient care ○ Perform medical evaluation and treatment as needed ○ Maintain patient tracking system to keep record of all patients treated

			<p>Mobile Hospitals and stock</p> <ul style="list-style-type: none"> ○ Check stocks of equipment and drugs 	
3.	Power	Ministry of Power	<ul style="list-style-type: none"> ○ Provide and coordinate national support until the local authorities are prepared to handle all power related problems ○ Identify requirements of external equipment required ○ Assess damage for national assistance 	<ul style="list-style-type: none"> ○ Support to Local Administration ○ Review the total extent of damage to the power supply installations by a reconnaissance survey ○ Dispatch emergency repair teams equipped with tools, tents and food <p>Hire casual labour for the clearing of damaged poles etc.</p>
4.	Transport	Ministry of Transport	<ul style="list-style-type: none"> ○ Overall coordination of the Centre and the civil transportation capacity in support of central state and local government entities ○ Restoration of roads <p>Coordinate and implement emergency related response and recovery functions, search and rescue and damage assessment.</p>	<ul style="list-style-type: none"> ○ Reserve stocks for fuel should be checked ○ Polythene for the protection of freight and equipment
5.	Search and Rescue	Ministry of Defence/Ministry of Home Affairs	<ul style="list-style-type: none"> ○ Establish, maintain and manage national search and rescue response system. ○ Coordinate search and rescue logistics during field operations ○ Provide status reports of SAR updates throughout the affected areas. 	<ul style="list-style-type: none"> ○ GIS is used to make an estimate of the damage area and the deployment of the SAR team in the area according to the priority <p>Discharge all ambulatory patients for the first aid which has the least danger to health and the others transported to safer areas</p>

6.	Public Works and Engineering	Ministry of Urban Affairs and Poverty Alleviation	<ul style="list-style-type: none"> ○ Pre positioning assessment teams headed ○ Emergency clearing of debris to enable reconnaissance ○ Coordinate road clearing activities to assist local relief work ○ Begin clearing roads. Assemble casual labour ○ Provide a work team carrying emergency tool kits, depending on the nature of disaster, essential equipment such as ○ Towing vehicles ○ Earth moving equipments ○ Cranes ○ Construct temporary roads ○ Keep national and other main highways clear from disaster effects such as debris etc. 	<ul style="list-style-type: none"> ○ Establish a priority list of roads which will be opened first ○ Identify locations for transit /relief camps ○ Adequate road signs should be installed to guide and assist the relief work
7.	Information and Planning	Ministry of Information and Technology	<ul style="list-style-type: none"> ○ To collect, process and disseminate information about an actual or potential disaster situation to facilitate the overall activities of all responders in providing assistance to an affected area. ○ Apply GIS to speed other facilities of relief and search and rescue ○ Enable local authorities to establish contact with the state authorities ○ Coordinate planning procedures between district, the state and the centre ○ Documentation of all procedures at national level ○ Provide ready formats for all reporting procedures as a standby 	<ul style="list-style-type: none"> ○ Documentation of response/relief and recovery measures ○ Situation reports to be prepared and completed every 3-4 hours

8.	Relief Supplies	Ministry of Planning and Programme Implementation	<ul style="list-style-type: none"> ○ Coordinate activities involved with the emergency provisions ○ Temporary shelters, ○ Emergency mass feeding ○ Bulk distribution ○ To provide logistical and resource support to local entities ○ Operate a Disaster Welfare Information (DWI) System to collect, receive, and report the status of victims and assist family reunification; and coordinate bulk distribution of emergency relief supplies. ○ In some instances, services also may be provided to disaster workers 	<ul style="list-style-type: none"> ○ Support to Local Administration ○ Allocate and specify type of requirements depending on need ○ Organize donation(material) for easy distribution before entering disaster site
9.	Food	Department of Food and Public Distribution	<ul style="list-style-type: none"> ○ requirement of food for affected population ○ Control the quality and quantity of food ○ ensure the timely distribution of food to the people ○ Ensure that all food that is distributed is fit for human consumption 	<ul style="list-style-type: none"> ○ Make emergency food supplies available to population
10.	Drinking Water	Department of Drinking Water	<ul style="list-style-type: none"> ○ Procurement of clean drinking water ○ Transportation of water with minimum wastage ○ Special care for women with infants and pregnant women ○ Ensure that sewer pipes and drainage are kept separate from drinking water facilities 	<ul style="list-style-type: none"> ○ Support to Local Administration ○ Water purification installation with halogen tablets etc ○ Hygiene promotion with the availability of mobile toilets

11.	Shelter	Ministry of Urban Affairs and Poverty Alleviation	<ul style="list-style-type: none"> ○ Provide adequate and appropriate shelter to all population ○ Quick assessment and identifying the area for the establishment of the relief camps ○ Identifying the population which can be provided with support in their own place and need not be shifted reallocated ○ Locate relief camps close to open traffic and transport links 	<ul style="list-style-type: none"> ○ Support to Local Administration ○ Locate adequate relief camps based on survey of damage ○ Develop alternative arrangements for population living in structures that might be affected even after the disaster
12.	Media	Ministry of Information and Broadcasting	<ul style="list-style-type: none"> ○ To provide and collect reliable information on the status of the disaster and disaster victims for effective coordination of relief work at state level ○ Not to intrude on the privacy of individuals and families while collecting information ○ Coordinate with EOC's at the airport and railways for required information for international and national relief workers ○ Acquire accurate scientific information from the ministry of Science and Technology ○ Coordinate with all TV and radio networks to send news flashes for specific needs of Donation ○ Respect the socio-cultural and emotional state of the disaster victims while collecting information for dissemination 	<ul style="list-style-type: none"> ○ Use and place graphical information to guide people towards relief operation ○ Use appropriate means of disseminating information to victims of affected area ○ Curb the spread of rumours ○ Disseminate deactivation message to all field workers

13.	Helplines	Ministry of Home Affairs	<ul style="list-style-type: none"> ○ Co-ordinate, collect, process, report and display essential elements of information and to facilitate support for planning efforts in response operations ○ Co-ordinate pre-planned and event-specific aerial reconnaissance operations to assess the overall disaster situation ○ Pre positioning assessment teams headed by the State coordinating officer and deployment of other advance elements ○ Emergency clearing of debris to enable reconnaissance of the damaged areas and passage of emergency personnel and equipment for life saving ,property protection and health and safety 	<ul style="list-style-type: none"> ○ One of the most critical needs will be having a simplified way of identifying and tracking victims and providing assistance ○ Identify locations for setting up transit and relief camps, feeding centres and setting up of the Helplines at the nodal points in the state and providing the people the information about the numbers
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ANNEXURE- V

Format for First Information Report on occurrence of natural calamity

(To be sent to MHA, Government of India within maximum of 24 hours of occurrence of calamity)

From: State -----

Date of Report -----

To

JS (DM), MHA (fax : _____ ; email : _____)

I/c National Integrated Operations Centre, MHA (fax: _____ ; email: _____)

- a. Nature of Calamity
- b. Date and time of occurrence
- c. Affected area (number and names of affected districts)
- d. Population affected (approx.)
- e. Number of Persons
 - Dead
 - Missing
 - Injured
- f. Animals
- g. Affected
- h. Lost
- i. Crops affected and area (approx.)
- j. Number of houses damaged
- k. Damage to public property
- l. Relief measures undertaken in brief
- m. Immediate response & relief assistance required and the best logistical means of delivering that relief from State/National
- n. Forecast of possible future developments including new risks.
- o. Any other relevant information

ANNEXURE-VI

**GOVERNMENT OF INDIA
MINISTRY OF HOME AFFAIRS**

STANDARD OPERATING PROCEDURE (SOP)

FOR

**ISSUING ALERTS AND ELECTRONIC MESSAGING IN THE
EVENT OF DISASTER SITUATIONS**

ABBREVIATIONS

DOD	Department of Ocean Development
EMS	Electronic Messaging System
ESF	Emergency Support Function
GSI	Geological Survey of India
HM	Home Minister
HS	Home Secretary
IMD	India Meteorological Department
IOC	Integrated Operation Centre
INCOIS	Indian National Centre for Oceanic Information Services
ITWC	Interim Tsunami Warning Centre
IS	Internal Security
MHA	Ministry of Home Affairs
MOS	Minister of State
NDMA	National Disaster Management Authority
NIOT	National Institute of Ocean Technology
PMO	Prime Minister Office
SOP	Standard Operating Procedure

STANDARD OPERATING PROCEDURE FOR ISSUING ALERTS AND ELECTRONIC MESSAGING IN THE EVENT OF DISASTER SITUATIONS

INTRODUCTION

1. The Ministry of Home Affairs (MHA) is the nodal Ministry for disaster response management in case of natural and man-made disasters. MHA, as the nodal Ministry is responsible for coordinating response and relief efforts with various Ministries/Departments of the Government of India, State Governments and District Authorities.
2. Integrated Operation Centre (IOC) has been set up in the Ministry of Home Affairs to handle disaster situations on a 24x7 basis. IOC is responsible for initiating incident alert messages using telephone, SMS, e-fax and e-mail messaging services to apprise senior level officers in the Government when a disaster is likely to occur or is imminent or when it has actually taken place.
3. This SOP puts in place standardized categories of alerts for events of different types and identifies the situations when alerts are to be sent by the IOC. The SOP would be reviewed periodically i.e. once in six months, keeping in view the additional requirements and the experience gained. The SOP has been formulated with a view to ensure that alerts are sent to the PMO/Cabinet Secretariat only in case of those events which have a higher significance and **not** for events having a low significance. Mock exercise messages and information which is of a sensitive nature from the security angle, will also **not** be sent to the PMO/Cabinet Secretariat through electronic messaging system.

OBJECTIVES

4. This SOP lays down guidelines, in a comprehensive manner, to provide a standard method for receiving reports/information about disaster situations from the concerned Ministries/ Departments/Agencies

and State Governments and thereafter issuing Alert messages to all concerned.

5. The SOP also standardizes the information requirements for various event categories. The SOP would also cover sending of information updates for unfolding events.

6. The SOP establishes Protocols to be put in place for alerting the PMO and the Cabinet Secretariat. It also lays-down the procedures to be followed for receiving reports, analyzing them and thereafter issuing alerts through various modes to the concerned authorities.

7. The SOP is designed to specify actions that are required to be taken by the Integrated Operation Centre in the Ministry of Home Affairs for reporting on disaster events.

8. The SOP specifies duties and responsibilities for the personnel working in the Integrated Operation Centre for issuing messages related to disaster events.

9. The instructions contained in this SOP are **not** to be regarded as exhaustive. All other actions that might be considered necessary by the Ministry of Home Affairs would require to be taken on the instructions of Home Secretary/Secretary (Border Management)/Joint Secretary (DM).

COMMUNICATION:

10. The main objective for setting up of the IOC, MHA is to ensure the efficient collection, assimilation and dissemination of information in terms of issuing alerts when a disaster is likely to occur or is imminent, or when it has actually taken place.

11. Once information is received of an imminent disaster or a disaster having occurred, IOC, MHA will generate alert messages/disaster warnings to the concerned authorities as per this SOP.

12. Warnings of impending, imminent or actual disaster situations may reach IOC, MHA from various sources in a number of ways. IOC, MHA will confirm the exact position in this regard from the nodal officers of official sources/agencies before issuing Alert messages.

13 Upon receipt of weather warnings or reports of actual disasters, IOC, MHA will activate “call up actions”. Each disaster situation will have different parameters in terms of severity, early warning and time available for response. Therefore, different stages for different events have been standardized for issuance of Alert messages.

14 In the case of a sudden onset of a disaster situation like earthquake, there will be no early warning or watch period; whereas for other disasters such as cyclones, floods etc. there would be an early warning and a watch period.

15 Electronic Messaging System (E.M.S.)

The main objectives for developing the EMS are that it should be able:

- i) to facilitate real-time, effective and coordinated response to crises/disaster situations
- ii) to accelerate information flow
- iii) to use multiple communication tools as well as network connectivity which also serves as a standby on occasions of failure of a particular communication tool.
- iv) to collect and collate information from multiple sources and sift them for onward transmission
- v) to provide for simultaneous vertical as well as horizontal flow of information
- vi) to prevent information loss
- vii) to archive vital information

CATEGORIZATION OF ALERTS

16. Specific hazards have different categories of alerts as indicated below. For the purpose of dissemination of alerts to PMO/Cabinet Secretariat, a uniform system has been devised by categorizing each type of alert in stages - **Yellow, Orange and Red.**
17. Alerts falling in **Yellow stage** will not be communicated to PMO/Cabinet Secretariat through EMS.

18. Alerts falling in **Orange stage** will be communicated to PMO/Cabinet Secretariat with 12 hourly updates or when it is upgraded to the Red Stage, whichever is earlier.
19. Alerts falling in **Red stage** will be communicated to PMO/Cabinet Secretariat with 3 hourly updates or at more frequent intervals as warranted by the situation.
20. Any changes in the category of alerts will be suitably integrated in the next message due as per the previous categorization.
21. Alert messages will be sent to PMO/Cabinet Secretariat at the periodicity indicated above. For any other, unprecedented event on disaster situation, alert messages to PMO/Cabinet Secretariat will be sent in consultation and with the approval of JS (DM).

Action Plan for Communication of alert messages

22. General

- (i) All concerned Ministries/Departments/Organizations/Agencies will report events to IOC, MHA.
- (ii) While generating and transmitting alerts to IOC, MHA, the concerned agency, will indicate the category of the event as well as its corresponding stage (Red/Orange/Yellow).

23. Yellow Stage

- i) IOC, MHA will transmit information on disaster situations falling in yellow stage to JS (DM).
- ii) Alerts will be transmitted further to HS/Secretary (BM) and Nodal officer of NDMA only on specific instructions from JS (DM).
- iii) Alert messages will also be sent to the concerned Ministries/Departments/Organizations/Agencies rendering ESF for their information and necessary action where required.

24. Orange Stage

- (i) All Ministries/Departments/Agencies will be required to transmit 12 hourly updates.
- (ii) All Ministries/Departments/Agencies generating alerts will be required to transmit information to IOC MHA within 30 minutes of the receipt of information regarding the upgradation of the stage.
- (iii) Alerts will be transmitted by IOC MHA to:
 - HS/ Secretary (BM)/ JS (DM)/PS to HM/PS to MOS and to the Nodal Officer of NDMA.
 - All designated officers in PMO/Cabinet Secretariat as indicated in the **Annexure**.
- (iv) All concerned ESF Ministries/Departments/Organizations/Agencies will be informed by IOC, MHA to be in readiness and make all necessary standby arrangements.
- (v) IOC, MHA will transmit alerts to the concerned State Governments with instructions to further transmit alerts to the concerned/Districts authorities.

25. Red Stage

- (i) All concerned Ministries/Departments /Organizations /Agencies will be required to transmit alerts to IOC, MHA **immediately** on receipt of information and not later than 30 minutes of the occurrence of the disaster events falling in the **Red Stage**.
- (ii) IOC, MHA will constantly monitor the position and transmit 03 hourly updates to the following:
 - HS/Secretary (BM)/ JS (DM)/PS to HM/PS to MOS.
 - Vice Chairperson, Members and nodal officer of NDMA

- All designated officers in PMO/Cabinet Secretariat as indicated in the **Annexure**.
 - All Ministries/Departments/Organizations/Agencies discharging ESF with instructions to contact their counterparts in the States and provide necessary assistance.
 - State Government/District Administration seeking hourly reports on assistance required from the Centre.
- (iii) All alerts messages will be followed by **Situation Reports (SITREP)** to be sent once a day or more frequently depending on unfolding events.

26.AVALANCHES (Defence Research & Development Organisation)

Category	Description	Stage
Low	Generally favourable condition. Triggering is generally possible only with high additional loads and on very few extreme slopes. Only sluffs possible and reach valley in small sizes. Valley movement is safe. Movement on slopes with care	Yellow
Medium	Partly un-favourable condition. Triggering is possible on most avalanche prone slopes with low additional loads and may reach the valley in medium size. Movement on slopes with extreme care. Valley movements with caution. Avoid steep slopes. Routes should be selected with care.	Yellow
High	Unfavourable condition. Triggering possible from all avalanche prone slopes even with low additional loads and reach the valley in large size. Suspend all movement. Airborne avalanches likely.	Orange
All round	Very Unfavourable condition. Numerous large avalanches are likely from all possible avalanche slopes even on moderately steep terrain. Suspend all movements. Airborne avalanches likely.	Red

27. **TSUNAMI (Department of Ocean Development)**

Category	Description	Stage
Slight	Contains information about the earthquake and a tsunami evaluation message that a tsunami is expected.(eg. For earthquakes with > M6.5 occurring in the ocean within a depth of <100 kms, a tsunami watch will be issued for those areas falling within 60 minutes travel time from the earthquake source and if expected run up is < 0.5 m and for those areas falling above 60 minutes travel time from the earthquake source and if expected run up is 0.5 to 2 m)	(Yellow) Tsunami Watch
Moderate	Contains information about the earthquake and a tsunami evaluation message that a tsunami is expected.(eg. For earthquakes with > M6.5 occurring in the ocean within a depth of <100 kms, a tsunami alert will be issued for those areas falling within 60 minutes travel time from the earthquake source and if expected run up is between 0.5 to 2 m as well as for those areas falling above 60 minutes travel time from the earthquake source and if expected run up is > 2 m)	(Orange) Tsunami Alert
Great	Contains information about the earthquake and a tsunami evaluation message that a tsunami is expected.(eg. For earthquakes with > M6.5 occurring in the ocean within a depth of <100 kms, a tsunami warning will be issued for those areas falling within 60 minutes travel time from the earthquake source and if expected run up is > 2 m)	(Red) Tsunami Warning

28. LANDSLIDES (Geological Survey of India)

Category	Description	Stage
IV	Landslides of small dimensions that occur away from habitations and do not affect either humans or their possessions. These may occur near infrastructural installations, agricultural and forestlands and may not affect them in a significant manner. These slides may include small incidents that block communication routes for short periods or do not affect the society in a significant manner.	Yellow
III	Landslides which are fairly large and affect infrastructural installations like strategic and important highways and roads, rail routes and other civil installations like various appurtenant structures of hydroelectric and irrigation projects. The landslides that enter large water bodies like reservoirs of hydroelectric projects and could damage some of components of these projects.	Orange
II	The landslides that may occur on the fringes of inhabited areas and result in limited loss of life and property. Landslides, which result in blockade of courses of relatively smaller natural drainages. If the blockade is of relatively smaller dimensions its impact would be of a lower order. Although a threat potential is there, it may not be immediate.	Orange
I	Landslides of large dimensions that are located over or in close vicinity of inhabited areas like urban settlements or fairly large rural settlements. Activity on these slides can result in loss of human lives, dwellings on large scale. These slides may also inflict heavy losses on urban infrastructure.	Red

	<p>The slides that block busy pilgrimage routes during peak times resulting in hardships to thousands of pilgrims and sometimes resulting in loss of human life.</p> <p>Landslides which result in blockade of courses of relatively large natural drainages. If the blockade is fairly large it could lead to formation of a very large reservoir of water behind it. Formation of a large landslide dam could result in sudden flooding of areas located upstream. Abrupt breaching of landslide dam would suddenly release enormous quantities of water in the downstream areas leading to flash floods that could result in loss of life and damage to property on large scale.</p>	
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29. CYCLONE (India Meteorological Department)

Category	Description	Stage
Cyclone Alert	Issued 48 hours before the commencement of bad weather when a system is located about 500 km or more away from the coast. The forecast may not contain information about landfall and hence it is still of inforamatory type but at the same time meant to trigger preparatory actions. During this stage, Disaster Managers plans on the course of action required to be initiated once the system moves closer to the coast.	Yellow
Cyclone Warning	These messages are issued 24 hours before commencement of bad weather and are of a “ serious nature ”. During this stage the system is monitored closely and the expected place & time of landfall and the districts along the coastal areas likely to be affected are clearly indicated in the warning messages. The location of the system at this stage may still be 300 km – 500	Orange

	km away from the coast. Disaster Management Machinery is expected to be geared up fully during this phase.	
Post landfall outlook:	<p>During this phase warning messages are issued about 12 hours before actual landfall and are of a “very serious nature”. At this stage, it is expected that the Disaster Management machinery is in full operational mode to face the impending disaster. All preparedness action should have been completed by this time. MHA would be closely monitoring steps taken by the concerned State Governments regarding evacuation and relief activities like food, sanitation etc.</p> <p>This phase is fit to be classified as “Great Danger” and all warning messages issued to MHA Control Room are required to be forwarded to senior officials of the PMO.</p>	Red

30. EARTHQUAKE (India Meteorological Department)

Category	Description	Stage
Slight	$M < 5.0$	Yellow
Moderate	$5.0 \leq M \leq 6.9$	Orange
Great	$M \geq 7.0$	Red

31. FLOOD (Central Water Commission)

Category	Description	Stage
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IV	Low Flood (Water level between Warning Level and Danger Level)	Yellow
III	Moderate Flood (Water Level below 0.50m. less than HFL and above Danger Level)	Yellow
II	High Flood (Water Level less than Highest Flood Level but still within 0.50m. of the HFL)	Orange
I	Unprecedented Flood (Water Level equal and above Highest Flood Level (HFL))	Red

32. **RAILWAYS (Ministry of Railways)**

Category	Description	Stage
Minor	50 or more casualties (inclusive of deaths and injuries)	Yellow
Medium	51 to 99 deaths.	Orange
Major	100 or more deaths, or where additional assistance is sought by the Ministry of Railways	Red

33. **FOREST FIRE (Ministry of Environment & Forests)**

Category	Description	Stage
Ordinary fire	Localized fires which can be controlled by the concerned territorial Conservator of Forests.	Yellow
Medium Fire	Where large forest area is under fire, which can be controlled by the State Government and no Central intervention is sought by the State Government.	Orange
Major Fire	Large fire, which may result in substantial loss of human lives, massive environmental degradation or loss of wildlife	Red
