Disaster Management, Risk Assessment & Mitigation

1.1 Procedures

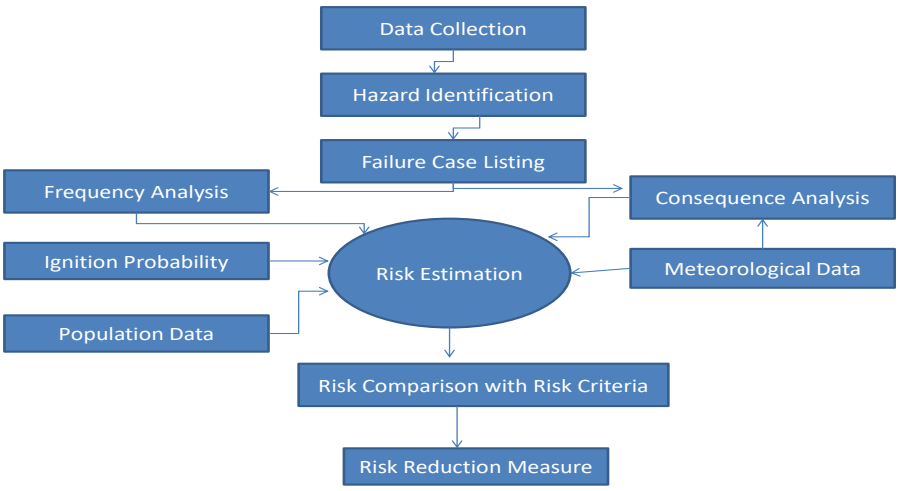
Risk assessment is a process that seeks to estimate the likelihood of occurrence of adverse effects as a result of major road mishaps, gas tanker explosions, fire hazards, floods, cyclones, earth quakes *etc*. at Highway projects. Fatality rate on Indian highways is very high mainly due to road accidents. The other adverse impacts due to gas tanker explosions, fire hazards, floods, cyclones, earth quakes *etc*. are nominal. Elimination of the risk (avoidance of accidents) is given prime importance and NHAI has introduced road safety provisions during the design of highway with the help of Road Safety Manual. Some of these are listed below:

- Safety barriers/delineators hard shoulders on main roads
- Traffic signs and pavement markings
- Underpasses and other grade separators at congested junctions
- Removal of junctions and direct access points on main roads
- Improved median openings with stacking lanes
- Separate provisions and direct access point
- Service roads in towns and villages for segregating local and highways traffic.

Contractor shall conduct Risk Assessment for all works to decide on priorities and to set objectives for eliminating hazards and reducing risks.

1.1.1 The Risk Assessment Process and Hazard Identification

A critical observation/study of the structure/process/site under consideration by the risk assessment team is an essential part of hazard identification as is consultation with the relevant section of the workforce. It is important that unsafe conditions are not confused with hazards, during hazard identification.



1.1.2 Person(s) at Risk

On a construction area, the persons at risk could be site operatives, supervisors, transport drivers, other visitors and the general public. The risk assessment must include any additional controls required due to mitigate vulnerability of any of these groups, perhaps caused by inexperience or disability.

1.1.3 Risk Control Measures and Hierarchy of Risk Control

The next stage in the risk assessment is the control of the risk. When assessing the adequacy of existing controls or introducing new controls, a hierarchy of risk controls should be considered. The principles are:

- Avoiding risks.
- Evaluating the risks which cannot be avoided.
- Combating the risks at source.

Adapting the work to the individual, especially as regards the design of the workplace, the choice of work equipment and the choice of working and production methods, with a view, in particular, to alleviating monotonous work and work at a predetermined work rate and to reducing their effects on health.

Adapting to technical progress

Replacing the dangerous by the non-dangerous or the less dangerous. Developing a coherent overall prevention policy which covers technology, organization of work, working conditions, social relationships and the influence of factors relating to the working environment.

Giving collective protective measures priority over individual protective measures and giving appropriate instruction to employees.

In addition to the above the following principles shall also to be employed:

- Eliminating;
- Substitution;
- Applying engineering controls (e.g. isolation, insulation and ventilation);
- Reduced or limited time exposure;
- Good housekeeping;
- Safe systems of work, Method Statement, Permit to work,
- Training and information;
- Personal protective equipment;
- Welfare;
- Monitoring and supervision;
- Review

The purpose of the risk assessment, therefore, is to reduce the remaining risk after taking into consideration of risks already addressed. This is called the residual risk.

The goal of risk assessment is to reduce all residual risks to as low as reasonably practicable (ALARP).

In a relatively complex workplace, this will take time so that a system of ranking risk is required the higher the risk level the sooner it must be addressed and controlled. For most situations, an alliterative risk assessment will be perfectly adequate.

For all high-risk activities, a quantitative risk assessment shall be conducted to quantify the risk level in terms of the likelihood of an incident and its subsequent severity. Clearly the higher the likelihood and severity, the higher the risk will be. The likelihood depends on such factors as the control measures in place, the frequency the exposure to the hazard and the category of person exposed to the hazard.

The severity will depend on the magnitude of the hazard (e.g. voltage, toxicity *etc*.). A simple of 3 x 3 matrix shall be used to determine risk levels at Construction / erecting sites as given in the Project EHS manual.

1.1.3.1 Matrix for Risk Assessment

Table 1: Consultations with Community / Primary Stakeholders

		Consequence				
		1	2	3	4	5
Probability	1					
	2					
	3					
	4					
	5					

1.1.3.2 Severity of hazard (Consequence)

Severity is the degree or extent of injury or harm caused by the hazards, or as a result of an accident. Severity of hazard is classified as per the Table 4.

Table 2: Consequence Descriptions

Value	Result of Hazard to personnel	Result of Hazard to Assets/Progress
5	Single or multiple fatality	Catastrophic damage, Critical Delay, May result in fatality
4	Serious Injury requiring hospitalization	Major Damage, Serious Delay
3	Lost time Accident	Serious Damage, Moderate Delay
2	Injury requiring medical treatment but not lost time	Moderate Damage, Minor delay
1	First Aid Treatment Only	Minor Damage, No Delay

1.1.3.3 Likelihood of occurrence (Probability)

Likelihood of occurrence of an accident or incident or ill health is classified as per the Table 5.

Table 3: Classification of Occurrence of likelihood

Value	Status	Description
5	Inevitable	Happens regularly on this site
4	Most Likely	Known to have occurred on this site in the past
3	Likely	Known to occur on other sites
2	Unlikely	Known to Occur in the industries
1	Most Unlikely	Never known before

1.1.3.4 Hazard Identification Risk Assessment:

The procedure for preparing the Hazard Identification Risk Assessment is as follows:

Risk involved in each activity and existing control measures are analyzed and Impact Rating and

probability rating are given in Hazard Identification Risk Assessment sheet.

Risk level is identified from the matrix based on the rating given.

Control measures are evolved to bring the risk level to ALARP (as low as reasonably practicable and residual risk is also identified.

If the residual risk is not an acceptable level, then assessment process shall be repeated to bring the residual risk at ALARP.

The lists of control measures for the activities should be handed over to the concerned execution engineer for implementation and the HIRA shall be explained to the concerned workmen / supervisors and engineer for implementation

1.1.4 Emergency Response Plan

Concessionaire / Contractor will prepare Emergency Response Plans for all work sites as a part of the Safety procedures. The plan shall integrate the emergency response plans of the contractor and all other sub-contractors.

Each Emergency Response Plan shall detail the procedures, including detailed communications arrangements, for dealing with all emergencies that could affect the site. This include where applicable, injury, sickness, evacuation, fire, chemical spillage, severe weather and rescue. Emergency plans and Fire Evacuation plans shall be prepared and issued. Mock drills shall be held on a regular basis to ensure the effectiveness of the arrangements and as a part of the programme, the telephone number of the local fire brigade should be prominently displayed near each telephone on site

The Emergency Response Plan is prepared to deal with emergencies arising out of:

1.1.4.1 Fire and Explosion

Fire Safety Procedures will be developed and shall be integrated into Emergency Response Plan.

1.1.4.2 Road Accident

In case of Road Accident the following contact no should be contacted.

Table 4: Emergency Contact Number

Help Line no	Description
100	Police
101	Fire
102	Ambulance
103	Traffic Police
1033	Emergency Relief Centre on National Highways
104	State level helpline for Health
104	Hospital On Wheels
1066	Anti-poison
1070	Central Relief Commissioner for Natural Calamities
1070	Relief Commissioners of Central/State/Union territory
1073	Road Accident
1073	Traffic Help Line
1077	Control room of District Collector/Magistrate
108	Disaster management
1090	Anti-terror Helpline/Alert All India
1091	Women in Distress
1092	Earth-quake Help line service

1096	Natural disaster control room
1099	Central Accident and Trauma Services
1099	Catastrophe & Trauma service
112	General emergency Department of Telecommunications (DoT)
112	All in one Emergency Number
1910	Blood bank Information
1911	Dial a doctor
1913	Tourist Office (Govt.of India)

Source: http://www.newincept.com/helpline-numbers-all-over-in-india.html

1.1.5 Operation Control Procedure For Traffic Management

1.1.5.1 Hazards Due To External Traffic Are As Follows

- Construction workers hit by external vehicles while working.
- Injury to Pedestrians:
- Due to fall in excavated trenches.
- Hit by construction equipment / vehicle.
- As they use carriageway due to blockage / absence of footpath.
- Collision due to improper traffic management.
- Between external vehicle and construction equipment / vehicle.
- Between external vehicles.
- External vehicle with other stationery objects in the side of the road

1.1.5.2 Objectives

- Warn the road user clearly and sufficiently in advance.
- Provide safe and clearly marked lanes for guiding users.
- Provide safe and clearly marked buffer and work zones.
- Provide adequate measures that control driver behaviour through construction zones

1.1.5.3 Traffic Control Plan

This plan gives the detailed guideline for traffic management in most of the common situations at our Projects. Traffic Control Plan for a specific road sections should be prepared based on this general guideline and applying the following variables, which may vary from project to project. The variables are:

- Average Vehicular Traffic Density in peak and non-peak hours.
- Maximum width of lane required for construction during various activities.
- Number and types of junctions in the road.
- Availability of standard footpath and its location and dimensions.
- Change in the lane width if any and its location.
- Regulatory and advisory speed limits *etc*.

1.1.5.4 TRAFFIC CONTROL DEVICES

Traffic control devices used to regulate the traffic in Road Construction Zones include,

1. Road Signs
2. Delineators
3. Barricades
4. Cones

5. Pylons
6. Pavement markings
7. Flashing lights

Table 5: Minimum sightline distance and the minimum size of the signs

Average Speed (Km/h)	Distance of first sign in advance of the first channelizing device (m)	Size of Warning Sign (mm)	Minimum no of signs in advance of the hazard
Under 50	100	600	3
51 – 60	100 – 300	750	3
61 – 80	120 – 300	900	3 or 4
81 – 100	300 – 500	1200	4
Over 100	1000	1200 to 1500	4

Cautionary / Warning Signs

In case of divided carriageways, the signs should be provided both adjacent to the shoulder and on the central median so as to be visible from all lanes.

Delineators

Delineators are devices or treatment which outlines the roadway or portion thereof. They include Safety Cones, Traffic Cylinders, Tapes, Drums, Painted lines, Raised Pavement Markers, Guide Posts, and Post-mounted Reflectors *etc*. They are used in or adjacent to the roadway to control the flow of traffic. Delineators are basically driving aids and should not be regarded as a substitute for warning signs or barriers for out-of-control vehicles.

Guide Post

They are intended to delineate the edges of the midway so as to guide driven about the alignment ahead, particularly where it might be confusing. Guideposts can be of metal, concrete, cut stone, amber or plastic. The posts can be made of Circular, Rectangular or Triangular Cross-section but the side facing traffic should be at least 10 cm wide.

Drums

Drums of height 800 mm to 1000 mm high and 300 mm in diameter can be used as either channelizing on warning devices. Both plastic and metallic drums (e.g. Bitumen drums) can be used for this purpose. Drums need to be filled up with earth or sand to increase its stability. Drums should be refectories and painted as shown in the **Figure 7.1**.

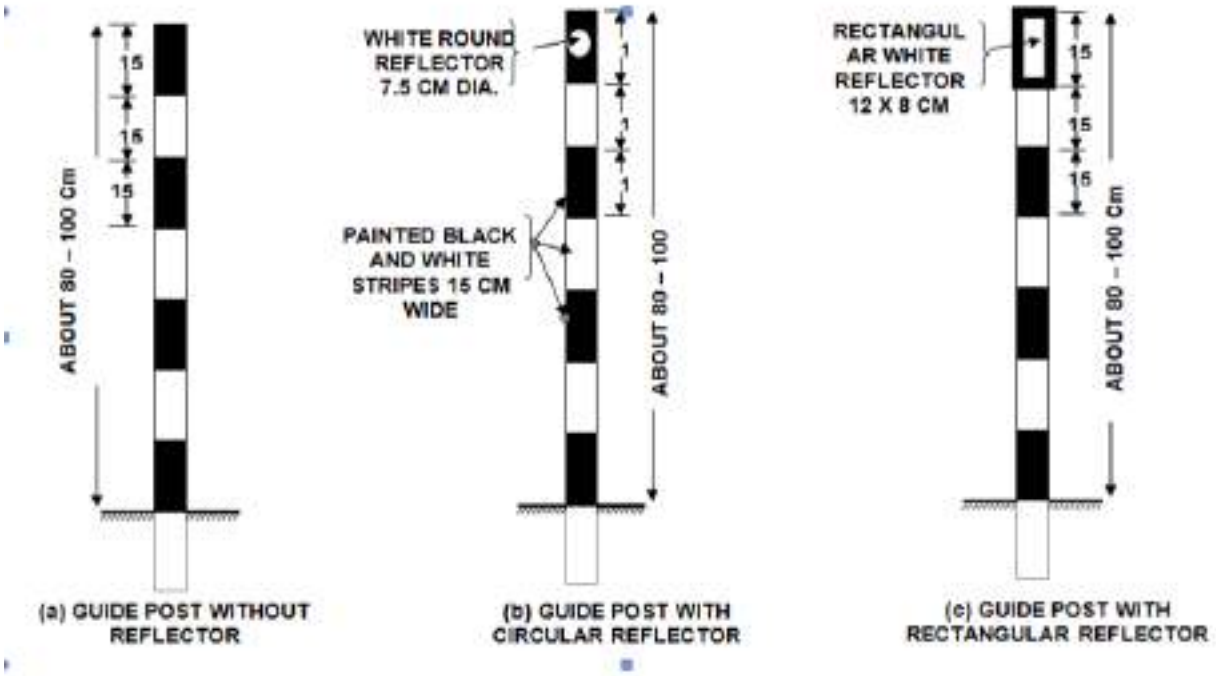


Figure 1: Drum Reflections

Safety Cones

Safety cones are 500 mm, 750 mm and 1000 mm high and 300 mm to 500 mm in diameter. They are usually made of plastic, rubber, HDPE, PVC and have retro refectories red and white bands. Safety cones would be displaced or blown unless their bases are anchored or loaded with ballast. This can be avoided by, using sand bag rings to provide increased stability. Using heavier weighted cones. Using cones with special weighted bases. Doubling the cones to provide added weight.

Barricades

CMRL prescribed standard barricades are used.

Flagmen

- An authorised personnel at least average intelligence, be mentally alert and good in physical condition be selected, since flagmen are responsible for public and workmen safety.
- Flagmen should be equipped with yellow helmet with green reflective sticker fixed around and reflective jacket along with hand signalling devices such as flags and sign paddles. The typical specification are given below,
- Flagmen need to maintain the flow of traffic continuous past a work zone at relatively reduced speeds by suitably regulating the traffic. He shall stop the traffic for a short while whenever required (e.g. for entry and exit of construction equipment in to work zone).
- Flagman should be positioned in a place where he is clearly visible to approaching traffic and at a sufficient distance to enable the drivers to respond for his flagging instructions. A flagman never leaves his post until properly relieved,

- The standard distance shall be maintained at 60 – 100 m but can be altered depending upon the approach speed and site conditions. In urban areas this distance shall be taken as 20 m to 50 m.

1.1.6 Traffic Management Practices

1.1.6.1 Definitions

Road traffic control involves directing vehicular and pedestrian traffic around a construction zone, accident or other road disruption, thus ensuring the safety of emergency response teams, construction workers and the general public.

1.1.6.2 Working zone:

The Plant Site, construction zone of road *etc*. at which workmen will be working.

1.1.6.3 Working space:

The space around the works area that will require storing tools, excavated material and other equipment. It is also the space to allow workmen, movement and operation of plant, (e.g. swing of jibs, excavator arms) to move around to do the job. Materials and equipment must not be placed in the zone either. Workmen will only need to enter the zone to maintain cones and other road sign.

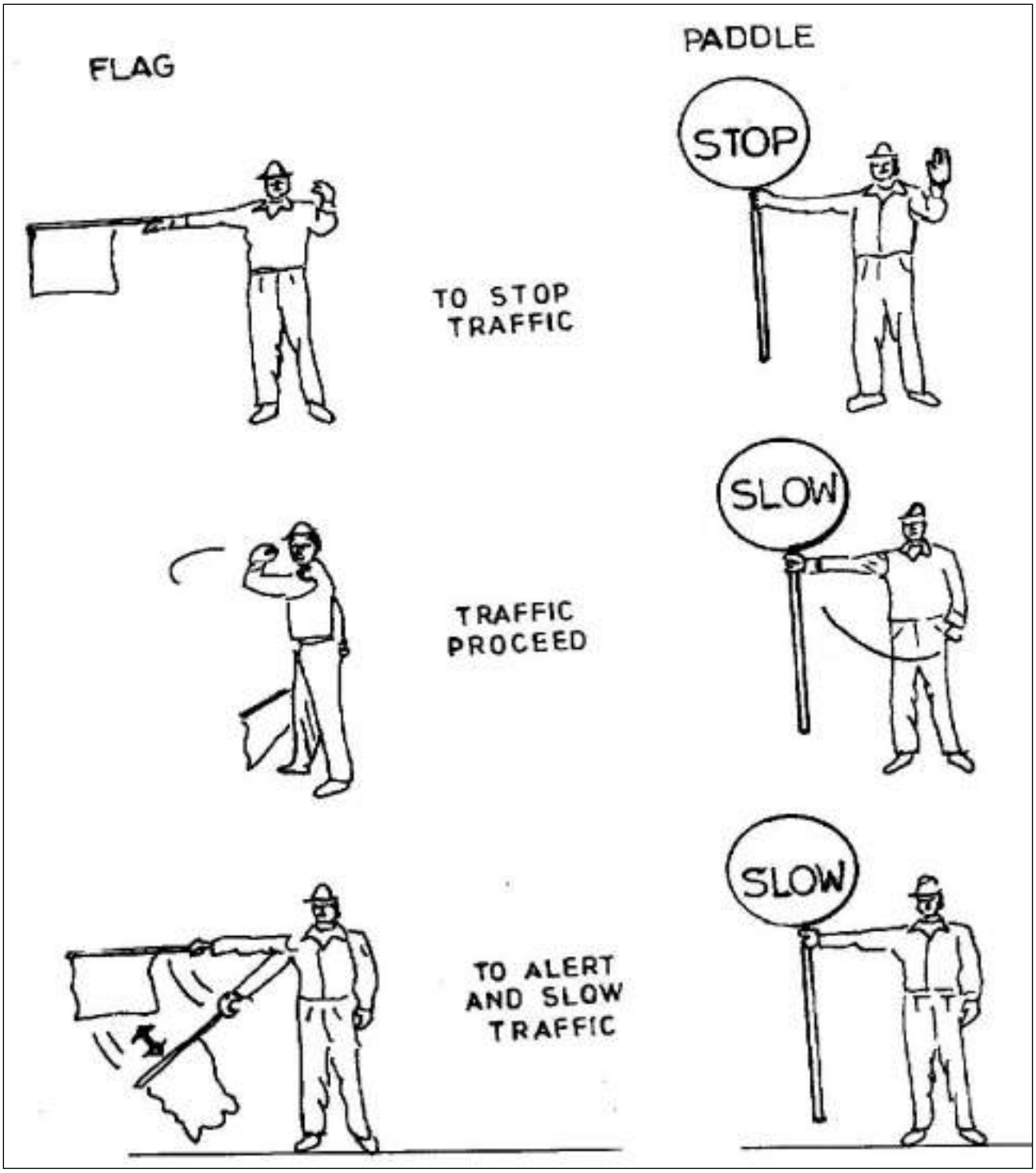


Figure 2: Road Signals Traffic Signals

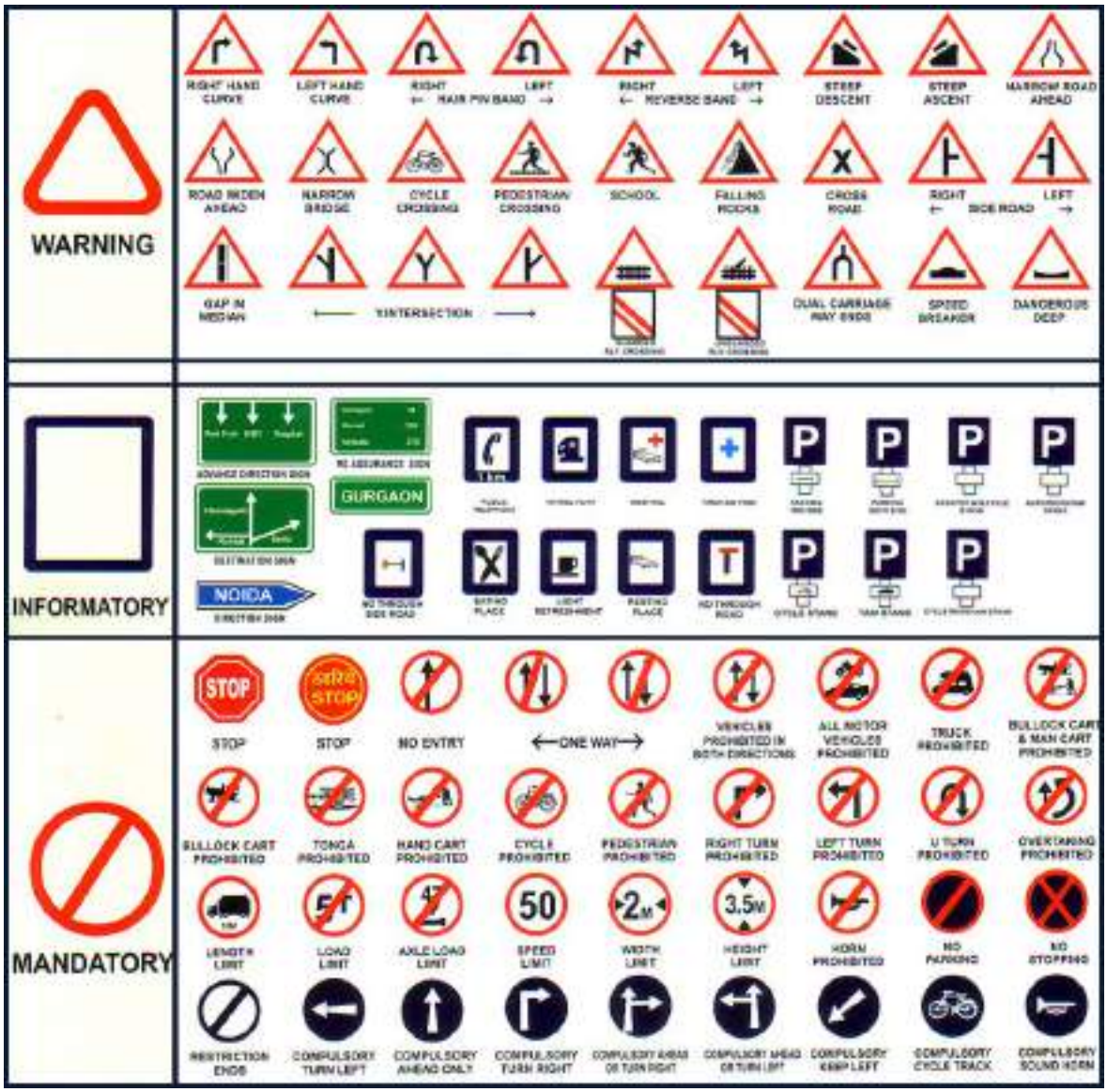


Figure 3: Traffic Signals

1.1.6.4 Safety zone:

The zone that is provided to protect workmen from the traffic and to protect from them.

1.1.6.5 Approach Transition zone:

This will vary with the speed limit and the width of the works as given in (diag: Traffic Control zone)

1.1.6.6 Longitudinal buffer zone:

This is the length between the end of the lead-in taper of cones (T) and the working space. It will vary with the speed limit as given in table (Traffic Control zone).

1.1.6.7 Lateral buffer zone:

This is the width between the working space and moving traffic. It will vary with the speed as given in table (Traffic Control zone). The lateral buffer zone safety clearance is measured from the outside edge

of the working space to the bottom of conical sections of the cones on the side nearest to the traffic.

1.1.7 Traffic Management on Road Junction

1.1.7.1 Construction traffic meets live traffic from quarry/plant/borrow pit

- Where vehicles are more to the approach junction from the side road, permission shall be seek for providing speed breaker at junction from local traffic police and road-authority.
- The layout for signs and traffic control devices.
- Flag man shall be kept in the peak time provided with the traffic circle painted with red and white at the corner at a height of 500 mm, clearly visible to approaching traffic for a distance provided with while gloves and STOP, GO Paddle. And night time flagman should use LED Batons.
- All vehicles from approaching road should be STOP, LOOK and GO.
- Spillage of earth / Gravel / Aggregates / Bituminous mix from the tipper shall be cleaned on regular basis, if required 2 coolies permanently posted for booming.
- All Construction vehicles must follow lane discipline and road signs.

1.1.7.2 Activities inside Median / Island

- The traffic would discontinue from plying temporarily on the carriageway; for 2 min for reversing & dumping earth / stones / *etc*., , by the direction of helper and the flagman controls the traffic as shown in Picture- 01 and made continue the traffic and for the next trip repeating the same.
- The construction zone shall be barricaded with standard CMRL barricade.
- One Flagman (refer flag man clause) shall be appointed at traffic coming side of the transition zone.
- No personnel are allowed to come out of the safety zone, unless flagman guidance.**Disaster Management Manual**

1.2.1.1 General

During South West Monsoon period there is absolute possibility of rains. The rains may cause heavy inflow of water in the rivers and jungle streams etc., however Kota district in Rajasthan having low history of Rain fall. Therefore, the water overflows thereby breaching embankments, causes enormous damages to houses, huts, agricultural lands, roads, telephone lines, railway tracks, electricity lines and other public properties. It is not feasible to completely prevent nature's fury at one stroke. However, to minimize the damage caused by nature's onslaught and to ensure speedy relief thereby mitigating the sufferings of the people. The plan can be set in motion when the need arises with the active coordination of inter departmental officials.

1.2.1.2 Community Awareness and Involvement

The community will be awared to keep their T.V., Radio on and listen to latest weather warnings and advisories from the Doordharsan and All India Radio station and any announcement through public address system. They will also be informed to pass on the information to others as quickly as possible.Avoid being misled by rumours. Pass on only the official information received from the T.V. Radio to others. If the house is out of danger from fllood and it is well built it is then probably the best place to weather the storm. However, please act promptly if asked to evacuate.Be alert for high water in areas where streams of rivers may flood due to heavy rains.Bolt up glass windows or put storm shutters

in place. Use good wooden blanks securely fastened provide strong suitable support for outside doors.If you do not have wooden boards handy, paste paper strips on glasses to prevent splinters flying in to the house.

Get extra food, especially items which can be eaten without cooking or with very little preparation. Store extra drinking water in suitably covered vessels. Make provision for children and adults requiring special diets.

If you are in one of the evacuation areas, move your valuable articles to upper floors to minimise flood damages.

Check on everything that might blow away or be born loose. Kerosene tins, canes, agricultural implements, garden tools, road signs and other objects become weapons of destruction in strong winds. Remove them and store them in a covered room.

Be sure that a window or door can be opened on the left side of the house *i.e.* the side opposite the one facing the wind.

Remove cattle to safe place as far away as possible.

If the centre of eye of the storm passes directly over your place, there will be wind and rain lasting for half an hour or more. During this period stay in a safe place. Make emergency repairs during the pre-monsoon period, if necessary, but remember that strong winds will return suddenly from the opposite direction, frequently with even greater velocity.

Be calm your ability to meet any emergency which will inspire and help others.

1.2.2 Natural Hazard Profile of Project Area

Table 6: District hazard profile

Name of district	Wind	Flood	Drought	Earthquake	Industrial Accident
Kota	Moderate	Low	Moderate	Low	Moderate

1.2.2.1 Draughts:

Low rainfall coupled with erratic behaviour of the monsoon in the state makes Rajasthan the most vulnerable to drought. Of all the natural disasters, drought can have the greatest impact and affect the largest number of people and livestock. Drought invariably has a direct and significant impact on food production and the overall economy. Drought, however, differs from other natural hazards. Because of its slow onset nature, its effects may accumulate over time and may linger for many years. The impact is less obvious than for events such as earthquakes or flood but may be spread over a larger geographic area. Because of the pervasive effects of drought, assessing its impact and planning assistance becomes more difficult than with other natural hazards.

The State Drought Monitoring Cell (SDMC) in collaboration with the Agriculture, Animal Husbandry, and Water Resources departments, and the National Crop Forecasting Centre (NCFC) would carry out assessment of expected damage which would include impact on agricultural production, depletion of water resources, impact on livestock population, land degradation etc. as well as human health.

The Department of Agriculture and Cooperation in collaboration with the SDMC and NCFC would standardize the Unit of deceleration of drought and would evolve alternative methods of quicker assessment of crop yield to mitigate the impact of drought in time.

SDMC would facilitate the integration of data and expertise from multiple institutions such as ICAR, NRSC, IMD, Agricultural Universities, State Departments of Irrigation, Ground Water, Revenue, Agriculture, Animal Husbandry *etc*., to evolve a robust method for drought intensity assessment. Once the indicators cross the defined threshold level (level to be decided by the state), the SDMA Secretariat would help in declaring drought at sub-district levels.

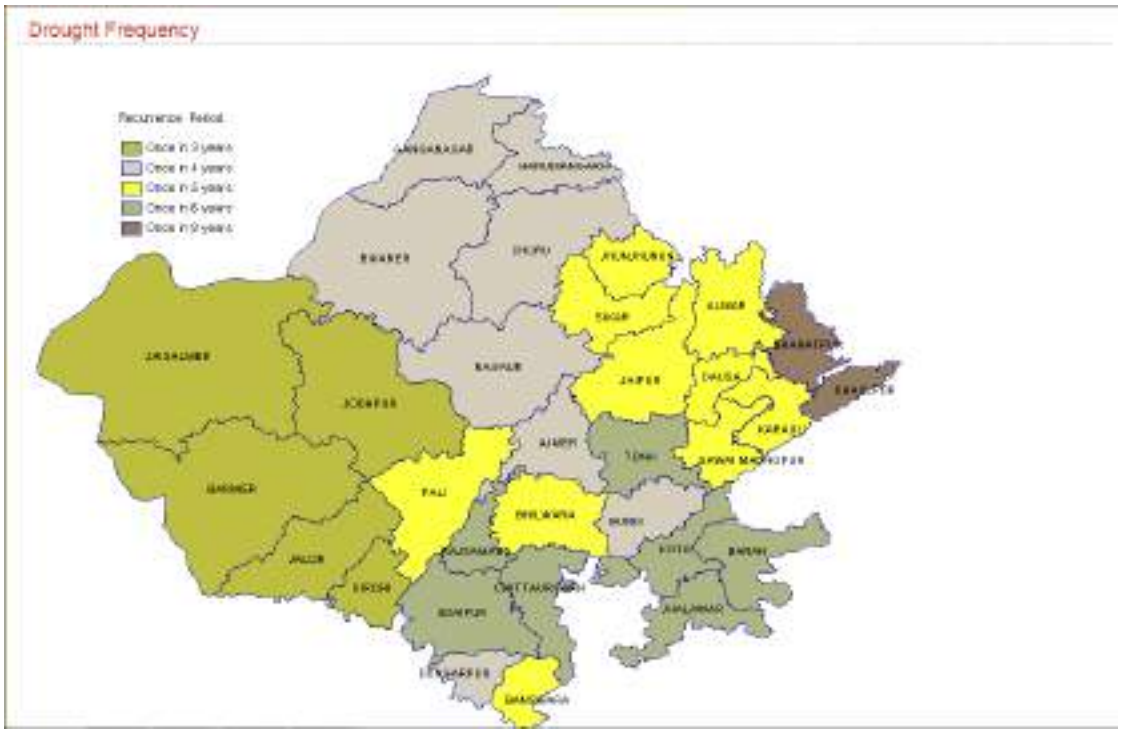


Figure 4: Draught Map Rajasthan

1.2.2.2 Floods

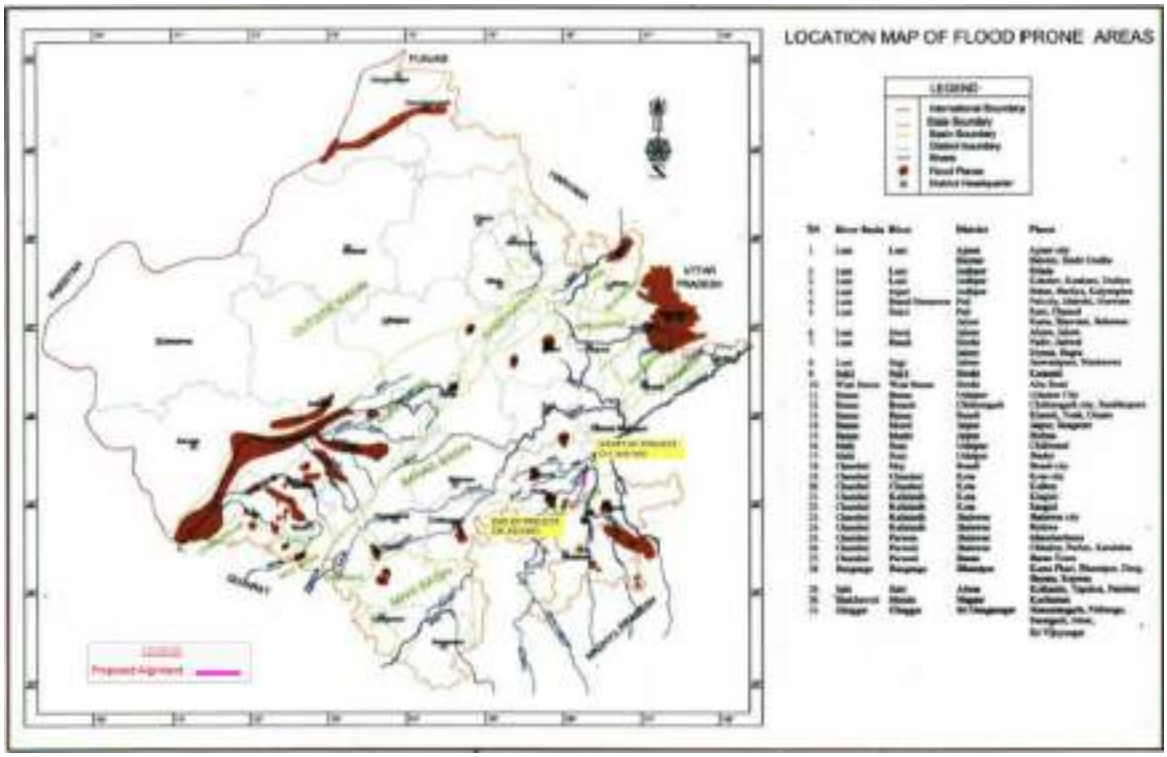


Figure Error! No text of specified style in document.**-5: Flood Map Rajasthan**

Though most parts of Rajasthan receive scanty rainfall, the State has a history of floods and inundations, mostly along the basins of rivers like Luni and Chambal. There are 13 river basins in the state viz.: Shekhawati, Ruparail, Banganga, Gambhiri, Parbati, Sabi ,Banas, Chambal, Mahi, Sabarmati, Luni, West Banas, and Sukli. Out of these, Luni, Banas, and Chambal basins are the largest and are divided into several sub basins. While the Luni river flows through parts of Ajmer, Barmer, Jalore, and Jodhpur, its sub basins of Bhund Hemawas, Sukri, Jawai and Bendi cover parts of Pali, Jalore, and Sirohi. Similarly, the Banas basin falls in Udaipur and Bundi districts and its sub basins of Berach, Morel and Mashi cover parts of Chittorgarh and Jaipur districts. Chambal is the largest basin of the State. Along with its sub basins of Kali Sindh and Parwati, it covers parts of Bundi, Kota, Jhalawar and Baran districts.

Figure shows the flood prone areas of Rajasthan. These include major parts of the basins and sub basins of River Luni in Barmer, Pali, Sirohi and Jalore; and the basins and sub basins of Chambal River in Baran, Kota and Bundi districts. The reasons for flooding in these regions include:

- Excess rain in the catchment
- Sudden release of large quantities of water from Dams/ water reservoirs
- Breach/ damage in major reservoirs/ dams
- Limited holding capacity

Besides the floods in these natural drainage systems, there are other reasons for inundation. Changes in rainfall patterns have also increased the risk of flash floods in many areas that were not flood prone

historically. The Barmer flood in 2006 was a revelation and made disaster managers and policy makers take a fresh view of the risks and vulnerability from floods in the State. People living in the low-lying areas of the above-mentioned basins are the most vulnerable to floods.

1.2.2.3 Sand Storms

Sand storms are typical features of south-western Rajasthan. High velocity winds along with sand, often cyclonic in nature, blow through most of the western districts, particularly in months from March to June. High wind and sand storms severely disrupt the routine life, transportation, electricity and other essential services. High winds also take away the top soil of the land which has vital nutrients for fertility. Livestock are particularly vulnerable to sand storms. It also leads to shifting of sand dunes, and often covers roads, rivers, ponds, and canals with large quantities of sand deposits

1.2.2.4 Rajasthan Wind and Cyclone Zone:

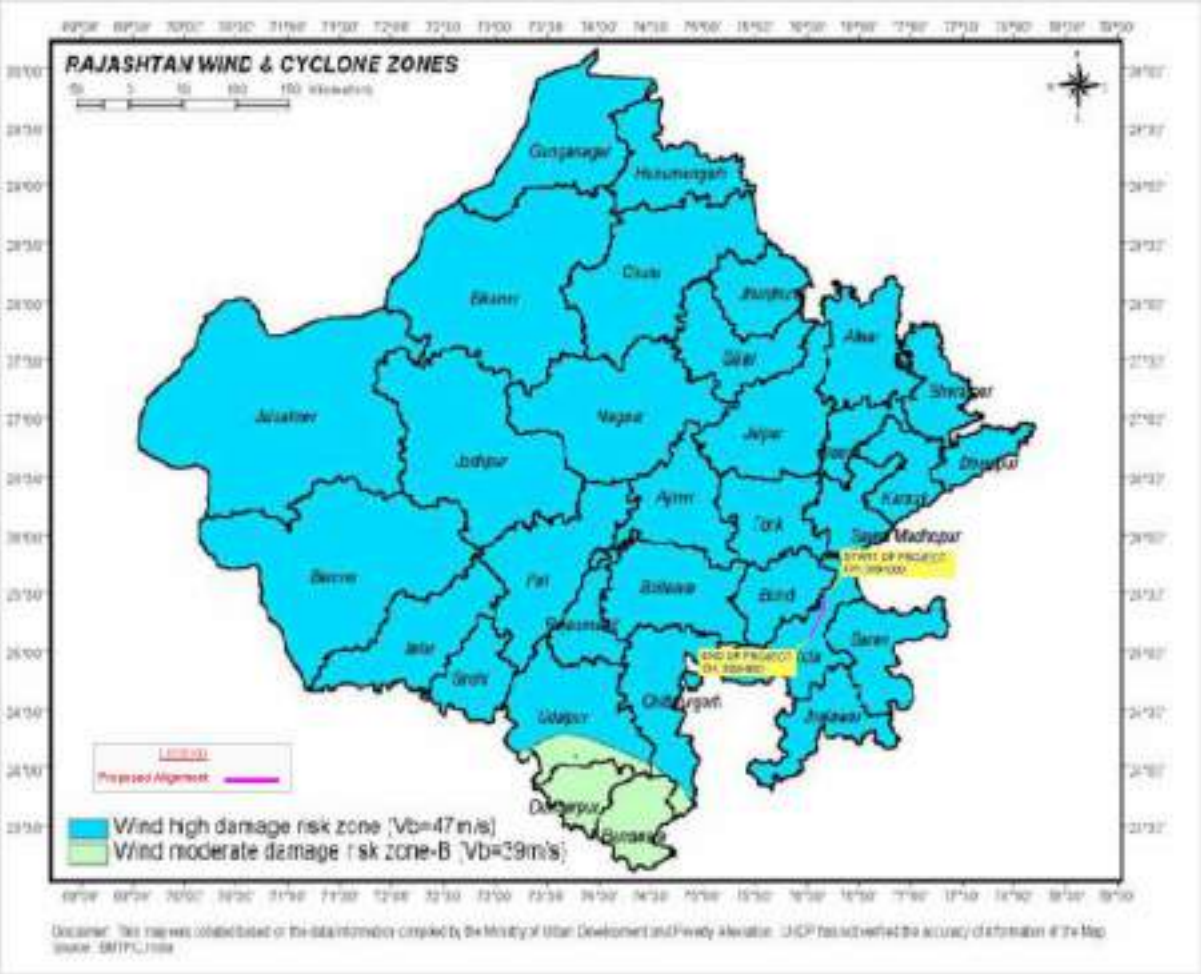


Figure Error! No text of specified style in document.**-6: Rajasthan wind and cyclone zone Map**

Table 7: Animal Epidemics in Rajasthan

S. No.	Disease	Affected Animals
1	Black Quarter (BQ):	Cattle, particularly young animals are more severely affected
2	Foot and Mouth Disease (FMD)	Cattle, mostly cross bred
3	Sheep pox	Sheep and Goats

S. No.	Disease	Affected Animals
4	Enterotoxaemia (ET):	Sheep and Goats
5	CCPP	Sheep and Goats
6	Pestes des petits ruminants (PPR)-	Sheep and Goats
7	Bird flu	Poultry, Duck, Turkey and Water Fowl
8	Equine influenza	Equines
9	Swine Fever	Pigs
10	Swine Pasteuralosis	Pigs

1.2.3 Trigger Mechanism & Operational Direction

Every operation must be aimed at a direction so as to get desirable results. Disaster Management Plan aimed at to face any eventuality with confidence. It is not only guidance but also provide various insights towards disaster management and mitigation. Every new experience and instances that encountered every year are added so as to take a cue and derive a lesson. So that Disaster Management Plan is prepared and updated.

1.2.4 Damage Assessment and Immediate Restoration/ Rehabilitation

In the aftermath of rescue operations are over, the rehabilitation process has to be taken up. A quick assessment of damages to houses eligible for grant of relief for house damages, financial assistance to the families, who have lost their kith and kin, should be done pragmatically. The Revenue Divisional Officers should allocate the work of intensive enumeration to designated staff that should be fixed with the responsibility of collecting data of People death, Cattle death,Damages to the houses/ crops *etc*. in Form No.20-A. The correctness and promptness of report preparation and transmissions to higher authorities in the State are important. A duty chart should be devised involving all revenue personnel and earmarking area if possible in batches of Revenue Staff should be listed out and kept ready to depute them to the affected areas as soon as the calamities are over. As far as possible, the personnel assigned with rescue operations may be left out from enumeration work as the enumeration will have to be undertaken quickly and simultaneously. As and when the assessment of damages is over, the payment of due compensation and other essential commodities, shall follow according to standing orders on the subject amended from time to time.

1.2.5 Mitigation Measures Undertaken

1.2.5.1 Relief Measures

Relief measures are taken with co-ordination of all Departments

Table 8: **Role and Action Plan of Various Departments**

S. No.	Department	Disaster Specific Action Plan
1.	Disaster Management & Relief (DM&R)	• Ensure coordinated movement of all departments, officials and agencies for combating the disaster • Issue necessary directions and ensure effective and coordinated response of all departments. • Arrange regular meetings for updating the apex body on a daily basis. • Provide inputs to concerned departments for effective implementation of the rehabilitation plans. • Document the experiences and best practices.
2.	Animal Husbandry	• Prepare contingency plan • Constitute veterinary mobile teams with required resources like medicines, doctors, subordinate staff, laboratories, protective gears, antibiotics,

S. No.	Department	Disaster Specific Action Plan
		vaccines and antitoxins, etc. in abundance. • Constitute technical groups at state, zone and district levels. • Identification of affected areas. • SafeDisposal of dead carcasses. • Focused attention to veterinary health. • Mass vaccination programme of animals in affected areas Make arrangements for rescue and evacuation of stranded livestock. • Pool in sufficient doctors for treatment of sick animals/ poultry. • Control spread of animal disease. • Carry out epidemiological surveillance to evade biological disasters. • Promote awareness through IEC activities.
3.	Public Health Engineering Department (PHED)	• Prepare Contingency plan • Enforce ground water legislation • Strict monitoring and vigilance on water for drinking purpose only. • Identify additional sources of water for maintenance of regular supply. • Ensure supply of sufficient water through tankers for habitats and cattle camps. • Provide household water purification tablets. • Augmentation of existing Resources • Hiring of Private Wells • Hand Pump repair programme • Installation of New Hand Pumps and Tube wells • Transportation of water through road tankers and by Rail • Earmark water for drinking purpose available in the tanks and ensure no illegal pumping takes place. • Provide adequate quantity of bleaching powder to PRI, especially Gram Panchayats to protect spread of water and vector borne diseases. • Promote awareness on safe hygienic practices and sanitation.
4.	Department of Health and Family welfare	• Health and epidemiology surveillance • Constitute mobile teams with required resources like medicines, doctors, paramedics, subordinate staff, laboratories, protective gears, antibiotics, vaccines, etc. in abundance. • Mobile clinics for health checkups • Organise regular rural health camps and keep public informed of such camps. • Check and monitor the nutritional status of affected people especially for women and children and give treatment. • Check samples of food grains, cooked food in community kitchens, etc. • Promote general awareness of health and hygiene • Manning of control room 24x7. • Maintain regular contact with EOC. • Keep all ambulances, mobile teams, specialists, blood, medicines, paramedics, etc. in a state of readiness. • Carry out triage. • Provide first aid to minor injuries. • Evacuate injured to hospitals. • Constitute and effectively deploy mobile teams having Doctors paramedical, • Set up health centers in relief camps and assure hygiene and sanitation. • Prevention/ control of epidemics and vaccination, availability of adequate x-

S. No.	Department	Disaster Specific Action Plan
		ray machines and orthopedic, neurology equipment. • Availability of stretchers, blood, medicines, ambulances. • Arrange additional beds and medical treatment in local and nearby hospitals as required. • Psychosocial counseling to distressed people. • Maintain continuous supply of medicines and emergency services till normalcy is restored.
5.	Disaster Management & Relief (DM& R)	• Ensure coordinated movement of all concerned departments, officials and agencies for combating Drought. • Make sufficient funds available for Drought response • Arrange regular meetings for updating the apex body and issue directions to all concerned departments regularly. • Document experiences and best practices.
6.	Public Works Department (PWD)	• Listing of works that could be done as under relief programmes as per the priority • Carry out sudden checks and supervise the relief works. • Provide temporary employment opportunity to employable people from affected families. • Manning of control room 24x7. • Maintain regular contact with EOCs at district/ state levels. • Keep all resources in the state of readiness. • Assessment of damage to infrastructure, roads, bridges and buildings and commencement of restoration work. • Carry out search, rescue, evacuation, relief operation. • Clearance of roads and debris of collapsed infrastructures. • Identification and demolition of unsafe buildings/ infrastructures. • Barricade the disaster site and unsafe areas. • Identification and demarcation of safe areas and preparation of temporary shlters for relief camps. • Prepare temporary roads and bridges, helipads and air strips on the need basis for effective relief operations. • Deployment of heavy equipment like dozers, excavators, cranes, pulleys, power saws, gas cutters, L&Ts, JCBs and other specialist equipment and vehicles. • Restoration of buildings, roads, bridges and other Government buildings. • Ensure close monitoring of response and rehabilitation operations and relief camps.
7.	Civil Supplies and Public Distribution System (PDS)	• Distribution of food packets, dry rations, fuel, oil and other essential items • Take precautionary steps against hoarding and profit mongering and ensure normal prices of commodities in the market. • Adequate supply and reserves of FOL and coordinate with all the national agencies for smooth transportation of food and civil supplies. • Supply daily necessities of food items, stock position and ensure continuous supply, in relief camp too. • Coordination with FCI/ warehouses. • Make public aware through media about food distribution and also about the availability of items at subsidized rates.
8.	Municipal Corporation	• Coordination and supply of safe drinking water using tankers, etc. • Manning of control room 24x7.

S. No.	Department	Disaster Specific Action Plan
		• Issue warnings to all Fire Service stations. • Keep all resources in a state of readiness • Assist in evacuation, search and rescue operations. • Ensure availability of all types of extinguishers for fire following earthquakes. • Engagement of labourers for excavation works; dismantle unsafe buildings, disposal of solid garbage and liquid waste, disposal of dead persons and carcasses. • Control other potential hazardous situations that might arise from oil, gas and hazardous material spills. • Organise relief camps wherever required; ensure pure drinking water, Sanitation, food, temporary shelters, basic relief materials as per requirements and needs. • Assist in post disaster response and rehabilitation work
9.	District Administration	• Prepare Drought Contingency Plan. • Issue necessary directions/ instructions to all concerned departments to be proactive to combat the upcoming situation in an effective and coordinated manner. Ensure effective coordination with all departments, agencies, NGOs and stakeholders. • Arrange/mobilize equipment and resources like water tankers, trucks/ vehicles to transport food supply, fodder, mobile medical vehicles, ambulances, etc. • Arrange for disposal of dead carcasses. • Generate daily reports of relief activities and disseminate. • Organise relief camps wherever required; ensure pure drinking water, Sanitation, food, temporary shelters, basic relief materials as per requirements and need. • Media Management • Procure tents, sanitation block, essential materials, etc. for relief camps.
10.	Department of Information and Public Relation	• Information dissemination, issue periodic bulletins to media. • Ensure information given to media are facts and true to avoid rumours. Arrange visit for media personnel in affected areas. • Information dissemination, update public on various relief interventions. • Operate the Control Room round the clock. • Nodal person to be designated as spokesperson for the Government. • Information dissemination, issue periodic bulletins to media.
11.	Emergency Operation Centre (EOC)	• Coordinate and issue direction to all concerned stake holders/ departments regularly • Brief the Disaster Management & Relief Commissioner regularly. • Coordinate the relief and rescue operation. • EOC to function as control room where all SDMA members and experts from various departments are available and take charge for effective coordination monitoring and implementation of rescue operations. • Prepare, forward and compile reports and returns from time to time. • Brief media regularly about the situation' • Brief/ Update the Government.
12.	Police	• Manning of control room 24x7. • Maintain regular state of readiness • Communication to EOC and stakeholders instantly.

S. No.	Department	Disaster Specific Action Plan
		• As first responder assume command for security and law and order • Demarcate entries and exits for rescue and relief operation and proper traffic management. • Support SDRF, Civil Defense, Home Guard, Army, Sainik Kalyan and other first responders for search and rescue. • Take necessary actions to avoid rumors. • Ensure prevention of theft and loot. • Deployment of lady police personnel in relief camps for Gender concerns.
13.	Electricity Board	• Issue directions to all officials/ staff. • Manning of control room 24x7. • Keep all resources in a state of readiness • Immediately shut down the supply of electricity in the area • Start restoration work of the damaged lines • Simultaneously, make electricity arrangements at the rehabilitation, relief camp areas.
14.	Rural Development Department (RDD)	• Issue warnings to all officials/ staff. • Manning of control room 24x7. • Keep all resources in a state of readiness. • Distribution of relief materials • Relief equipment, tractors, labour, digging/ excavation tools, etc. to be arranged to mobilise Support in organizing relief camps wherever required • Ensure pure drinking water, Sanitation, food, temporary shelters, basic relief materials as per requirements and needs. • Arrangement of Rural relief camps • Arrangement of community kitchens. • Assist in post disaster response and rehabilitation work
15.	India Meteorological Department	• Transmit updated information to EOC • Mass media publicity/ issue bulletins at regular intervals.
16.	Railways& Transport Department	• Manning of control room 24x7. • Alert officials/ staff and keep all resources in a state of readiness. • Search, rescue and evacuate injured persons to safer places. • Assess the situation for appropriate actions. • Regulate the movement of all trains and passenger buses • Carry out inspection of railway bridges and lines. • Deployment of equipment like generators sets, pump sets, cranes pulleys, dozers, gas cutters, earthmovers, labourers for clearance of fallen bogies, electricity Poles, damaged tracks, etc. • Transport and provide emergency tents, water, medicines, food, etc. to the accident site. • Adequate arrangement of specialized trains , trucks and Buses for transportation of rescue and relief material. • Restoration of damaged railway lines, electricity poles to restart services as soon as possible.
17.	NGO	• Provide first aid, health services, arrangement and distribution of food and relief materials , assistance to authorties,financial assistance *etc.*