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Chapter 1

Introduction

Chapter 1 Introduction

Aims and Objectives of the DDMP (disability-inclusive)

Section 30.2 (i) of National Disaster Management Act 2005, made it mandatory for every district to have a disaster management plan in place t. Under the chairmanship of the Hon. collector the District Disaster Management authority of every district t should prepare a disaster management plan include the HRVA, prevention & mitigation measures, preparedness, response and recovery plan.

1.1 The border objectives of this plan

- Improve understanding of disaster – i.e. risk, hazard and vulnerabilities.
- Analysis of Hazard, Risk, Vulnerability and capacity of people in coping with disaster situation.
- Assemble all relevant information from all line departments and the stakeholders related to management of disaster t through a unified format.
- Prepare the resource data and maps for better preparedness and reducing response time.
- Understand the responsibilities of all stake holders in management of disaster in all three phases.
- Setting up multi tasking District level operation Centre, which will act as a coordination center and decision support centre in a normal scenario and in times of any kind of emergency convert as EOC.
- Prepare the guidelines and mechanism for the district operation centre.
- Prepare the SOP's (standard operation procedure) in opine with Incident response system (IRS) for converting disaster management unit as proactive rather than reactive .
- Integrate mitigation measures in all developments plans.
- Promote the culture of disaster risk reduction for resilience through structural, non-structural and financial measures, as well as comprehensive capacity development.

1.2 Authority for DDMP: Disaster Management Act 2005 (DMAct)

At the district level, District Disaster Management Authority is responsible for all activities such as, capacity building, ensuring dissipation of early warning, preparedness, prevention, mitigation, coordination between departments and other stakeholders including the community.

Similarly, the authority is responsible for preparation of district level Plan and provide knowledge base support to other line departments to prepare their plans by providing suitable infrastructure.

1.3 Evolution of DDMP

The DDMP recognizes the need to minimize, if not eliminate the cause of disaster, therefore, plan should specify responsibilities of stake holders. The DDMP is envisaged as ready for activation at all times in response to an emergency in any part of the district. It is designed in such a way that, it can be implemented as needed on a flexible and scalable manner in all steps of disaster management: i.e. a) mitigation (prevention and risk reduction), b) preparedness, c) response and d) recovery (immediate restoration to long-term betterment reconstruction).

The DDMP also provides a broad idea with clarity for rapid mobilization of resources and effective handling of disaster by the district disaster management authority. **While it focuses primarily on the needs of the government agencies, it envisages all those involved in disaster management including communities and non-government agencies** as potential users. The DDMP provides a well-defined framework for disaster management covering scope of work and roles of relevant agencies along with their responsibilities and accountability necessary to ensure effective mitigation, develop preparedness, and mobilize adequate response

1.4 Stakeholders and their responsibilities

Stakeholders in Sindhudurg district are as follows-

1. District Administration
2. Under the chairmanship of Hon. District Magistrate who is also a chairperson of DDMA and Incident commander during emergency.
3. District Disaster Management Officer(DDMO)
4. DDMO is by and large responsible for day to day operations related to disaster management which includes conducting trainings, capacity building for stakeholders, management of EOC, and other administrative work such as coordination between other line departments, Liaoning with the NGOs in all three phases of disasters.
5. Zilla Parishad and PRIs
   All line departments and departments under Zilla Parishad (ZP)-
   a. Education, Health, PWD, Irrigation, animal husbandry, agricultural, etc. all departments under ZP and other departments such as Police, State Transport, Forest, Food and Civil Supplies, etc.
6. Various projects such as Swachh Bharat Mission, MGNREGA, NCRMP, DRR etc.

1.5 How to use DDMP Framework

The DDMP details a broad idea with clarity for rapid mobilization of resources and effective disaster management by the district disaster management authority. While it focuses primarily on the needs of the government agencies, it envisages all those involved in disaster management including communities and non-government agencies as potential users. The DDMP provides a well-defined framework for disaster management covering scope of work and roles of relevant agencies along with their responsibilities and accountability necessary to ensure effective mitigation, develop preparedness, and mobilize adequate response.

1.6 Approval Mechanism of DDMP:

Authority for implementation (State Level / District level orders)

DDMA is responsible for reviewing, updating and approval of the DDMP. This plan (DDMP) is further submitted to state disaster management unit (DMU) for the approval from SDMA.

1.7 Plan review and updating: Periodicity

The District Disaster Management Plan is a vital document interims of implementation and response perspective. The state plan has consisted of the broader idea the vulnerability profile of whole state, but the district plan consists with the detailed assessment report. So in case of any emergency this document is very useful to response quickly and mitigate the scenario.

As per the DM act 2005, section 31 (7) the District authority shall review the plan time to time, the implementation of the plan and issue such instructions to different departments of the Government in the district as it may deem for the implementation thereof.

Following measures should take care while updating the DM plan

- A planning should be done to review the plan on a regular basis, to ensure that the item recurring updating are changed and are current.
- When a updating is made to plan, the review date should be displayed on the review page of the plan.
- Plan holders are requested to verify that they have understood the changes.

Chapter 2

Hazard, Vulnerability Capacity and Risk Assessment

Chapter 2: Hazard, Vulnerability, Capacity and Risk Assessment (HVCRA)

This chapter is dynamic and hence, would enhance common understanding amongst stakeholders on priority sector areas that need attention for risk reduction and sustaining developmental gains. The depth of HVCRA will depend on the availability of resources. Therefore, analysis of existing information should form the basis of the DDMP and this section should be updated annually and relevant action points in the document should be suitably modified to address the new analytical findings.

2.1 Socio – economic profile of the district.

Sindhudurg is one of the disaster prone districts in Maharashtra having 121 kms. coastal line. Occasional Cyclones (Cyclone Phyan in Nov 2009), Floods are more common especially in Malvan, Kudal, Sawant wadi,Vengurla, Dogad and Kankavli due to overflowing rivers. Land slides are frequent especially in the ghats (Amboli, Karool, Phonda), Road accidents are frequent on Mumbai Goa highway (National highway no. 17) and due to hair pin bends there are many accident spots identified and Rail accidents along the Konkan rail, mostly during the monsoon due to landslide (In Vaibhav wadi near Kharepatan tunnel in Jun 2003) and lastly due to heavy rain and wind incidents of tree falling are observed. The present Disaster Management Program which has been implementing by the Government of Maharashtra aims to minimize the risk caused by unexpected disasters in the district. The Disaster Management Program exclusively works for developing the disaster management plans, providing trainings, and strengthening the capacity of the different Disaster Management Teams **(DMTs)** and creating awareness among public on various disasters. As it is said that, plan development is one of the vital objectives of this project much more attention has been paid by the district administration to develop the plan so that it will be more useful to handle the disasters timely in future. Therefore, genuine efforts have been dedicated to develop the District Disaster Management Plan (**DDMP**).

Disaster Management has comprehensive cycle that includes preparedness, response, recovery and reduction phases. Based on this cycle, the response part is addressed with Incident Command System, **(ICS)** a best management tool, and linked with resource inventory connected to website India Disaster Resource Network, www.idrn.gov.in **(IDRN).** In fact, ICS and IDRN make it more effective.

Above all, this plan will be a true guide to a disaster manager at district level, since it provides all necessary information required for timely and effective response to any unexpected disaster.

Being a coastal district Sindhudurg is largely prone to cyclones and flash floods. Considering this situation, the District Disaster Management Plan **(DDMP)** has been developed and covered all relevant information related to human resources, equipments and critical supplies

The earlier Ratnagiri district was divided into two districts, Ratnagiri and Sindhudurg on 1st May 1981 for the industrial and agriculture development of the southern part of the Konkan division. Sindhudurg District is located at the southwest corner of Maharashtra state along

with the western coast in the Konkan region. It is one of the six districts in the Konkan Division along with Ratnagiri, Raigad, Thane, Mumbai and Mumbai Suburban. It lies between latitudes 15□ 40' to 16□ 40' north and 73□ 20' to 74□ 10' east longitudes.

The district headquarter is at Oras Budruk which lies on the Mumbai Goa Highway and is well connected by bus routes to the state capital, Mumbai and other major towns in Maharashtra. The state capital of Mumbai is 550 kms to the north of this district, while Kolhapur is 160 kms to the east, Ratnagiri 192 kms to the north and Panaji, the capital of Goa is 80 kms to the south.

Area and Administrative Division

Sindhudurg district covers an area of 5207 km. For administrative convenience, it has been divided into 3 sub divisions.

Total Talukas – 8, Total Gram Panchayats – 429 Total Revenue villages –757, Total No.Of Saja – 335 Urban Local Bodies – 8

Sr.No	Name of the Sub-division	Talukas
1	Sawantawadi	Sawantawadi, Vengurla and Dodamarg
2	Kudal	Kudal and Malvan
2	Kankavli	Kankavli, Deogad and Vaibhavwadi

Sr. No.	Taluka	No. of Gram Panchayat	No. of Saja	No. of Revenue Villages
1	Sawantwadi	63	49	90
2	Kudal	68	59	125
3	Kankavali	63	48	106
4	Vengurla	30	33	84
5	Malvan	65	52	136
6	Deogad	72	50	98
7	Dodamarg	36	21	59
8	Vaibhavwadi	34	23	59
	Total	431	335	757

Socio Economic Features

The total geographical area of the district is 5207 km consisting of 1.69% of the total area of the state of Maharashtra.

Area wise, Sawantwadi is the largest Tahsil having an area of 1343.9 sq.km. Followed by Kudal 819.5 sq.km. ,While Vaibhavwadi is the smallest Tahsil with an area of 417.7 sq.km.

Demographics

Description	Figure
Total population(Census 2011)	8,49,651
Total male(Census 2011)	4,17,332
Total female(Census 2011)	4,32,319
Total literacy rate(Census 2011)	85.86%
Female literacy(Census 2011)	79.81 %
Families(Household) (Census 2011)	2,09,839
Schedule Caste Population(Census 2011)	55,586
Schedule Tribe Populations(Census 2011)	6,976
Total BPL families(2002 sourse DRDA)	74,809

Major Historical and Religious Centres

Kunkeshwar Dewasthan (Deogad), Sindhudurg Fort (Malvan), Bharadi fair (Aanganyachiwadi, Malvan), Bhavai fair (Sonurli, Sawantwadi), Ghodemukh fair (Sawantwadi), Datta Mandir (Patgaon, Deogad).

River Systems and Dams

There are six major rivers in the district.

1. Vaghothan 2.Sukhnadi 3.Tillari 4.Karli 5. Gadnadi 6. Terekhol
    1. The Vaghothan river has a course of about 48 kms from the Shivgad pass to it's mouth which is protected by the Deogad promontory from the south.
    2. Gad River flows in a southwesterly course from the Sahyadris and joins the sea 3 miles north of Malvan.
    3. Karli river is also known as Sarambal in the upper reaches and as Karli only at its mouth.
    4. Terekhol in its upper reaches is known as Banda river and in the lower reaches as Terekhol.

Sr. No	**Name of the Dam**	**Name of the River**	**Size**	**Status**
1	Tillari	Tillari	Large	Complete
2	Talamba	Karli	Large	On-going
3	Deoghar	Deoghar	Medium	Complete
4	Nardawe	Gad	Medium	On-going
5	Sarambal	Terekhol	Medium	On-going
6	Aruna	Aruna	Medium	On-going
7	Shirshinge	Vaghotan	Small	On-going
8	Tarandale	Terekhol	Small	On-going
9	Dendonwadi	Gad	Small	On-going
10	Shivdav	Gad	Small	Complete

11	Otav	Achara	Small	On-going
12	Talere	Khandara	Small	On-going
13	Nadhavade	Vaghotan	Small	On-going
14	Nirukhe	Karli	Small	On-going

There are some other rivers such as Kalne river, Kasal river, Kharepatan river, Kalaval river, Karli and Redi creek.

2.2 Matrix of Past disasters in the district

Sr. No.	Year	Magnitude	Talukas and number of villages affected	Life and cattle loss	Damage to infrastructure	Economic losses	Environmental

Hazard Risk Vulnerability Assessment (HVCRA): Till a proper HVCRA is conducted, this section may include analysis of the matrix of past disasters on maximum severity and best practices. This section may also include Geographic Information System (GIS) maps.

This chapter largely deals with the disasters that Sindhudurg district experienced. Based on this, the vulnerability assessment of people and their income sources, infrastructure, crops, livestock resources, drinking water supply, daily necessities, communication and transportation system, public distribution, medical facilities and other elements has been done so that such elements can be safely shifted to, or to be taken care of before any unexpected disaster or during the disasters. This is the most important part of the plan. Vulnerability assessment deals with the socio-economic vulnerability, housing vulnerability and environmental vulnerability.

2.3 Hazard, Vulnerability Capacity Risk Assessment (HVCRA)

2.3.1 Hazards

History of Disasters in Sindhudurg District

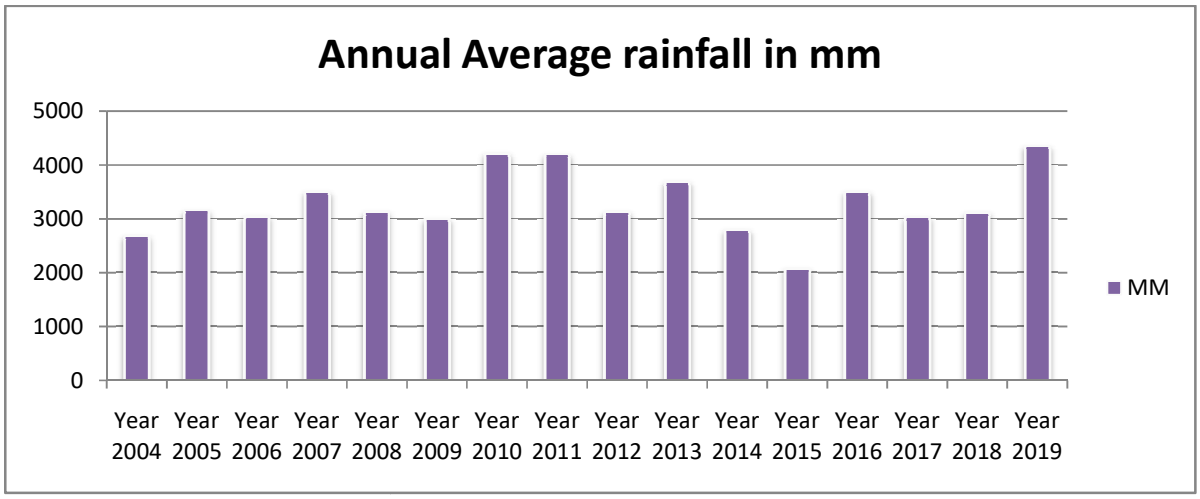
Sindhudurg district is situated in the coastal region and having a proximity to Arabian Sea. This district has a high amount of rainfall primarily because of the clouds of the southwest monsoon winds are blocked at the Sahyadri Mountains and so shed a lot of rain on the eastern side of the Western Ghat scarp.

This leads to very high rainfall in the foothills of the Sahyadris on the Konkan side with most of the Konkan Rivers having their origin in the runoff from the steep mountain slopes. Such a heavy rainfall causes largely flash floods, and occasionally landslides, road accidents.

Months during which maximum rainfall occurs are July & August.

Rainfall data of last 15 years average rainfall – 3283.66 mm

Sr. No	Year	Annual Average rainfall in mm
1	2004	2678.8
2	2005	3153.2
3	2006	3045.4
4	2007	3497.50
5	2008	3129.30
6	2009	2997.23
7	2010	4204.3
8	2011	4191.45
9	2012	3122.75
10	2013	3680.45
11	2014	2787.66
12	2015	2067.61
13	2016	3496.49
14	2017	3028.95
15	2018	3111.37
16	2019	4346.15
17	2020	4990.00
18	2021	4051.00
19	2022	3186.46



In the following talukas, some villagers were temporarily shifted to safe places due to the flood situation in the year 2005 & 2009. But there was no rehabilitation.

Taluka	Village	No. of Families	No. of people	Safe Shelter for evacuated victims
Kudal	Pavshi Sheltewadi	18	82	Relatives Place
	Chendwan Maliwadi	93	229	Primary School
	Sarambal	27	93	Relatives Place
Deogad	Dhalawali	2	7	Relatives Place and Z.P. School
	Manche	2	10	Relatives Place and Z.P. School
Sawantwadi	Banda	9	10	Relatives Place and Z.P. School
	Insuli	6	15	Relatives Place and Z.P. School
	Sherle	14	57	Relatives Place and Z.P. School

Tahasilwise number of people evacuated during 2019 floods

Taluka	Village	No. of Families	No. ofpeople
Dodamarg	Aavade	39	130
	Ugade	02	05
	Kudase	25	115
	Kendre Khurd	12	45
	Kendre Budruk	16	74
	Konal	74	135
	Ghativade	07	22
	Ghotage	116	254
	Ghotagevadi	07	35
	Zare	01	08
	Teravan Medhe	02	05
	Parame	12	41
	Palaye	01	03
	Bambarde	01	02
	Maneri	44	140
	Sateli Bhedashi	08	28
	Sasoli	12	38
	Jholambe	15	41
	Kumbhavade	01	03
	Total	**395**	**1124**
Sawantwadi	Banda	135	685
	Insuli	105	525
	Madkhol	18	110
	Asaniye	29	165
	Sherle	69	345
	Nigude	03	17
	Kas	07	23
	Shirshinge	48	240
	Majgaon	01	03
	Otavane	02	09
	Sarmale	03	19
	Satose	01	04
	Total	**421**	**2145**

Taluka	Village	No. of Families	No. ofpeople
Vengurla	Ubhadanda- Siddharthwadi	1	9
	Chipiwadi	5	19
	HodawadaBajar	1	6
	Hodawada (Kavadaswadi)	1	6
	Kelus(Bapadatewadi)	6	18
	Kelus(Madhaiwadi)	8	28
	Shiroda(Harijanwadi)	1	4
	Tulas Paltad(Parabwadi)	31	121
	Tulas (Kajarmali)	1	2
	Tulas (Wagheriwadi)	1	2
	Pal(Mirkholwadi)	4	16
	Dabholi(Mobarwadi)	1	9
	Vengurla	1	2
	Total	**64**	**240**
Kudal	Kudal	71	247
	Kavilkate	3	11
	Chendavan	99	298
	Pawashi	76	236
	Bao	20	67
	Sarambal	23	85
	Pinguli	24	97
	Anao	4	23
	Bambardetarf Kalsuli	8	41
	Ghotage	1	5
	Total	**329**	**1110**
Malvan	Tondavali Baudhavadi	12	40
	Bagwadi	2	6
	Mala	5	20
	Total	**16**	**66**
Kankavali	Kharepatan	2	5
	Total	**2**	**5**

The major calamities, which the district administration in Sindhudurg district has to face, are floods in the major rivers and road accidents on the Mumbai- Konkan - Goa Highway. Due to this, various disasters occur whose details have been given below:-

A. Flood

Flash floods bring about disasters. As expressed above there was a critical situation in some parts of the district during 2005-06 floods. Most of the rivers were overflowing and there was a loss of life and property. The river water entered the standing crops and the farmers suffered a huge loss. Most of the livestock also was flown away in this flood. Some people were shifted to safe shelters but there was no rehabilitation.

2.3.2 Vulnerability Assessment

A. Flood and Cyclones

Based on the previous history, Sindhudurg district has an unexpected rainfall and flash flood followed by landslides and road accidents. This district receives high amount of rainfall during the rainy season. As a result most of

the rivers get excess water and experience floods. This heavy rainfall also results in landslides in isolated areas characterized by steep slopes.

The major rivers where flood comes at least once a year are:

1. Waghotan 2. Sukhnadi 3. Tillari 4. Karli 5. Gad Nadi

Apart from flood, tidal waves may affect the villages close to the Arabian Coast during cyclone and Tsunami. Flood in 2005 affected almost the whole district by and large. The estimated loss resulted by this flood was more than 9 crores.

Identified flood prone villages Talukawise

Sawantwadi

Gram Panchayat	Flood Prone village/wadi	No.of families /persons to be affected	Red / Blue Zone	River / dam khadi
Insuli	Dhuriwadi	132 persons	-	Terekhol
	Bilewadi	278 persons	-	
	Kudavtemb	-	-	
Banda	Machhi Market	150 persons	-	Terekhol
	Nimajagawadi	-	-	
	Tulsanpulwadi	-	-	
Sherle	Kapaiwadi	6 families	-	Terekhol
	Dukanwadi	3 families	-	
Talawade	Joshiwadi	41 persons	-	Hodawada
	Pedanekarvadi	33 persons		
	Murarvadi	34 persons		
	Kaleredakarvadi	22 persons		
	Alikadchi Khervadi	3 persons		
	Bhutachi Vadi	5 persons		
Aaronda	Aaronda	14 families	-	Terekhol
Kinle	Kinle	10 families	-	Terekhol
Kavthani	Kavthani	-	-	Terekhol
Satarda	Varchiwadi	5	-	Terekhol
	Rayache Ped	-	-	Terekhol
Satose	Satose	-	-	Terekhol
	Alikadchi Khervadi	3 persons		
	Bhutachi Vadi	5 persons		
Aaronda	Aaronda	14 families	-	Terekhol
Kinle	Kinle	10 families	-	Terekhol
Kavthani	Kavthani	-	-	Terekhol
Satarda	Varchiwadi	5	-	Terekhol
	Rayache Ped	-	-	Terekhol
Satose	Satose	-	-	Terekhol

Taluka – Malvan

Gram Panchayat	Flood Prone village/wadi	Families/persons to be affected	Red or blue Zone	River /dam khadi
Masure-Marde	Kava	428 persons	-	Gad-Kalawal Khadi
	Sayyad Juva	108 persons	-	
Masure-Dangmode	Marde-Usalatvadi	110 persons	-	Gad-Kalaval Khadi
	Marde-Tokalvadi	165 persons	-	
	Khajanvadi	110 persons	-	
Bandivade-Budruk	Malawadi	174 persons	-	Gad-Kalaval Khadi
	Shilwadi	7 persons	-	
	Khorwadi	2 persons	-	
	Palavevadi	61 persons	-	
Malgao	Malgao	50 families		Gad Nadi
Bagayat	Bagayat			
Chinder	Aparajwadi	35 families		

Taluka – Kankavali

Gram Panchayat	Flood Prone village/wadi	No. of families / persons to be affected	Red Zone Or Blue Zone	River /dam khadi
Phonda	Phonda	12 families		Gad River
Kalmath	Kalmath	32 families		
Varavade	Varavade	31 families		
	Fanasnagar	15 families		
Kharepatan	Bandargao, Kajirde	30 families		Suk River

Taluka – Vaibhavwadi

Gram Panchayat	Flood Prone village/wadi	No. of persons likely to get affected	Red Zone or Blue Zone	River/dam /khadi
	Sardarwadi	50 persons	-	Gothana
Yedgao	Inamdarvadi	100 persons		
Napane	Napane	200 persons	-	Shanti Nadi
Kokisare	Ghangalevadi	50 persons		

Umbarde	Umbarde	300 persons		Sukhnadi
Kusur	Kusur	100 persons		
Sonali	Sonali	200 persons		200

Taluka – Deogad

Gram Panchayat	FloodProne village/wadi	No. of families / persons to be affected	Red Zone or Blue Zone	River/dam khadi
Dhalavali	Muslimvadi	25 families		Vijaydurg Khadi
Korle	Belanekarvadi	10 families		
	Khanvilkarvadi			
	Bhatvadi			
Malape	Muslimvadi	20 families		
Manache	Muslimvadi	30 families		

Taluka – Kudal

Gram Panchayat	Flood Prone village/wadi	No. of persons likely to get affected	Red Zone or Blue Zone	River /dam khadi
Kudal	Aambedkarnagar	81Population		Karli River
	Kavilkate	10 persons		
	Laxmiwadi(NEAR ST DEPOT)	31 persons		
Pawashi	Shelatewadi	146 persons		
Bao	Bagwadi	31 persons		
Sarambal	Dewoolwadi	101 persons		
Chendvan	Malewadi	232 persons		

Taluka – Vengurla

Gram Panchayat	Flood prone villages	No. of families / persons to be affected	Red Zone / Blue Line Zone	River / Dam or Khadi
Hodawada	Kavdaswadi	74 persons	-	Hodawada Tulas
	Kasturbawadi	48 persons	-	
	Nhaikarwadi	61 persons		

	Bhoj Dalviwadi	16 persons		
	Harijanwadi	59 persons		
	Dewoolwadi	19 persons		
	Parabwadi	11 persons		
	Subhashwadi	33 persons		
Kelus	Ranjanwadi	14 persons		Kalavi Nadi
	Bapadatewadi	48 persons		
	Madhaliwadi	34 persons		
Kalavi	Kalavi-Taliwadi	29 persons		Kalavi Nadi
	Bokarewadi	19 persons		
	Kalavi	295 persons		
Chipi	Chipi	22 persons		Karli Khadi

Most of the areas in the district are flood prone and therefore there is a danger to human life, livestock and property. The people living in kaccha mud houses are more vulnerable to flood. Here most of the people are engaged in agriculture therefore standing crops may be destroyed. Old people, pregnant women, disabled persons are highly vulnerable. They have to be shifted to safe shelters.

It is estimated that the above 85 villages are vulnerable to floods and cyclones. The main elements which are vulnerable are the people staying near riversides, poor people, children, old people and ailing people. The houses and the belongings of such people will be damaged. As the main occupation of the people here is agriculture, their crops will be washed away. That is they will lose their livelihood. The main infrastructures, communication system will be disturbed. Sources of drinking water will become impure. Necessary steps will have to be taken to restore the same.

Tidal Wave Prone Villages / Wadis

Taluka	Gram Panchayat	Tidal Wave prone Village / Wadi
Vengurla	Redi	Velagar
		Kerawade
	Vengurla	Kurlewadi
		Navabag
	Nivti	Kelus – Kalwibandar
		Bhogave to Newalewadi
		Kille – Nivti to Dungoba Devasthan
		Nivti – Medha
Malvan	Malvan	Talashi Tondavali to Waingani
		Devbag – Mobarwadi
		Tarkarli
		Dandi Vayri
		Dandi to Dhuriwada
		Rajkot to Medha
		Rajkot to Sarjekot
	Achara	Waingani to Tondavali (Middle Part)
		Pirachiwadi to Jamdool
		Morve to Tambaldeg
Deogad	Deogad	Taramumbari
		Mith Mumbari
		Anandwadi
		Deogad Killa
		Jamsande
		Wadatar
		Mallai
	Vijaydurg	Kharepatan

The villages near the three coastal talukas will suffer a lot during high tide, cyclone, storm,

etc. The fishermen living in these areas lose their livelihood. They do not get the danger warnings in time. Most of the land near the seacoast gets eroded and submerged into the sea every year.

B. Road Accidents

There is a good network of pakka and kaccha road in the district with 582.55 km of state highway and 2416.20 km Zilla Parishad roads. About 107 km of the National Highway Mumbai-Konkan-Goa passes through this district and has considerable transport of hazardous materials which are offloaded at Marmagoa harbour in Goa and transported to Mumbai and places in Maharashtra.

The information from the police and RTO reveals that road accidents take place on this highway, which are related to tankers carrying hazardous materials. No road site settlements and villages are affected by these accidents.

Konkan railway started running in the district on 20th Jan 1997. Its network is about 103 km. in Sindhudurg district. For this project nearly 800 hectares of land was occupied. There are two tunnels one at Vaibhavwadi and the other at Kharepatan. There are six railway stations such as 1. Sawantwadi 2. Kudal 3. Sindhudurg 4. Kankavali 5. Nandgaon 6. Vaibhavwadi. It proves to be a great boon to the people here as their time and money is saved as they travel to Mumbai and other places of the country. Also the perishable goods for which Konkan is famous such as Alphonso mangoes, jackfruits, cashews, fish can be supplied to far away places.

A railway accident occurred in the year 2003 in the monsoon season near Berle,Vaibhavwadi when the 904 Karwar – Mumbai Central derailed in which 52 passengers died and many were injured. So, to cope with such disasters in the future some safety measures must be followed.

About 107 km of the National Highway Mumbai-Konkan-Goa passes through this district and has considerable transport of hazardous materials which are offloaded at Marmagoa harbour in Goa and transported to Mumbai and places in Maharashtra. State Highway No.112, 115, 116 carry goods as well as people everyday on a large scale. Most of the accidents occur during rainy season due to slippery roads. Also the drivers do not follow the traffic signals.

The roadside houses, buildings are more likely to get affected due to the road accidents.

C. Landslides

Locations prone to landslides in this district are :

Due to heavy rain some parts of the district experienced landslides along with tree collapse leading to the human loss.

Landslides largely occur in three major hill stations and make troubles in movement of vehicles on both National and State Highways. So, it is a regular event, which cannot be ignored in disaster management plan.

- **Amboli Ghat** on Sawantwadi-Amboli-Belgaum Road State Highway No.180 .

- **Phonda Ghat** on Kankavli – Phonda – Ratnagiri – Kolhapur Road State Highway No. 178
- **Karul Ghat**-Gagan Bavada-Kolhapur Road State Highway No. 177

D. Earthquake

Though Sindhudurg district has no earlier history of earthquakes still it comes under the **seismic zone III.** There was no loss in Kankavli, Sawantwadi, Malvan and Vengurla due to the Killari earthquake of 1993.

In Deogad taluka, a loss of 6 houses in the village Jambhavade took place causing loss of Rs. 600/- and in Vaibhavwadi taluka Rs. 400/- of a house in the village Kolpe in earthquake of Killari and Umarga in 1993. The proximity of the Western Ghat Fault Scarp and evidences of neo tectonic activities in the Konkan area point to the earth movements in the recent past and the possibility of an earthquake cannot be ruled out. There is no history of earthquakes in this district earlier.

Due to heavy rain some parts of the district experiences landslides along with tree collapse leading to human loss. The passengers have to stay where they are. Amboli Ghat on Sawantwadi – Amboli -Belgaum Road State Highway No.112 supplies daily necessities such as milk, various goods which comes to a standstill. As a whole the communication system may totally get disrupted.

There is a control room at the Collector Office,district head quarter which works round the clock. At each tahsil office control room is in operation during monsoon period i.e. from June to October. The control room of Police works round the clock.

The officers of the control room of the district administration receives the information of flood, heavy rainfall, cyclone warning, uprooting of large number of trees, electric poles, road accidents, from various parts of the district and from IMD Colaba office and transmitting them to all Tahsil offices, Collector, RDC and Dy Collectors, Port and Fisheries Department. The Irrigation Department maintains control room on all the dam sites from June to October every year.

E. <u>Industrial and Chemical Accidents</u>

Sindhudurg is primarily an agricultural district with industrial areas accounting less than 1% of the total area of the district. There is M.I.D.C. Estate at Kudal and two Udyamnagars at Kudal and Majgaon in Sawantwadi Taluka. The core industries are plastic engineering, aluminium utensils, cashew processing, oil paints, cement pipe manufacturing, sleepers manufacturing and pig iron factory at Redi.

Thus, Sindhudurg district is vulnerable to various hazards as mentioned above. The data of the disasters and the

2.3.3 Authority/Agency that carried out HVCRA

The HVCRA was done in house with the help of local consultants available. The HVCRA is based on the data collected for past 10 years and in consultation with the tahasil office.

2.4 Tools, Techniques and Methodology used for HVCRA:

(As described in NDMA guidelines.)

Hazard Analysis: List of hazards with probability of occurrence (frequency and magnitude): It would consist the type of hazards that the district is prone to, history of hazards, impact analysis of the worst case scenario, the area, people and infrastructure that are exposed to these hazards. It should also provide information about the exposure levels of various villages and cities that fall in multi- hazard zones. This chapter could also look at issues that are being faced in the district due to climate variability.

Vulnerability Analysis: UN ISDR has defined "vulnerability" as the conditions determined by physical, social, economic and environmental factors or processes, which increase the susceptibility of a community to the impact of hazards. The analysis would cover various social groups, infrastructure, properties, and environmental resources that are vulnerable to the impact of various hazards in the district. The vulnerabilities can be categorized as physical/material, economic, social/organizational and attitudinal/ behavioural and environmental. This section would also describe major trends and forces of development that push people to live in unsafe conditions that lead to generation of new vulnerabilities- e.g. population growth, industrialization, environmental degradation, etc. Details to be given in Annexure. List of vulnerable Talukas and villages (hazard-wise) be provided in the Annexure.

Capacities and Resources Analysis: It should highlight the capabilities and availability of resources with the district administration and stakeholders to reduce disaster risks and organize effective response. Capacities could include policies, institutions, equipments, early warnings trained human resources to handle variety of response & coordination functions and financial resources that the district stakeholders have for disaster risk reduction (DRR). The information and analysis gathered pertaining to the physical, technical and financial resources that are available with different departments and stakeholders would also be enlisted (number, type, location, condition etc). The inventory of resources available (equipment & skilled human resources) with each department & stakeholder, including private resources that can be utilized for emergency response, should be prepared. Assessment of capacities and training needs of practicing engineers, architects and masons required for hazard resistant construction would be done. A list of departmental focal points with contact details should also be prepared while doing this analysis. Only analysis and outcome is to be given here. List of resources, availability and location is to be given in Annexure.

Outcome and recommendations of the HVCRA is to be provided.

Chapter 3

Institutional Arrangements for Disaster Management (DM)

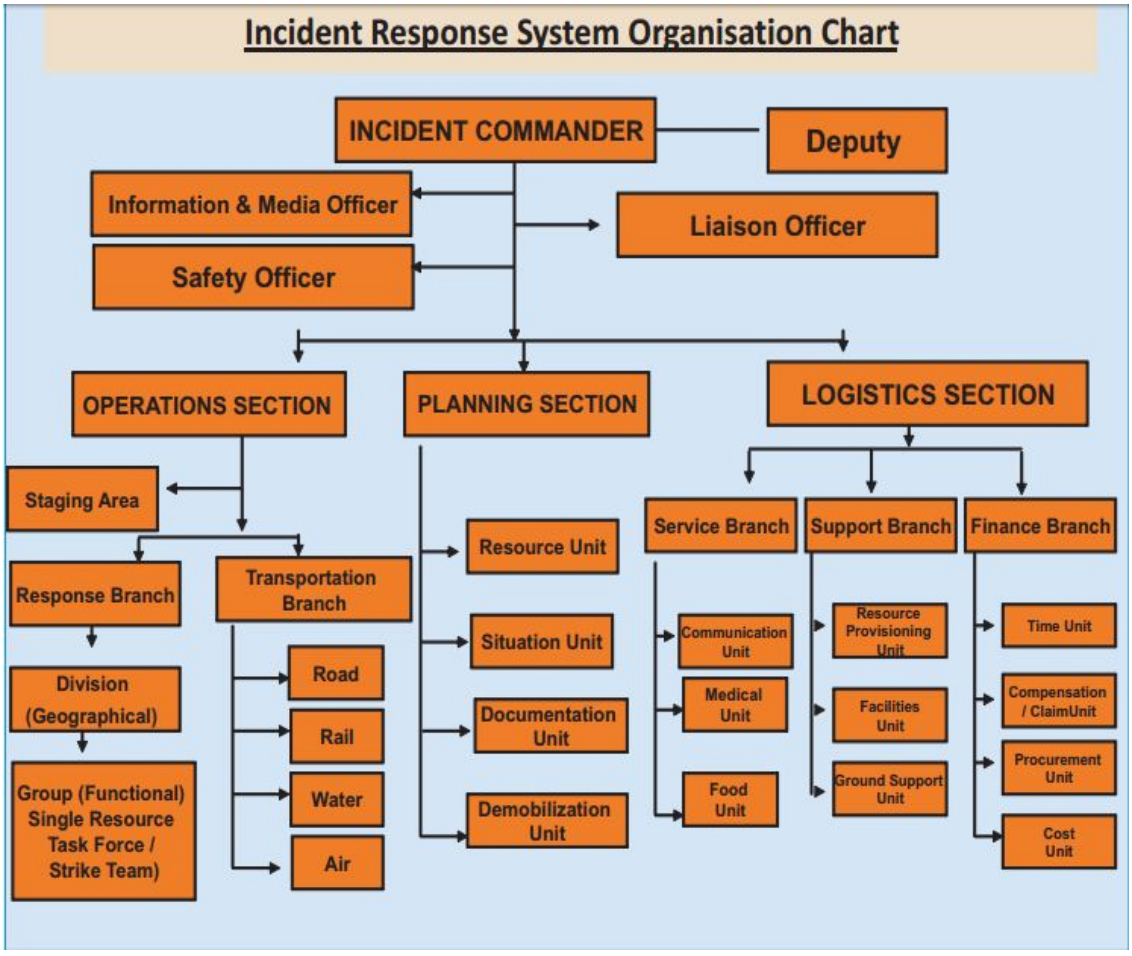
Chapter 3 Institutional Arrangements for Disaster Management

This section describes the organizational structure that exists at the District, Block, Gram Panchayat, Municipality and community levels for DM. It would include information about composition of the above institutions and their functions as per the DM Act, 2005 and the National Policy on Disaster Management 2009. However, District Disaster Management Authority (DDMA) may also identify functions of other institutions which they consider important such as Disaster Management Teams, Crisis Management Group / Incident Response System (IRS), Emergency Operation Centers (EOCs) and their operation, Site Operation Centres, Platforms such as inter-agency groups that would facilitate partnerships with NGOs, private sector, elected representatives, Community based Organisations (CBOs), other academic and technical institutions. Major industrial /service / infrastructure establishments and fair capability plans should be listed (detailed in annexure).

3.1 DM organizational structure at the national level,

NDMA i.e National Disaster Management Authority is the highest authority in the country under the chairmanship of Hon. Prime Minister and 8 experts. The authority is responsible for monitoring and guiding the state authorities regarding various issues related to disaster management in reference to DM Act 2005.

3.2 DM organizational structure at the state level including IRS in the State



At the state level, chairperson of SDMA Normally Chief minister or in case of his absence, person deputed by CM and approved by SDMA, acts as Incident Commander, while department head can be deputed depending upon type and nature of disaster, its intensity and chances of spreading which will help to bring the situation under control, as well as assist the vulnerable groups to that disaster.

3.3 DM organizational structure at the district level

3.3.1 District Crisis Management Group (CMG)

This group is parallel to district response force. It has important role to play during disaster scenario. Ideal composition of group will be representatives of Police, Home guard, Civil defence, Health department, PWD, NSS, NCC, NYK and civil society organization.

3.3.2 District Disaster Management Authority and Task Forces

In order to implement the District Disaster management Plan in the district the following committee has been constituted under the chairmanship of Deputy Commissioner as below:-

All the departments will identify the experts and willing personnel to be part of the district level task force. These members of the task force will respond to emergency situations depending upon type of disaster.

The DDMA has been constituted under section 25 (1) of the Disaster Management Act 2005 under the chairmanship of District Collector with the following officials / officers as members: -

TABLE 1 SHOWING THE DDMA MEMBER NAMES

Sr. no.	Position	Designation of the officers
1	Chairperson	Hon. District Collector
2	Co-Chairperson	Hon. Chairman Zilla Parishad
3	Member	Hon. Chief Officer Zilla Parishad
4	Member	The Superintendent of Police
5	Member	The Civil Surgeon
6	Member	The Executive Engineer PWD
7	Member	The Executive Engineer, Irrigation Dept.
8	Chief Executive Officer	Resident Deputy Collector (RDC)

The institutional mechanism for disaster management at the district level is as follows:-

District Disaster Management committee

Besides this, the Disaster Risk Management Programme also traced much to form Committees at the three levels with plans and task forces. A Disaster Management Committee exists to assist the Collector in

- Reviewing the threat of disasters
- Vulnerability of the district to such disasters
- Evaluating the preparedness

- Considering the suggestions for improvement of the response document DDMP

  Ideally The Committee is supposed to meet once a year under the chairmanship of the Collector and consists of the following functionaries. However, the duration can be varied as per the eruption of disaster and as the chairman of DDMA may feel necessary.

Status	**Designation of the officers**
Hon. Collector	Chairperson
The District Superintendent of Police	Member
The Chief Executive Officer, Zilla Parishad	Member
The Additional Collector	Member
The Resident District Collector	Member-Secy
The Chief Fire Officer Municipal Corporation	Member
The District Health Officer	Member
The District Agriculture Officer	Member
The District Animal Husbandry Officer	Member
The Civil Surgeon	Member
The Executive Engineer, P.W.D.	Member
The Executive Engineer, Irrigation Department	Member
The Executive Engineer, Minor Irrigation Division	Member
The Executive Engineer, M.S.E.D.C.	Member
The Executive Engineer, MWSSB	Member
The Deputy Director of Education	Member
The Divisional Manager, Railways	Member
The Regional Transport Officer	Member
The Regional Manager, M.S.R.T.C.	Member
The District Publicity Officer	Member
The District Supply Officer	Member
The Local Station Director, A.I.R.	Member
The Local Station Director, Doordarshan	Member

Tahsil Disaster Management Committee

This committee shall be constituted at every Tahsil under the Chairmanship of Tahsildar and the following members: -

1. Tahasildar
2. Nayab Tahasildar (Or RNT)
3. Responsible officer from Police dept.
4. Block Development Officer
5. Block Medical Officer
6. Representative from Education Dept.
7. Representative from College (NSS, NCC)
8. Representative from PWD,
9. Representative from MSEB
10. Divisional Forest Officer
11. Non Official Members
12. Chairman /Vice chairman Panchayat Samiti
13. Representative from Panchayt raj Samiti
14. Representative from Selected NGO (SHG, Youth clubs. Trekking groups etc)
15. MIDC Incharge

This Committee will prepare the Tahsil disaster management Plan and monitor capacity building / training and maintenance of equipments.

The committee will also conduct regular meetings and discuss about possible Hazards.

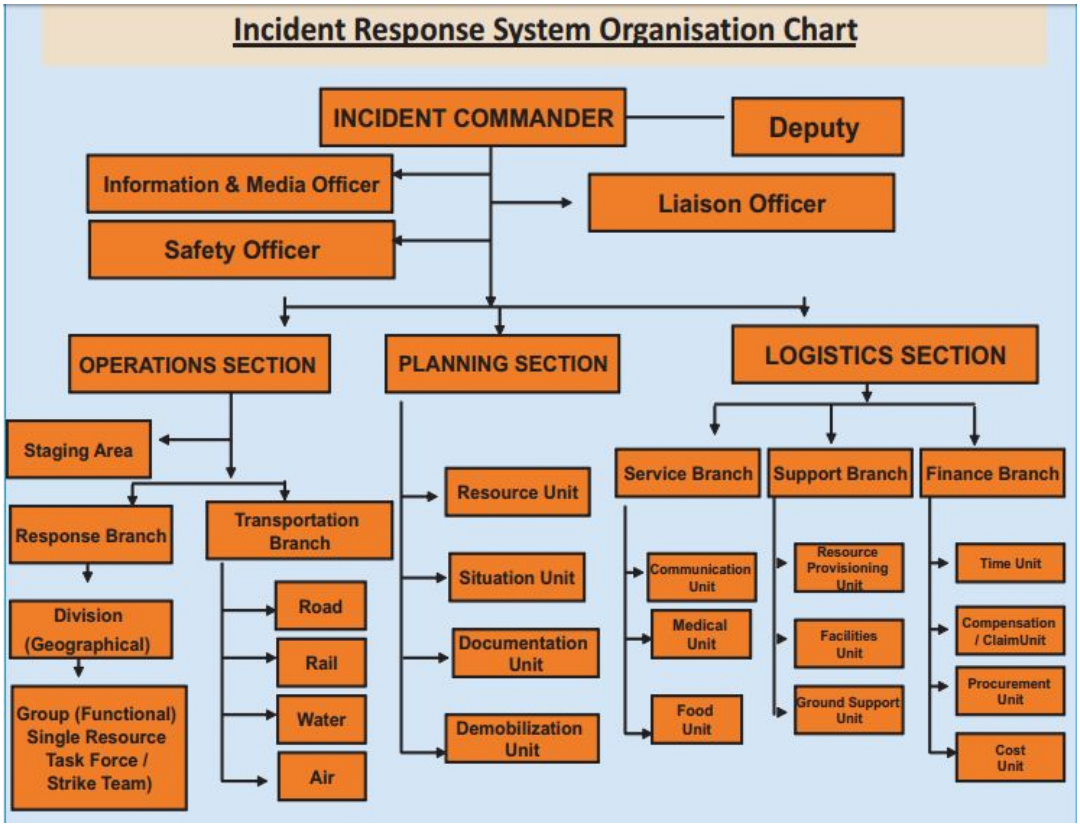
Village Disaster Management Committee

The committee can represent following -

1. Sarpanch
2. Talathi
3. Teacher,
4. Police Patil,
5. Gram Sevek
6. Anganwadi sevika
7. Asha Workers
8. Electrician
9. Patkari (irrigation dept)
10. NGOs e.g. SHG, Ganesh mandal, Krida Mandal etc.
11. Retired government servent or form armed forces.
12. Senior members from community.
13. Adequate representation should be given to ladies and other cast / religions.

This is reflected and detailed in village level plans prepared. This committee will be responsible for preparation of village level plan including identifying hazards and with special responsibility to for village level task force who can attend to the local emergencies.

3.3.3 IRS in the District



At the district level, chairperson of DDMA i.e. District Magistrate (normally Hon Collector) is Incident Commander, while all department heads can be deputed depending upon type of disaster, intensity and chances of spreading which will help to bring the situation under control, as well as assist the vulnerable groups to that disaster.

3.3.4 EOC setup and facilities available in the district

The warning or occurrence of disaster will be communicated to

- Chief Secretary, Relief Commissioner, Emergency Operation enter
- Office of Divisional Commissioner
- All district level officials, Municipal Councils
- The Officials of central government located within the district
- Non-officials viz; Guardian Minister of the district, Mayor, ZP President, MPs, Local units of the Defence Services.

District has following EOC's established

1. Divisional commissioner office
2. Collector office
3. RDMC Sangli (Regional D.M. Centers)
4. All Tahasil Headquarters. (operational only during Monsoon period) however the desk clerk responsible for D.M. at Tahasil level can be contacted by using his personal contact number.

3.3.5 Alternate EOC if available and its location

Addition to above mentioned EOCs,

1. Police
2. Fire and emergency services
3. 108 National ambulance service
4. MIDCs
5. Divisional Commissioner Office.
6. State ATI YASHADA (backup of Mantralaya control room (?)

Above have their own EOCs dedicated for their own operations. These EOCs can also be used as alternate EOCs in case of emergencies.

3.3 Public-Private Partnership

The PPP model was very successfully used during Malin landslide, which is considered as the best example in the country. Entire Malin village was relocated and shelters were constructed by involving public-private partnership.

Public and private emergency service facilities are available in the district

Many of the housing societies larger than 400 flats or more have their own task force in many cases including fire engine equipped with staff and infrastructure.

3.4 Forecasting and warning agencies

The list of the agencies competent for issuing warning or alert is given below :

Forecasting-

Indian Meteorological Department(IMD) and Irrigation department are main information centres, which forecast the likely occurrence mainly that of flood, cyclones, heavy rains.

Warning-

Mainly early warning system is activated through local tahsildar and is dissipated through the chain of government functionaries working at the village level.

Police, home guard, civil defence are also called upon to dissipate forecast/warning under directives issued by DDMA or by SDMA.

Disaster	Agencies
Earthquakes	IMD, MERI
Floods	Meteorology Department, Irrigation Department
Cyclones	IMD
Epidemics	Public Health Department
Road accidents	Police, Health
Industrial and Chemical Accidents	MIDC, Industry, Police
Fires	Fire Brigade, Police, MIDC

For immediate contact in case of major disaster;--

1. **NDRF,5th** BN , Pune,Tel-02114-247000,
2. **Coast Guard Goa**- Telephone- 0832-2521051, 2520440
3. **Coast Guard, Ratnagiri**, 02352-220490/224088, Fax- 02352

Chapter 4

Prevention and Mitigation Measures

Chapter 4. Prevention and Mitigation Measures

4.1 Understanding Preventive and Mitigation

Culture of prevention refers to the action that needs to be taken at all levels to save lives before a disaster strikes. Prevention refers to the activities and measures that are taken to avoid existing and new disaster risks. While certain disaster risks cannot really completely eliminate, prevention measures aim at reducing vulnerability and exposure. The key elements to prevention and mitigation are preventive planning and integration of disaster risk reduction measures in developmental planning. Disaster Prevention & Mitigation measures are guards of hazard impact. They stand against the intensity of the hazard impact and reduce the risk involved. The report states that the major responders in disaster situations, the state governments are responsible for organizing an effective disaster response mechanism as well as preparedness and mitigation measures. The first step towards this is the strengthening of the organizational structure of disaster management at various levels and revising/ updating codes, manuals and disaster plans.

4.1.1 Specific projects proposed for Preventing Disaster

The HPC carried out series of consultations with Government, non-Government, National and international agencies and media organizations that submitted their findings on the disaster management scenario in their respective areas. This became the basis for the planning process for prevention, preparedness and response plans for all administrative levels.

The importance of physical as well as socio-economic vulnerability is emphasized. The prevailing social and economic conditions and its affect on human activities affect the capacities of people to deal with the physical components of vulnerability. Thus the prevention and mitigation measures undertaken by the various levels of governance need to take into account both these aspects simultaneously. Policies that do not take into account both these aspects often fail to protect the populations they were created for. A good example of this are resettlement projects that do not take into account the traditional livelihood options of the people and fails to explore its viability in the new area, or introduce alternate options.

4.1.2 Specific projects for vulnerable groups

Without a through vulnerability assessment it is impossible to create a preparedness and mitigation plan. The following steps were stated as imperative for the same –

- Identification of hazard prone areas.
- Preparation of vulnerability profiles that map physical as well as socioeconomic hazards.
- Vulnerability and risk assessment of existing buildings and the initiation of retrofitting activities.
- The creation and implementation of technical guidelines for hazard resistant construction of buildings through techno-legal regimes.

This is an important aspect of prevention and mitigation activities as unplanned and inadequate developmental activity is one of the major causes of increased losses during disasters. Unchecked urbanization increases risks as communities live in high-

density areas with poorly built and maintained infrastructure. Unplanned and unscientific urbanization, poor land use patterns and deforestation are discussed in the report as a major cause for losses of human life and infrastructure in the aftermath of a disaster.

The report explores the disasters that India is vulnerable to in detail and divides it into geophysical regions based on topographic and climactic characteristics that make them susceptible to different types of disasters. In addition it looks at overarching issues of global warming and climate change, which it states will supersede all local environmental issues as it has the ability to completely change the face of the earth. It has been statistically proven that the Himalayan glaciers are shrinking steadily which means that entire water systems of the country will be affected. It is predicted that in the next 50 to 60 years the glaciers will stop producing the water levels that we witness and depend on. This will drastically cut down the water available downstream and adversely affect agricultural economies, which will cause tremendous social upheaval in areas already suffering from poverty.

Due to rapid population growth and urbanization in disaster prone areas, more and more people are vulnerable to disasters. Natural occurrence such as floods, earthquakes, cyclones etc. cannot be avoided completely as it is a part of the environment we live in, however it's impact can be reduced and its worst effects prevented. A natural hazard turns into a disaster when it affects people and causes economic damage, i.e. when it hits a community and disrupts it's normal functioning.

An emphasis has been made on the need to link disaster mitigation measures with developmental plans, effective communication systems, use of latest information technology, insurance, extensive public awareness and education campaigns. This can be done only through the strengthening of institutional mechanisms, international cooperation, and the involvement of the private sector.

The report looks at diversification of land systems as a strategy for providing insurance against risks caused by unexpected weather and erosion, while ensuring sustainable production of the land on a long term basis. It also looks at agroforestry, a technique of growing food crops in association with woody perennials, to optimize the use of natural resources and minimizing the need for inputs derived from nonrenewable resources. A form of multiple units land management, agroforestry has the potential to ensure stability and sustainability in production and provide ecological and economic security. The method can control soil degradation, desertification, floods, droughts, reduce pollution of groundwater, increase biodiversity in farming systems, check deforestation, reduced pressure on forests through on farm supply of fuel wood, fodder and other forest products.

4.2 Mainstreaming DRR

The following were other brief guidelines for prevention and mitigation of disasters –

- Take a proactive approach by emphasizing means to prepare for and prevent disasters thus reducing its effects on human life.
- Examine the relation between environmental degradation and vulnerability to disasters, and their combined effects on both natural and manmade habitats that will assist in creating long term prevention and mitigation plans.

- Utilize remote sensing data while conduction risk analysis and mapping.
- Adopt as a point of policy retrofitting of buildings and structures as a component of disaster management and earmark funding for the purpose.
- Create a knowledge base by linking with disaster research and education institutions to create a space for collaborative strategic thinking that can allow continuous revision of disaster prevention and mitigation plans.
- Initiate research that will collate local traditional disaster knowledge. This knowledge should be studied and examined alongside disaster information and scientific knowledge to create better prevention and mitigation plans.
- Record data about disaster events in a structured and systematic manner so that current measures and plans can be evaluated for effectiveness and amended as needed.
- Apply meteorological, climatological and hydrological knowledge in the area of disaster management that will assist in the assessment of risk, land-use planning and the designing of structures that greatly contribute to disaster mitigation.
- Take into account the cascading nature of disasters to create more effective prevention and mitigation strategies.
- Identify and strengthen existing centers of excellence in order to improve disaster prevention, reduction and mitigation capabilities.
- Create a culture of prevention by introducing measures for intensive training for building up of human resources to improve disaster awareness and capabilities.
- Initiate public disaster awareness and training programs that cater to the needs vulnerable groups like women, children, elderly and disabled to build up society's resilience towards disasters.
- Community mobilization in disaster situation is extremely important. Panchayats and Urban Local Bodies should be involved in activities towards community level coordinated action, disaster mitigation education etc.

4.3 List of ongoing projects

In-order to bring back normalcy of life in the disaster affected area Government brings many projects which are essential for upbringing of society.

Few of the projects are based on prevention and mitigation while few are post disaster

1. Projects such as National cyclone risk mitigation project -
   This is imitative of central govt. And is implemented by state government under funding by world - bank.
2. Risk reduction project is also flag project by state government.
   Yearly budget is allocated to district based on the activities
   This includes the strengthen district functionaries by preparing d.m. plans for dist level departments, conduct mock drills, conducting trainings, capacity building, control rooms, procurement of life saving equipments e.g. boats, life buoy, generator sets and other essential equipments.
3. Other schemes such as construction of safe houses, roads, strengthening of bridges and buildings, preparation of department wise plans, updating IDRN site etc.
4. Time bound projects by national and international level NGOs eg UNICEF, UNDP

4.4 Mitigation measures

4.4.1 Hazard Specific Structural and non-structural Mitigation Measures

Earthquake

An earthquake is a violent and sudden shaking of the earth's crust due to collusion or breaking or moving away of tectonic plates at the top of which the whole of human civilization is perched. The joining of the tectonic plates is known as fault-lines and where the disturbances weaken the surface of the plate almost to the breaking point is known as sub-surface fault lines. The earthquake is caused by the release of energy through these fault lines and sub-surface fault lines. The intensity of this energy ranges from 0 to 10 and is measured on Richter scale.

The typical impact of the tremor known as earthquake varies from its intensity to intensity and the distance of the area from its epicentre. It ranges from shaking of structures to the changing of very landscape. Its typical impact is in the form of physical damage, destruction of infrastructure and loss of property. Physical damages may be in terms of damages or destruction of structures or damages or destruction by fire or floods due to dam failures caused by earthquake. Casualties will be due to damage or destruction of structures etc. It will be much higher in areas nearer to the epicenter and densely populated area with weak buildings traditionally constructed with earth, rubble, bricks etc; urban settlements in poorly constructed apartments and in proximity of high rise buildings.

Prevention & Mitigations Measures

In case of Earthquake as a hazard no prevention measures are there to be taken. However, mitigation measures for Earthquake impact reduction are there to be taken. They consist of structural and non-structural measures.

Structural Measures: The prime structural mitigation measures that are expected to considerably reduce the impact of earthquake are:

- Conduct micro-zonation study and create seismic map in earthquake prone location.
- Identify the vulnerable structure
- Adopt the building code and suggestion given by the micro- zonation study and Properly designed, engineered and constructed structures — residential, service or infrastructure — built on well tested soil for adapting to suitable adjustments in design.
- Retrofitting in old structures so that short-comings in construction could be externally strengthened to a considerable extent to withstand the convulsions caused by Earthquake.

Non-Structural Measures:

For getting the structural measures implemented with due earnestness, honesty of purpose and sense of compulsion host of non-structural measures in the form of policies guidelines and training have to be provided.

- Policy decisions about construction of structures with due approval from specified authorities have to be taken. The building codes etc have to be suitably formulated/amended and appropriately detailed and legal implications properly stated.

- Guidelines both for earthquake-resistant constructions as well as for retrofitting have to be formulated with specifications about site selection, foundation, construction, materials and workmanship making involvement of specialist architects, trained engineer and masons mandatory.
- The guidelines have to be formulated for the concerned authorities about land use planning, monitoring of construction work and controlling of settlements in hazard prone areas to avoid fatalities and loss of property.

Mitigation Strategy

The desired implementation of mitigation measures requires a well-thought strategy. Implementation of mitigation measures, therefore, has to be multi-pronged: adoption wise attractive and cost wise comfortable.

The Strategy for mitigation measures for the typical effects of earthquake involves.

- Training of A, B, C, D, E, F, G, H and M; Architects, Builders. Contractors, Designers, Engineers, Financers, Government functionaries and masons.
- Awareness generation among the house owners about what details to look for or insist upon about the building, household fittings and equipment, in the houses they own or intend to purchase.
- Computer based information dissemination about the area-wise nature of soil, the kind of construction appropriate in the area, the certifications about the house/flat one is about to buy.
- The empanelment of specialist architects, trained engineers and masons by urban bodies and works departments for building earthquake resistant structures.
- The Certification of commercial buildings by Fire Dept and urban regulatory bodies both at the planning and completion stages.

But, all these put together shall not be sufficient to make mitigation measures people-centred and motivating enough to observe norms. It can, however, be done through

- Awareness among the stakeholders about the need to build/rebuild earth quake resistant houses/structures and keeping safe neighborhood.
- Capacity building of Architects/Engineers/Builders and even masons for construction of earth quake resistant houses/structures.
- Formulation of suitable building bye laws in urban areas and enforcement thereof.

Floods

Floods are temporary inundations of land with water caused by rains, overflowing of rivers, discharges released from large reservoirs, cyclones, tsunami, melting of glaciers and sea tides. It may come gradually and take hours and days together to recede or may even happen suddenly due to heavy rains, breach in embankments, failure of dams, cloud bursts, storm surge etc. Except for flash floods, there is usually a reasonable warning period.

In a land-locked district, floods are caused by either overflowing of rivers due to excessive rains in its catchment or excessive discharge released from reservoirs. The floods cause either breach in embankments or excessive erosions. As chance would have it, out of the four causes & consequences of floods—excessive rains, excessive discharge, excessive erosion, siltation and breach in embankments—only two of them can control and manage. The rest of the two are beyond the control of the administration. The district can however control excessive erosion, siltation and breach in embankments.

Normally, floods are quantified and analyzed on the basis of depth of water and duration for which floodwater stays. Velocity of water causes erosion of river banks and– or destroy and damage habitations and other structures. Rate of rising of water level and timing of floods vis–a–vis agricultural activities determine damages resulting from floods.

The damages caused by floods consist of the flooding of land leading to-

- Crop damage, collapsing of mud houses, buildings, endangering human lives,
- Livestock and other public and private property.
- People, standing crop and livestock are liable to perish by drowning.
- Utilities such as sewerage, water supply, communication lines, road network and power supply get damaged, disrupted or destroyed; clean drinking water becomes scarce.
- Food shortage is caused due to loss of harvest & spoiling of stored grains.
- The agriculture gets affected due to deposition of coarse sand layers over the ground or onset of salinity or water logging for considerably long period.

On the whole, floods damage houses/ human settlements/crops/infrastructure, endanger human and cattle lives, fragment families, destroy wealth, jeopardize livelihood base and causes migration. It literally wipes out the socio-economic development achieved so far in the state and drives it to rewrite everything and begin from the beginning: response, relief, restoration, rehabilitation, reconstruction, and redevelopment are needed on a very large scale. All precious investment is reduced to almost naught. All precious efforts made before go largely waste.

Flood Mitigation Measures

The flood mitigation measures may again be structural or none—structural. Mapping of flood prone areas is a primary step involved in reducing the risk of the region. Historical records give the indication of flood inundation areas and the period of occurrence and the extent of the coverage. The basic map is combined with other maps and data to form a complete image of the flood-plain. Warning can be issued looking into the earlier marked heights of the water levels incase of potential threat. In the coastal areas, the tide levels and land characteristics will determine areas liable to inundation. Flood hazard mapping will give the proper indication of water flow during floods.

The structural mitigation measures

- The revival and maintenance of traditional practices of dam, reservoir and ponds system for diverting and storing flood water and making use of the same for multipurpose activities including irrigation, restoration of water tables etc. For this, larger involvement of senior citizens from the local areas will be required who have better understanding and knowledge about the system.
- The conversion of rivulets and tributaries into reservoirs for storing flood water for a desired period and for later use. For this, major river-based GIS mapping would be required. Besides the bed of the rivulets and tributaries would have to be properly structured and meticulously maintained.
- Using base flow and flood flows of the perennial rivers to generate hydroelectricity by putting generating units of 5 MW, 10 MW or even 20 MW may be planned. This

will help both better river management as well as water conservation for productive utilization. As it is, we take care of and maintain anything which is productively utilized. Thus, if we start generating power, the rivers will in the process get maintained and managed.

- Attempt to modify Dams and Reservoirs, Embankment, Drainage Improvements, Channel Improvements, Diversion of Flood Waters and Using Natural Detention Basin.
- Storing Flood Water in reservoirs may help in reducing flood intensity, but the sedimentation caused by the stored flood water may subsequently reduce the capacity of the reservoir. As such, smaller reservoirs are often better choice than larger ones. For, then desilting of small reservoir becomes possible and can be undertaken periodically by the beneficiaries themselves.
- Channel Alterations help in reducing the gushing of flood water and these should again be done with provisions for regular maintenance of the slopes in the channel, removing of debris and other obstructions, using natural vegetation for strengthening the sides of the channels and for using it as a source of promoting fisheries etc.
- Watershed Management measures reduce overland runoffs from agricultural lands to streams or other water bodies by improving infiltration of rainfall into the soil, minimizing run-off and reducing the sedimentation that can clog stream channel or storage reservoirs. The measures to avoid it include maintaining trees, shrubbery and vegetative cover, slope stabilization etc.

Non- Structural Measures :

- Attempts to modify susceptibility of Flood. Flood plain zoning: It aims to regulate the developments in the flood plains, so that it is compatible with 'Flood Risk'. It recognises the basic fact that the flood plains are essentially the domain of the river, and as such all developmental activities must be compatible with the flood risk involved.
- Flood forecasting : Involves observing and collecting hydrological and meteorological data, transmission and then processing the data with a view to work out the likely level to be achieved at a particular site, i.e. to give advance warning. Stay in touch with IMD and CWC. Establish infrastructure for flood warning and dissemination.

Measures to be adopted at District Level

Following measures should be taken at District level by the collector on whom the implementation of DDMP rests. Action plan of relevant line departments should be put into order.

- Convening a meeting of District Level Disaster Management Committee before the onset of monsoon in the month of April/early May.
- Arrangement for functioning of control room. Specific charge should be given at Taluka level to listen to weather bulletins from radio and television to monitor the warning relevant to the Taluka.
- A joint inspection team at Taluka level will inspect river embankments in the month of March and April. A summary report will be sent to the Sub-Division and District accordingly.
- When monsoon breaks, District will send the daily/ weekly report regularly from the report received from village and gram panchayat levels and to the Sub-Divisional Officer. Dissemination of weather report and flood bulletins to lower level.
- Installation of temporary police wireless stations and temporary telephones in floodprone areas. Identification of the owners of country mechanised boats with address and contact numbers.

Landslide

Landslides impact the Earth's natural environment, including effects on (1) the morphology of the Earth's subaerial and submarine surfaces; (2) forests and grasslands, and (3) habitats of native flora and fauna. Morphologic effects are part of a general tendency of surface degradation by mass wasting and erosion. The effects of landslides on vegetation and wildlife are mostly negative; in some cases, they are catastrophic. However, landslide-caused disasters to flora and fauna are generally local in nature, which allows for species recovery with time. In the long term, landslides may even have positive effects on the habitats of flora and fauna.

Major earthquakes also have triggered multiple historic landslides over large areas. These often consist of thousands of individual landslides that in total have significant effects on the Earth's surface.

Prevention and Mitigation Measures of Landslide

Protection of life and properties from landslide disaster is indispensable in creating a safe environment for the society. The national imperative towards safety due to landslide initiation is increasing in view of the higher rate of human settlement in the mountain slope on many part of the district. Landslides are significant amongst those hazards that can easily be disastrous to human life and property. It is estimated that economic loss due to landslides may reach between 1-2% of the gross national product in many developing countries. Evaluating and mitigating the landslide hazard and risk is a major challenge for the technocrats and decision makers in the developing world as 80% of the reported fatalities due to landslide is within the developing countries.

Structural Measures

Risk treatment of already distressed slope includes the four broad types of landslide remediation practices for slope stabilization, namely: control works, restraint works, slope protection works and mass improvement techniques. Mitigation measures for landslide dams have been given special attention as a large portion of the hazard prone area in the district is susceptible to the formation of such dams with disastrous possibilities.

- Treating vulnerable slopes and existing hazardous landslides.
- Restricting development in landslide-prone areas.
- Preparing codes for excavation, construction and grading.
- Protecting existing developments.
- Monitoring and warning systems.
- Putting in place arrangements for landslide insurance and compensation for losses.
- Creation of landslide inventory.
- Selecting scales for mapping depending upon end-user requirements.
- Selecting landslide hazard zonation methodologies for different scales.
- Multi-hazard integration especially integrating seismic hazard.
- Prioritisation of areas for landslide hazard zonation mapping.
- Landslide risk zonation.

Geological and geotechnical investigations of landslide risk assessment involve a multidisciplinary approach where engineering geologists and geotechnical engineers are an integral part of the investigating team. The investigations include preliminary stage geological investigations, detailed geological investigations and geotechnical investigations. As an aid to the development of a systematic method and development of standard codes, and planning and capacity building for geological and geotechnical investigations, a few major disastrous landslides will be identified for creating pace setter examples of detailed investigations. These pace setting investigations will be carried out by assigning tasks to the identified organisations having necessary expertise and experience.

Depending on the risk assessment different kind of structural measures can be taken, like:

- Drainage Measures- Design Surface and sub surface drainage measures.
- Designing of check dam, canal, spill dam, culvert, diversion etc.
- Retaining structures- Type of retaining wall such as RE wall, Gabions wall, Concrete clad wall etc. with relevant and effective design.
- Slope Reinforcement- Soil nailing , geo grid reinforcement, rock anchoring, rock bolting , cable anchoring etc.
- Use of Geo Synthetic materials like- Geo bags, Geo tubes, Geo net, geo grid, Geo Synthetic clay liner etc.

Biotechnical slope protection consists of two elements: biotechnical stabilization and soil bioengineering stabilization, both of which entail the use of live materials – specifically vegetation . Biotechnical stabilization utilizes mechanical elements (structures) in combination with biological elements (plants) to prevent and arrest slope failures and erosion . Both mechanical and biological elements must function together in a complementary manner. Soil bioengineering stabilization, on the other hand, can be regarded as a specialized subset of biotechnical stabilization in which live plant parts, i.e., roots, stems and branches, serve as the main structural/mechanical elements in the slope protection system.

Non Structural Measures

Taking care towards non- structural measures are also important aspect for preventing the landslide risk.

- Landslide hazard, vulnerability, and risk assessment.
- Multi-hazard conceptualization.
- Landslide remediation practice.
- Research and development; monitoring and early warning.
- Knowledge network and management.
- Capacity building and training.
- Public awareness and education.
- Emergency preparedness and response.
- Regulation and enforcement.

The issues related to awareness and preparedness are considered to be of crucial importance in both the pre- and post-disaster management processes. Mechanisms will be initiated for creating awareness among various stakeholders including

government officials, local communities and non-governmental organizations on a sustained basis in landslide affected regions so that all the stakeholders are empowered by information and knowledge and mentally prepared to face the hazard.

Capacity building is an important component of the disaster management process and is a field which needs attention. The requirement and importance of introducing appropriate capacity development interventions including capacity upgradation of institutions and organisations, education and training of stakeholders and responders, and proper documentation is included in the Guidelines.

Fire

Fires are the accidents which occur most frequently. It has whose diverse causes that require a range of intervention methods and techniques adapted to the conditions and needs of each incident. The fire risk can arise either from industrial processes, accidents in storage godowns or closely built timber framed buildings

Depending on the type of fire (nature of the material ablaze), meteorological conditions (wind) and the effectiveness of the intervention, material damage can be limited to a small area, or affect wide areas like forests or agricultural fires, hydrocarbons, gas or other highly flammable products, storage or piping installations, and rail or marine transport equipment. Fires are an important disaster to focus on as they can arise in response to other disasters like earthquakes or landslides. As fire disasters can be primary or secondary focus has to be on ensuring that fire services are able to respond despite disturbances caused by another disaster that has just occurred.

As a part of mitigation strategy, efforts should be made to

- Make fire fighting services available to rural areas outside the local municipal limits.
- Assist municipal authorities that don't have fire brigades to establish such a service.
- Encourage agricultural marketing committees and cooperatives in rural areas to establish their fire services.
- Evolve methods of coordination between municipal fire services and industrial safety departments.
- Undertake community education and preparedness for fire fighting in areas where fire services will not easily available.
- In industrial towns, fire services should be equipped with protective clothing and fire fighting devices including masks, gloves etc. for dealing with chemicals and toxic materials.
- Special burns wards should be established in every civil hospital and in the hospitals near the industrial estates.
- Equipping fire services with communication facilities like wireless etc. and wherever such facilities exist, these should be upgraded.
- Computerized data management system should be introduced to keep the record of all fires including frequency, extent, fatality, economic losses etc.
- The roles and responsibilities of district administration, police, fire services and medical services should be clearly laid down.

Epidemics

An epidemic is the rapid spread of infectious disease to a large number of people in a given population within a short period of time, usually two weeks or less. An epidemic can be the consequence of other disasters like storms, floods, droughts etc. Strengthening surveillance programmes and warning systems go a long way in controlling epidemics.

Mitigating the risks from epidemic

Steps towards mitigating the risks from epidemic include the following –

- Identification of areas endemic to certain epidemics must be routinely updated to access field requirements
- Identification of appropriate locations for testing laboratories
- Ensuring continuous flow of field data from both government establishments and private medical personnel.
- Collating and analysing the data at regular intervals to assess epidemiological monitoring requirements.
- Creating awareness among the general population to encourage preventive measures that can help in controlling epidemics.
- Quality monitoring of piped drinking water supply and water.
- Vector Control programmes as a part of overall community sanitation activities which include surveillance of water bodies and canal distribution network for control of diseases like malaria.
- Promotion of personal and community latrines
- Introduction of sewage, drainage and solid waste management systems
- Promoting and strengthening community hospitals with adequate network of para professionals to improve the capacity of the Public Health Department (PHD) for surveillance and control of epidemics.
- Establishing testing laboratories at appropriate locations in different divisions within the districts to reduce the time taken for diagnosis and subsequent warning.

Special reference to Pandemic (Covid – 19)

A new virus called the severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) was identified as the cause of a disease outbreak that began in China in 2019. The disease is called coronavirus disease 2019 (COVID-19).

In March 2020, the World Health Organization (WHO) declared COVID-19 a pandemic. Public health groups, including the U.S. Centers for Disease Control and Prevention (CDC) and WHO, are monitoring the pandemic and posting updates on their websites. These groups have also issued recommendations for preventing the spread of the virus.

How does the corona virus spread?

Data has shown that it spreads from person to person among those in close contact (within about 6 feet, or 2 meters). The virus spreads by respiratory droplets released when someone infected with the virus coughs, sneezes or talks.

What are the symptoms of COVID-19?

COVID-19 symptoms can be very mild to severe. Some people have no symptoms. The most common symptoms are fever, cough and tiredness.

Other symptoms may include shortness of breath, muscle aches, chills, sore throat, headache, chest pain, and loss of taste or smell. This list is not all inclusive. Other less common symptoms have also been reported. Symptoms may appear two to 14 days after exposure.

What can I do to avoid becoming ill?

The best way to prevent illness is to avoid being exposed to the virus. The CDC and WHO recommend following these precautions:

- Keep 6 feet (2 meters) of distance between yourself and people outside your household.
- Wash your hands often with soap and water for at least 20 seconds, or use an alcohol-based hand sanitizer that contains at least 60% alcohol.
- Cover your mouth and nose with your elbow or a tissue when you cough or sneeze. Throw away the used tissue.
- Avoid touching your eyes, nose and mouth.
- Clean and disinfect surfaces you often touch on a daily basis.

If you have a chronic medical condition and may have a higher risk of serious illness, check with your doctor about other ways to protect yourself.

Role of district administration in Pandemic –

As health of the people is one of the prime responsibilities of district administration, district disaster management authority (DDMA) should take immediate action to control the pandemic under the guidelines of the Health department.

The incident response system to be activated with Head of Health department as deputy to Incident commander.

DDMA to initiate control rooms at, Health dept and other line departments with collector office as main control room (incident command control room).

After initial information regarding the spread of epidemic, the areas where spread is maximum should be taken in consideration and then the action plan (Response) for controlling of epidemic should be worked out with on consultation Health dept., the assistance of other line departments, NGOs and other agencies (such as private Hospitals, suppliers) should also be included in response plan.

The detail inventory of recourses to be prepared as per the type and spreading of pandemic.

Adequate preventive equipments (foggers, spreading pumps, pesticides, dusting powder, testing kits, masks, PPE kits, Human recourses are to be made available.

Industrial and Chemical Accidents

- Industrial and chemical accidents refer to incidents originating from technological or industrial accidents, dangerous procedures, infrastructure failures or certain human activities, which may cause the loss of life or injury, property damage, social and economic disruption or environmental degradation.

- Major accidents involving chemical substances have local effects, but in some circumstances they can affect whole regions because of factors like the weather conditions during the time of the accident. Prevention of such incidents must be the priority, but a positive result can only be assured if there are strict guidelines for using and handling of dangerous chemicals.
- When an accident involving chemical substances that could endanger life or the environment occurs in a chemical works or installation, those in charge of it should implement the safety measures which will minimise its consequences.
- They should immediately inform the relevant local authorities of the accident who will be responsible for informing the public and deciding upon the instructions to be followed by them.
- The co-ordinated use of the civil and military means required to deal with the disaster should be ensured.
- All industrial concentrations should be encouraged to establish MARG for management of industrial accidents.
- Industries involved in the production or transportation of inflammable, hazardous and toxic materials should have a mandatory responsibility for preparing an off-site plan and communicating the same to the District Collector. Simulation exercises should be undertaken in the adjoining communities.
- Poison centers should be established in every civil hospital and in the hospitals near the industrial estates with facilities for detoxification.
- All transport of hazardous and toxic materials should be communicated to the RTO.
- All pipelines carrying hazardous and toxic materials should be equipped with devices to check any leakage or metal fatigue.
- Small-scale industries releasing toxic wastewater should be encouraged to set up common effluent treatment facility.
- A common format for chemical data sheets should be devised which should be used to collect information from all industries in the district and the same should be available with fire brigade and police.

Cyclone

Ref - https://nidm.gov.in/PDF/safety/flood/link2.pdf

Cyclone is natural phenomena which have set pattern in Indian sub continent. Normally all the cyclones are developed between equator and 6 degrees North / south. These low pressure start moving towards north / south direction and start gaining speed as well as intensity as they start approaching to land. This speed and intensity depends upon the temperature difference between sea water and temperature on land.
In Indian continent, on east coast, the probability of cyclone hitting the land area has be around 8%. However, due to global warming, it is notice that frequency and the intensity has increased. This is now considered is potential hazard to Indian west coastal area.

According to the World Meteorological Organization (WMO), tropical cyclones are weather systems "in which winds exceed gale force (34 knots or 63 kmph)". A combination of warm sea temperatures, high relative humidity and atmospheric instability results in the formation of a tropical cyclone. These disasters are

characterised by destructive winds, storm surges and torrential rain causing massive community disruption.

A long coastline of 7516 Km has resulted in India's exposure to nearly 10% of all tropical cyclones. On an average, 5-6 tropical cyclones occur in a year in India, mostly in the Bay of Bengal. Post-monsoon cyclones occur most frequently and are generally more devastating in intensity. It is estimated that 58% of the cyclonic storms that form in the Bay of Bengal hit the coast in October and November. Strict implementation of Coastal Zone Regulations, efficient early warning dissemination mechanisms and construction of cyclone shelters and cyclone resistant housing practices are important mitigation measures to reduce the risk.

Vulnerability -

The vulnerability of a human settlement to a cyclone is determined by its siting, the probability that a cyclone will occur, and the degree to which its structures can be damaged by it. Buildings are considered vulnerable if they cannot withstand the forces of high winds. Generally those most vulnerable to cyclones are light-weight structures with wood frames, especially older buildings where wood has deteriorated and weakened the walls. Houses made of unreinforced or poorly-constructed concrete block are also vulnerable.

Early warning -

The warning for the cyclone is received from Indian Metrology department (IMD) giving indicators such as direction of wind, movement of epicentre, wind speed, wave height and probable land fall point. Normally such warnings are issued every 6 hourly and information is updated.

These warnings are sent to Mantralaya control room, Respective Collector office control room and Police dept.

The warning received in form of wind speed and probable landfall point is dissipated by district administration to probable affected area.

After receipt of warning (normally 12 hours before land fall time which is close to accurate) the prevention measures are initiated.

Prevention –

The prevention is not possible to control the cyclone but proper prevention methods by community surely helps in reducing the loss of life and property. Following 6 points are essential to reduce the damage. And this is possible by proper capacity building activity by district administration.

1. Avoid areas prone to storm surges and flooding.
2. Shelter domestic animals.
3. Secure vehicles.
4. Those in insecure dwellings, move as early as possible, to **cyclone** refugee centre with your emergency kit.
5. Avoid going outside.
6. Monitor closely **cyclone** bulletins on Radio/TV.

Mitigation –

Proper and solid construction is main to mitigate the impact of cyclone. However following 7 points helps in reducing losses in case of cyclone hits the area.

1. Installation of early morning systems.
2. Developing communication infrastructure.
3. Developing shelter belts.
4. Developing community **cyclone** shelters.
5. Construction of permanent houses.
6. Training and education.
7. Land use control and settlement planning.

Under the ongoing project of national cyclone risk mitigation project (NCRMP) which is funded by world bank and is implemented by National disaster Management Authority (NDMA) and State Disaster Management Unit (DMU) have initiated mitigation activity such as development of Mangrove forests, shifting electrical cables to underground, construction of cyclone shelters, capacity building of stake holders from different departments etc.

Tsunami

(https://tsunami.incois.gov.in)

A tsunami is a series of waves caused by earthquakes or undersea volcanic eruptions. But as the waves travel inland, they build up to higher and higher heights as the depth of the ocean decreases. The speed of tsunami waves depends on ocean depth rather than the distance from the source of the wave.

A tsunami in the deep ocean has very long wavelengths and very low **amplitude**. Approaching the shore the tsunami will slow down in **speed** and amplitudes will increase dramatically. This is due to the fact that the tsunami's **energy** flux, which is dependent on both its wave **speed** and wave **height**, remains nearly constant.

Vulnerability

Sindhudurg district have long coast line on west of the district. Even-though there is no record of Tsunami wave in coastal Sindhudurg, due to large floating population of tourist, Hotels, beaches resorts, and outside workforce working on fishing vessels. Labour working in mines and on various roads, rail, airport and seaport projects, the vulnerability is considerable.

This vulnerable group consists of low income group population and migrated workers with limited access to various information related to their safety.

It is difficult to state the number as in case of tsunami, the floating population and early warning will vary the number of likely affected population of the district.

Early warning

In response to December 26, 2004 tsunami, government of India has established Indian Tsunami Early Warning Centre (ITEWC) at Indian National Centre for Ocean Information Services (INCOIS), Hyderabad under the Ministry of Earth Sciences and is operational since October, 2007. Indian Tsunami Early Warning System comprises a real-time seismic monitoring and sea-level (Tsunami buoys and Tide gauges) network. In addition, INCOIS also takes the help of numerical model to assess the tsunami potential at different locations on the coast. The system is operational round the clock on all days. The ITEWC is capable of detecting ‘tsunamigenic’ earthquakes occurring in the Indian Ocean as well as in the Global

Oceans within 10 minutes of the occurrence of the earthquake and disseminates the advisories to the concerned authorities through email, fax, SMS, GTS and website. The ITEWC is providing advisories to all Indian Ocean rim countries as part of UNESCO-IOC framework.

Prevention

Unfortunately Tsunami cannot be prevented as its outshoot of earthquake in sea. How ever small measures such as mangrove forest, plants / trees those can reduce the serge of the water

Indicators that can help in preventing losses due to Tsunami.

1. Have Community Tsunami Risk Reduction Plan.
2. Have designated and mapped tsunami hazard inundation zones.
3. Have a public display of tsunami information.
4. Produce easily understood tsunami evacuation maps as determined to be appropriate by local authorities in collaboration with communities.
5. Develop and distribute outreach and public education materials.
6. Hold at least three outreach or educational activities annually.
7. Conduct an annual tsunami community exercise.
8. Address tsunami hazards in the communities Emergency Operations Plan (EOP)..
9. Commit to supporting the Emergency Operations Centre (EOC) during a tsunami incident, if an EOC is open and activated.
10. Commit to supporting the Emergency Operations Centre (EOC) during a tsunami incident, if an EOC is open and activated.
11. Have redundant and reliable means for a 24-hour warning point and/or EOC to disseminate official tsunami alerts to the public.

Mitigation

The strict implementation of Costal Regulatory Zone (CRZ) is key in reducing loss to life and property in case of Tsunami and cyclone.

Construction of cyclone shelters, mangrove development, ensuring safe houses which can withstand intensity of tsunami and gust of cyclone should be mandatory on 5 km distance from coastline specially in the bay areas.

Addition to above, capacity building of the people in coastal areas plays important role. Proper understanding at grass root level ensures the prompt and in time evacuation.

Mock drills involving district, state level functionaries also add to the mitigation ensuring in reduced loss of life

Drought

Drought is a slow creeping disaster. Its onset is difficult to demarcate and so also its end. Delay in the arrival of monsoon, failure of monsoon, irregular and scanty rainfall during kharif, falling of groundwater level, drying of wells and reservoirs and deficit in paddy plantation indicate the onset of drought. Generally non-structural and, therefore, difficult to quantify on immediate basis. Its spatial extent like that of floods denotes its severity.

The fall in groundwater level, less food production, availability of less fodder for animals, migration of labourers, water crisis determines its long-term impact. Its impacts like those of floods are cumulative and its continuance over a period or season magnifies the impact manifold.

Drought unlike other hazards does not cause any structural damages. The typical effects include loss of crop, livestock, timber, fishery production, food shortage, dehydration, loss of life, increased poverty etc. In fact, the impacts of drought are generally categorized as economic, environmental and social.

- Economic impacts denote loss of production in farm sector and also in nonfarm sectors like- forestry, fisheries, poultry, livestock because they depend upon surface and sub-surface water supplies. These losses result in loss of income and purchasing power among those rural people who depend on these for their livelihood. The processing industries based on agro- products suffer losses due to reduced supply of agro-products or supply at enormously increased prices. And losses both in primary and secondary sector result in unemployment, loss in revenue etc.
- Environmental impacts are seen in the depletion of flora and fauna due to reduced availability of water both for feeding and drinking the wild life habitats with the loss of forest cover, migration of wild life and their increased mortality due to preying by starving population. Continuance of drought for a longer period may result in the loss of biodiversity.
- Social impacts are seen in the large scale migration of the population from the drought affected areas to areas less affected, thereby causing dissensions. Children prefer doing some wage earning rather than going to school. People start selling their

possessions to manage two times meal for the family. The social status and dignity get compromised. Inadequacy of food supply causes starvation. Inadequacy of water supply generates social conflict. Thus the social capital and moral economy, the woof and warp of social fabric, is tattered and reduced to pieces.

Drought Mitigation Measures

Structural Measures

Water Management: In the land of flooding rivers, if drought is a recurring feature then surely, it is a clear-cut case of poor water management.

- Keeping in view the drainage and irrigation as interdependent to maintain the quality of soil, following water conservation related measures are required to be taken in drought prone areas.
- Maximising efficient use of available surface and groundwater in drought prone areas i.e. to resort to drip and sprinkler practices wherever possible, particularly for commercial crops including fruit orchards,
- Construction of underground reservoirs to escape the impact of evaporation.
- Conservation of floodwater in the branches of mainstreams and the network of rivulets.
- Creation of Anicuts or check dams to hold water in the river beds and make it flow through the canals for irrigation purposes.
- Revival of dam, reservoir and pond systems of the past and maintain the same.
- Digging of recharge wells and water harvesting structures to conserve water through rain water harvesting and by developing the culture of roof water harvesting in each household.
- Spring water harvesting by diverting hill streams through small excavated channels, called KULS for irrigation and domestic use.

Soil Management:

The other factor responsible for drought conditions in Bihar is the nature of soil for which the first and foremost measures to be taken are:

- The use of organic fertilizers which not only enriches the soil with minerals but also slowly but surely enhances its water holding capacity. Besides, the use of organic fertilizer gets better values of the products in the market, specifically in the developed countries.
- Aforestation which helps in both water and soil conservation. Such plants that have shorter growing period should be preferred. It helps the soils in enhancing its capacity to hold water and prevents erosion. It is also said to be the best method to contain the spread of drought.

Crop Management:

The third factor responsible for agricultural drought is kind of cropping being done. There are cropping patterns that help in soil conservation as well as in getting better farm yield. They are:

- Strip cultivation: Consist of cultivation of different crops in different strips simultaneously.
- Cover Cropping: In plantation fields where gestation period of trees is long., creeper crops are planted which spread fast and provide cover to the top soil and thereby conserve it.

- Crop rotation: Instead of grooming the same crop in the same field every year which tends to exhaust the same kind of mineral in the soil, as well as the moisture content in the soil. By rotating different types of crops soil fertility and moisture contents both are preserved.
- Alternate cropping: In deficit and/or irregular rainfall situations, alternate crops requiring less irrigation like bazra, need to be sown.

Introduction of modified Crop insurance:

Disaster management is an integral part of agriculture and a well functioning insurance scheme is the only answer. Response to disasters through NCCF and CRF has failed to adequately address to the problem of agrarian distress due to vagaries of nature. National Agriculture Insurance Scheme (NAIS) even in the modified version fails to address this issue – indemnity levels are low, threshold levels are unrealistic, premium rates are high even after subsidy, crop compensation is unsatisfactory.

- To mitigate the drought and market risks, a farmer friendly crop insurance scheme through private insurance companies would be introduced for all major crops where the development cost of insurance product would be shared by the State Government. Scheme being an area insurance scheme amounts to a car insurance scheme when the owner would get compensation only when certain number of cars also meet accident before the owner gets the compensation.

Non- Structural Measures

Along with the structural measure non- structural measures are necessary to implement. Sometimes implementation of the structural measures are not possible due to funding issues on that scenario a strong ground for non- structural measures can prevent the drought scenario on greater extent. The different kind of measures can be adopted by the states are:

- Working towards convergence of lessons learnt from studies carried out by multiple institutions working in related fields such as Central Research Institute for Dry land Agriculture (CRIDA), Agriculture Institute, India Meteorological Department (IMD), National Remote Sensing Centre (NRSC) and Indian Council for Agricultural Research (ICAR), etc.
- Impact of drought on agricultural economy should be assessed in terms of indicators like area sown, input use, livestock, crop yield, farm and overall income, employment and migration of families.
- Impact of drought on the poor in urban areas should also be assessed.
- Great stress be laid on preventing deterioration in quality of life during drought.
- Drought mitigation measures should be strengthened with the help of the on- going communication revolution. Remote sensing techniques should be used extensively for drought assessment and mitigation. Satellite data may be used to target potential ground water sites for taking up well digging programmes.
- There should be adequate accountability of drought management authorities at all concerned levels of administration. There should be proper monitoring, assessment and evaluation of actors taken by the authorities.
- Agricultural extension agencies should be effectively involved in drought mitigation efforts; these agencies should remain very alert during the period of drought and should be strengthened in drought prone areas.
- Timely and adequate supply of inputs like drought resistant seeds by the concerned authorities should receive emphasis.

- There should be Water Availability and Outlook Committee and Impact Assessment Committee at local levels.
- Capacity Building program for different group of people at different level, like- arrange demos on drip and sprinkle irrigation and water harvesting for farmers at drought prone areas.
- Encourage farmers to adopt crop pattern development programs.
- Arrange awareness program regarding drought at different level.

Mitigation Measures/ Activities and Responsibility of line departments at various stages of Disaster Cycle of Various Hazards

Flood

Task	Activities	Responsibility
Development of techno- legal regime/ regulations	❖ Prohibition of development in wetlands, flood zone and low lying areas ❖ Encourage for flood proofing structures in flood prone areas ❖ Build new water and sewage systems and utility lines ❖ Prescribing standards for different flood prone zones on flood plains ❖ Enactment and enforcement of laws regulating development activities in flood plain ❖ Specific building by-laws for flood plains	❖ Revenue Dept. ❖ Irrigation Dept. ❖ UD Dept. Panchayat and Rural Housing ❖ Local Governments ❖ PWD

Safe dwelling in flood hazard areas

Task	Activities	Responsibility
Arrangement of safe dwelling in flood hazard areas	❖ Development of flood hazard map ❖ Study of past history on floods occurred and estimated loss and damage ❖ Asses the vulnerability of risk elements ❖ Build houses in safer zones	❖ Revenue Dept. ❖ Irrigation Dept. ❖ UD Dept. Panchayat and Rural housing ❖ Local Governments ❖ PWD

Development and Redevelopment Policies

Task	Activities	Responsibility
Development and redevelopment of flood preventive policies	❖ Develop long term flood policies to protect natural resources, property and lives. ❖ Legislative and regulatory requirements	❖ Revenue Dept. ❖ Irrigation Dept. ❖ UD Dept. ❖ Panchayat & Rural Housing ❖ Local Governments ❖ PWD

Modifying floods

Task	Activities	Responsibility
Modifying flood by construction works	❖ Construction of dams and reservoirs, dikes, levees, and floodwalls, channel alterations, high flow diversions, storm water management, coastline protection works and watershed management. ❖ Development of catchment area of the flood plain • Forestation and vegetation • Land sloping and small check dam construction	❖ Revenue Dept. ❖ Irrigation Dept. ❖ UD Dept. Panchayat & Rural Housing ❖ Local Governments ❖ PWD

Flood Forecasting and Warning System

Task	Activities	Responsibility
Updating of flood forecasting and warning system	❖ Strengthening and up gradation of existing flood forecasting system ❖ Stay in touch with IMD and CWC ❖ Establish infrastructure for flood warning and dissemination ❖ Ensure proper communication between	❖ DDMA Authority ❖ Irrigation Dept. ❖ CWC ❖ IMD

	district authority and SEOC.	

Non-structural Measures

Task	Activities	Responsibility
Capacity Building	❖ Prepare departmental flood contingency plan ❖ Establish rain gauge recording station with trained manpower in the state ❖ Train the flood rescue teams and ensure they have functional rescue materials.	❖ Revenue Dept. ❖ DDMA Authority ❖ Irrigation Dept. ❖ Line Dept.
	❖ Conduct demos/ mock drills in flood prone areas time to time and ensure that rescue teams are properly trained and equipped ❖ Organize trainings for various stakeholders involved in flood mitigation and management ❖ Organize mock drills on flood rescue	
Awareness Generation	❖ Undertake public awareness activities in flood affected areas and let people know what to do and what not to do after, before and during flood. ❖ Design and develop the IEC materials in local language and ensure their storage and distribution among people. ❖ Motivate all families in flood prone areas to prepare the family kit of emergency materials	❖ Revenue Dept. ❖ DDMA Authority ❖ Irrigation Dept. ❖ Information Dept. ❖ Line Dept.

Earthquake

Structural measures

Zoning and Building codes

Task	Activities	Responsibility
Zoning and Building codes	❖ Conduct micro- zonation study and prepare seismic map in earthquake prone locations ❖ Identify the Vulnerable structures ❖ Adapt building code and suggestions given by micro zonation study and do construction works accordingly	❖ Revenue Dept. ❖ DDMA ❖ UD Dept. ❖ PWD Dept. ❖ Gram Panchayats ❖ Local Urban Bodies ❖ Housing Dept.

Development of safe siting and Earthquake Resistant Structure

Task	Activities	Responsibility
Safe siting in earthquake areas.	❖ Select rock or stiff soil for building construction ❖ Avoid constructing the capital-intensive infrastructure, hazardous facilities and important buildings in Seismic fault areas	❖ Revenue Dept. ❖ UD Dept. ❖ PWD Dept.
Develop earthquake resistant structures	❖ Adopt earthquake resistant structure in all construction works ❖ Incorporate the earthquake resistant design in all houses build by government departments and private agencies	❖ Gram Panchayats ❖ Local Urban Bodies ❖ Housing Dept.

Retrofitting of weak structures

Task	Activities	Responsibility
Retrofitting the weak structures	❖ Develop a database of existing private and govt. building in the state ❖ Identify the buildings need retrofitting ❖ Prepare a project/scheme for retrofitting	❖ Revenue Dept. ❖ UD Dept. ❖ PWD Dept. ❖ Gram Panchayats ❖ Local Urban bodies ❖ Housing Dept.
Avoid use of very weak/ risk structures	❖ Identify the very weak/ old structures ❖ Put notice not to use and vacate	

Instrumentation for monitoring of seismic activity

Task	Activities	Responsibility
Regular monitoring of seismic activities	❖ Set up seismic recording stations in seismic prone areas with modern equipment's ❖ Ensure regular study and research work in this field by technical groups ❖ Ensure dissemination of data and information to all concerned	❖ Science and technology Dept. ❖ Local urban bodies

Non-structural measures

Task	Activities	Responsibility
Capacity Building	❖ Strengthening of Techno- legal regime ❖ Organize trainings on earthquake resistant structures for engineers, architects, masons and other working in construction industry. ❖ Prepare departmental earthquake contingency plan, action plan and SOP ❖ Carry out structural safety audit of all critical Infrastructures and key resources ❖ Motivate disaster insurance of buildings ❖ Improvement of emergency response	❖ Education & technical Education Dept. ❖ Revenue Dept. ❖ DDMA ❖ Line Dept.
Awareness Activities	❖ Organize school programs, public awareness campaigns on earthquake safety. ❖ Organize Drop. Cover Hold demo in Schools ❖ Develop IEC Materials and distribute	❖ Information Dept. ❖ DDMA

4.11.3 Drought

Structural Measures

Task	Activities	Responsibility
Water management construction works	❖ Construction/ repair/ strengthening of dams, reservoirs, lift irrigation, water sheds, tube wells and canals for surface irrigation ❖ Construction/ repair/strengthening of percolation tanks, farm ponds, check dams etc. ❖ Construction/ repair/ strengthening of warehouses and cold storages for preservation/ storage of food grains	❖ Revenue Dept. ❖ Irrigation Dept. ❖ Agriculture Dept.
Soil management	❖ Use of organic fertilizer to enhance water holding capacity of soil ❖ Prefer shorter growing period plants	❖ Agriculture Dept.
Crop management	❖ Adaptation of strip cultivation of different crops ❖ Adaptation of Cover cropping to moisture the soil for long period ❖ Do crop rotation for soil fertility and moisture contents	❖ Agriculture Dept.
Adaptation of new technology	❖ Application of advanced agro-science technology and agro engineering inputs to improve agriculture production	❖ Revenue Dept. ❖ Agriculture Dept.

Task	Activities	Responsibility
	❖ Adaptation of new technology for water harvesting and watering crops ❖ Undertake programs to motivate farmers to change crop patterns, and follow alternative livelihood sources	
Techno-legal regime	❖ Enactment and enforcement of laws regulating ground water level and exploitation of natural resources ❖ Do insurance for all crops	❖ Revenue Dept. ❖ Agriculture Dept.
Forecasting and warning	❖ Strengthening the existing drought forecasting system ❖ Establish infrastructure for drought warning and dissemination	❖ Revenue Dept. ❖ DDMA ❖ Irrigation Dept. ❖ IMD

Non-Structural measures

Task	Activities	Responsibility
Capacity building	❖ Develop departmental drought contingency plan, action plan and SOP ❖ Provide training on drought mitigation and management to all stakeholders ❖ Arrange demos on drip and sprinkle irrigation and water harvesting for farmers ❖ Encourage farmers to adapt crop pattern developed for drought prone areas ❖ Rational use of fertilizers and pesticides ❖ Motivate farmers to adapt the technique for preservation of	❖ Revenue Dept. ❖ Irrigation Dept. ❖ Agriculture Dept. ❖ Forest and Environmental Dept. ❖ Rural Development ❖ All Line Dept.

	green folder	
Awareness	❖ Aware general public on drought consequence and provide tips on water conservation, drought resistant crops, new technology, off-farming activities and alternative livelihood sources ❖ Aware farmers about government schemes and insurance Policies for crops, animal husbandry, fishery, horticulture etc.	❖ DDMA ❖ Revenue Dept. ❖ Irrigation Dept. ❖ Agriculture Dept. ❖ Information Dept. ❖ All line Dept.

4.11.4 Fire

Structural Measures

Task	Activities	Responsibility
Develop fire infrastructure and other fire facilities	❖ Extend coverage of fire and emergency services to rural areas ❖ Involve the new stakeholders ❖ Strengthen coordination between municipalities and industrial safety department ❖ Equip fire stations with modern fire engines and other equipment's ❖ Provide fire proof devices to fire fighters ❖ Insurance coverage for fire staff ❖ Make provision for special fire burn ward in the hospital	❖ Fire and emergency services dept. ❖ Industrial safety department ❖ Urban local bodies ❖ Health Dept.
	❖ Ensure that all fire stations are connected to effective communication system	

Non-structural measures

Task	Activities	Responsibility
Capacity Building	❖ Impart fire management training to fire staff and strengthen their working skill. ❖ Organize regular demo for fire brigade to familiar them with fire equipment's ❖ Conduct mock drills to check up the departmental preparedness	❖ Urban Development Disaster Management Unit
Awareness	❖ Organize awareness programs on	

Generation	fire safety in Schools, Colleges and offices. ❖ Disseminate fire safety tips among public through print and electronic media ❖ Develop IEC materials on dos and don'ts for public distribution	

4.11.5 Industrial and Chemical Accidents

Structural measures

Task	Activities	Responsibility
Industrial safety measures	❖ Set up Emergency response Centre (ERC) ❖ Strengthen Mutual Aid Response Group (MARG) ❖ Form and strengthen the crisis Groups at District and local levels. ❖ Industries not to be allowed in Hazard prone areas ❖ Develop on-site and off-site plans ❖ Set up toxic water treatment facility ❖ Set up leakage checkup devices ❖ Purchase, store and keep functional all necessary industrial safety equipment's. ❖ Make Provision for poison ward in Civil hospital	❖ Industrial Dept. ❖ MIDC ❖ District Authorities ❖ Local Authorities
Techno – legal regime	❖ Implement the Acts and Rules related to industrial safety firmly. ❖ Ensure structural safety inspection/ audit inspection/audit by competent authority.	❖ Industry Dept. ❖ MIDC ❖ Local Authority
Strengthening EOC and warning systems	❖ Establish/ strengthen EOCs at all level ❖ Set up on site and off – site warning dissemination system	❖ Nodal Authority ❖ MIDC ❖ Dist. Collector ❖ Municipal Commissioner

Non-Structural Measures

Task	Activities	Responsibility
Emergency Planning	❖ Prepare/ update emergency onsite and offsite plan ❖ Regular monitoring of safety activities in all the factories/	❖ Nodal Authority: MIDC ❖ Dist. Collector ❖ Municipal

	industries	Commissioner
Organize Capacity Building	❖ Organize industrial safety trainings for officers and staff working in the factories ❖ Set up an on –site and off –site monitoring team to check up all safety measures ❖ Conduct mock drills in regular interval ❖ Encourage disaster insurance	❖ Nodal Authority: MIDC ❖ Dist. Collector ❖ Municipal Commissioner
Awareness Activities	❖ Organize community awareness programs for the communities residing near the factories and let people know what to do what not to do in case of industrial disaster ❖ Develop IEC materials on local language and distribute them in schools and local communities ❖ Organize School level awareness activities and ensure students participation in large number	❖ Nodal Authority: MIDC ❖ Dist. Collector ❖ Municipal Commissioner ❖ DDMA

4.11.6 Epidemics

Structural Measures

Task	Activities	Responsibility
Surveillance and warning	❖ Identify the epidemic prone areas ❖ Establish mechanism for regular monitoring of such locations ❖ Set up testing laboratories with trained manpower if required ❖ Collect data and disseminate to concerned authorities	❖ Public health Dept. ❖ Local Govt. Bodies ❖ Municipal Authorities
Preventive and promotive Measures	❖ Ensure clean drinking water, personal toilets, and proper sanitation facilities in epidemic prone areas ❖ Ensure safe drainage and proper waste management system	❖ Public health Dept. ❖ Local Govt. Bodies ❖ Municipal Authorities
Strengthening Institutional infrastructure	❖ Organize Capacity building trainings for health staff ❖ Establish testing labs with modern equipments and trained manpower	❖ Public Health Dept. ❖ Local Govt. Bodies ❖ Municipal Authorities

Non-structural Measures

Task	Activities	Responsibility
Capacity Building activities	❖ Identify the primary stakeholders of current epidemic ❖ Organize epidemic management trainings for all stake holders ❖ Provide necessary safety devices to health staff who manage and work in epidemic areas	❖ Health Dept.
Awareness Programme	❖ Organize public campaigns to aware them on what to do and what not to do to control the epidemic ❖ Use both electronic and print media to disseminate the safety measures and the actions government taken to check the epidemic	❖ Health Dept.

4.11.7. Road Accidents

Structural Measures

Task	Activities	Responsibility
Strengthening Intuitional capability	❖ Make provisions for special enforcement wing ❖ Set up traffic posts and trauma care centers on Highways ❖ Set up hotline and speed monitoring technology ❖ Keep equipments for removal of accident Vehicles ❖ Fix a lead agency for monitoring ❖ Make provision of special route for hazardous Vehicles	❖ Transport Dept.
Strengthening Road Infrastructure	❖ Avoid parking at any point on National and state highways ❖ Make special provision for parking with food, water, fuel and other facilities ❖ Show excavation locations with barricades ❖ Put road dividers, speed breakers, information sign boards and men at railway crossings ❖ Keep machines for removal of debris in emergency	❖ Transport Dept.
Improving	❖ Insurance regulation	❖ Transport Dept.

Regulations	❖ Strictly use protective materials by two wheeler drivers ❖ Special rules for school buses ❖ Training for drivers carrying hazardous materials ❖ Use blinking lights for Stationary Vehicles	

Non – Structural Measures

Task	Activities	Responsibility
Capacity Building	❖ Organize capacity building training to all stakeholders involved in road transport, and traffic management. ❖ Strengthen the management skill of traffic police and RTO staff organizing mock drills in regular interval	
Awareness Generation	❖ Create Public awareness on road safety, traffic rule, and noise pollution control. ❖ Disseminate the transport rules and regulation among public and the consequences of its violation	❖ Transport Dept. ❖ Local Governments

4.11.8 Land slides

Structural measures

Task	Activities	Responsibility
Preventive and protective measures	❖ Treating Vulnerable slopes and existing hazardous landslides ❖ Restricting development in landslide – prone areas ❖ Preparing codes for excavation, construction and grading ❖ Protecting existing developments ❖ Monitoring and warning systems ❖ Putting in place arrangements for landslides insurance and compensation for losses. ❖ Creation of landslide Inventory ❖ Selecting landslide hazard zonation methodologies for different scales ❖ Multi- hazard integration especially integrating seismic hazard ❖ Prioritization of areas for land slide hazard zonation mapping	❖ PWD ❖ Revenue ❖ IMD ❖ Police ❖ GSI

	❖ Landslide risk Zonation	

Non- structural measures

Task	Activities	Responsibility
Capacity building	❖ Land slide remediation practice ❖ Research and development; monitoring and early warning. ❖ Knowledge network and management ❖ Public awareness and education ❖ Emergency preparedness and response ❖ Regulation and enforcement	❖ Revenue Dept. ❖ DDMA ❖ Police

Summary of Mitigation measures:

Task	Activity	Authority for implementation	Starting date	Date of completion	Cost	Funding source
1	2	3	4	5	6	7

Chapter 5

Preparedness Measures

Chapter 5 Preparedness Measures

5.1.1 Identification of stakeholders involved in disaster response

Community is the first responders in case of most of the disasters. This shows the importance of VDMP as well as Village Task Force and their training. Local people who can do search and rescue operations should be identified and given training. But not every levels of disasters can be managed by village task force. Highly trained professionals are needed for response. It includes swimmers, divers etc. They can be identified at Taluka level and given training at village level.

Response and evacuation of disabled population is very important as they are highly vulnerable. Training can be given for the rescue workers for rescuing them or evacuating them during emergency. Fire brigade are adequately trained in this and carry people using different cradle carry method, firemen carry method, blanket carry method etc. The Taluka level rescue workers should be trained in it.

5.2 Formation of teams

For different activities in Rescue and relief activities different teams should be formed so that the activities can be carried out easily during the time of disasters.

Response and evacuation of disabled ((Availability of assistive devices and technologies for persons with disabilities in preparing for and responding to disasters)

Formation of Teams for–

The teams are formed in three phases of disaster i.e.- pre during and post. The break up is as follows-

Pre-disaster- Capacity building
Public Awareness
Preparation of plans, up-dation, verification
Training

During- Search and Rescue
First aid
Relief Camp
And all other components required by IRS.

Post Disaster- Understanding needs of affected community
Rehabilitation
Distribution of relief aid
Policy advocacy to bring normalcy in affected area.
Documentation

Additional measures as described in IRS.

5.2.1 Early Warning

Early warning is the most essential component in preparedness as it can effectively help in understanding the forthcoming hazard likely to get converted into disaster. Early warning is especially effective in case of cyclones, heavy rains, cloud burst,

tsunami, etc. The hazards such as earthquake or in many cases of man made disasters, is not that eminent.

Establishing proper early warning mechanism helps administration to take the necessary steps such as evacuation, managing response teams, developing shelters and if the likely intensity is high then probable loss assessment. These warning are mainly from Indian Meteorology Department which is responsible for monitoring of cyclones and rainfall.

Upon receiving the early warning, the administration should take the responsibility to reach out to the vulnerable villages and intimate them regarding the possible disaster and likely damage. This will help in reducing the loss of life to the larger extent.

5.2.2 Search & rescue

Referring to the Disaster management cycle, search and rescues is the first step in post disaster scenario. Effective mobilization of search and rescue teams can reduce loss of life or injuries to the large extent.

For this, preparedness of search and rescue teams at district and tahasil level are essentially important. This preparedness involves upto date training to rescue teams as well as mobilization of well-maintained equipment.

It is observed that in most of the cases, local communities are the first responders to carry out search and rescue activities. If community level trainings are properly done, the load on tahsil and district level can be considerably reduced.

VOs like NCC, NSS, NYK, civil defence, Home Guards and other task forces available at various departments, local trekking groups, youth clubs etc..

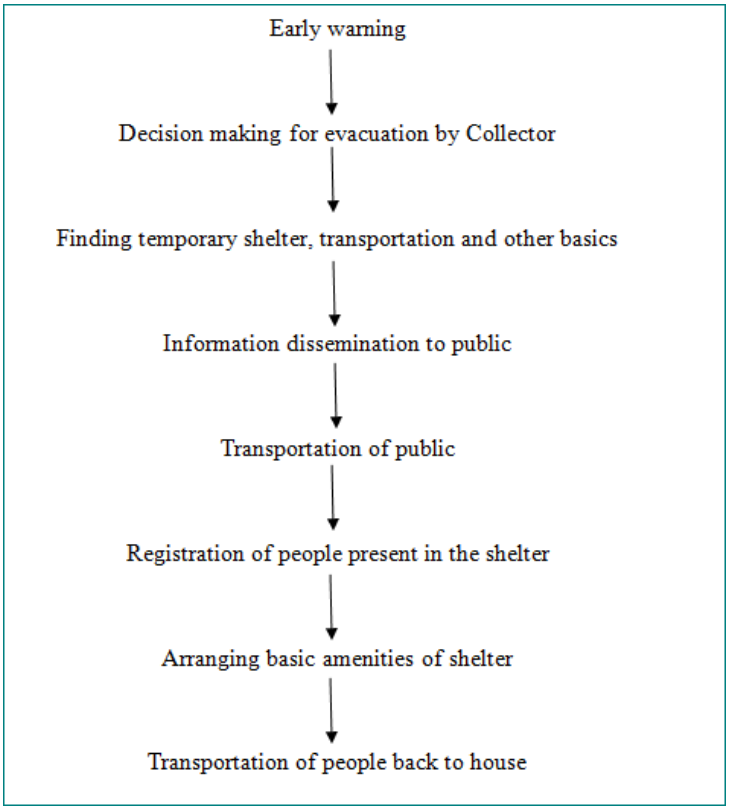
5.2.3 Evacuation

Depending upon the impact and the size of affected population (vulnerable group), chances of spreading of the damage in surrounding area is to be considered before planning the evacuation process. This process can be implemented by using various transport facilities such as bus, train, boats and airlift.

In IRS process the logistic dept can actively coordinate all such facilities.

While evacuating authorities should consider evacuation of affected people, Live stock as well as their valuable belongings.

The evacuation process, where early warning is issued, the process can be initiated well in advance. This helps in transport of large number of community members and their live stock along with their belongings to mobilise at much suitable way.



5.2.4 Damage and Loss Assessment

In order to start any post disaster activity, it is essential to know the extent of the damage to the life, property and environment. To understand this, inputs from government officials from different departments deputed at village level are taken into consideration. For different disasters, the geographical area that needs to be assessed will vary depending upon the extent of the hazard.

Type	Number	Remarks
Number of affected population		
Number of affected families		
Loss of life		
Injured		
Missing		
No of house fully damaged		
No. of house partially damaged		
Crops fully damaged (acre)		
Crops partially damaged (acre)		

Fully damaged educational institutions		
Partially damaged educational institutions		
No of water sources damaged/not functioning		
No of latrine damaged		
Loss of livestock's (no.)		
Embankment Fully damaged(km)		
Embankment partially damaged (km)		

5.3 Activation of IRS in the district

The District Collector (Chairman of SDMA) automatically becomes the head or the Chairperson of the DDMA, and hence he is appointed as the Responsible Officer of the district. Under his advice, other members of the IRS team are appointed as per the type of disaster, its intensity, chances of spreading and the concerned line department etc.

Some of the responsibilities may be passed on to the Additional District Collector for management and supervision of any incident that occurs in the district, as he is the Chief Executive Officer of the District. The District Emergency Operation Centre and the Incident Commander will make him aware of all the developments and progresses of responses activities in the district.

5.4 Protocol for seeking help from other agencies

Protocol for seeking help from other agencies such as Govt. of India, State Government, Public Sector Undertaking (PSUs), Other State Governments, National Disaster Response Force (NDRF), State Disaster Response Force (SDRF), Army, Navy and Air Force, Central Para Military Forces. -

The line departments and their head will perform different roles and responsibilities based on the nature and kind of disaster. These responsibilities of the line departments shall be clearly defined based on different types of disasters in the DDMP, which will be further approved by the State Government.

Army, Air Force & Central Paramilitary Forces

The Chairman of the DDMA will report to the State Home Department which will further ask for military help to the Central Home Ministry, who will take the subject with the concerned departments for the requisition of Army, Air force and Central Paramilitary Forces.

National Disaster Response Force

The DDMA can immediately make arrangements for requisition the NDRF team or battalion directly, if there are cases of sudden onset of disasters in areas, where early warning systems may not be present. The DDMA will maintain a close association with the NDRF Commander in Chief of the NDRF located nearest to the district

(Pune), for the rapid deployment of the team in case of threatening disastrous situations.

State Disaster Response Force

The DDMA will write to the State Disaster Management Authority who will consult further with concerned ministries for requisition of SDRF, if it exists in the State.

5.5 Mechanisms for checking and certification of logistics, equipment and stores

The DDMA will write to the concerned Logistic Section Chief (LSC) in the Revenue Department, to further carry out the responsibility of checking and making certifications of logistics, equipment and stores

5.6 Operational check-up of Warning Systems

The DDMA will conduct operational check-ups of warning systems periodically. The pre-monsoon preparedness meeting also leads to checking of warning equipment. A checklist is to be prepared for routine maintenance and testing of the equipment. During the mock drill, the early warning systems for various hazards should be checked and verified. Also the response to the early warning by the respective department should also be verified on the timeline prepared by DDMA.

In general, the early warnings are dissipated to the village level through the police department and if available, fire department. In case of unavailability, the warning is dissipated to the village level through Talathi/ Gram-sevak and if not available then local person responsible e.g. elected member, police patil or teacher who may be available at village.

5.7 Operational check-up of EOC

EOC is the crucial in handling the during and post disaster scenario. DDMA will create a check list of parameters for smooth functioning of EOC.

Ensure proper manning, functioning of various equipment such as internet connections, wireless equipment, detail maps showing various vulnerable areas in district, Hot lines, telephones (land line and Mobile) social media groups, Whatapp groups etc.

Periodic maintenance of the equipment shall be carried out. For emergency situation, alternate system such as power back-up, alternative devices (e.g. satellite phone, HAM radio etc.) for communications should be available at EOC and other important officials so that communication with EOC is not disrupted at any point of time. All essential documetns and GRs should also be available in the EOC.

The references are and can be drawn from NIDM document on EOC, which is available on NIDM portal.

5.8 Seasonal inspection of facilities and critical infrastructure

The DDMA shall coordinate along with the Public Work Departments, to conduct a seasonal inspection of facilities and critical infrastructures like bridges and Highways, bridges, government buildings especially before the onset of monsoons.

5.9 Command and coordination

Identification of quick response teams

The head or the Chairperson will coordinate meetings regularly with all the departments and stakeholders and even include various NGO's and groups for effective management and preparedness of summer seasons and monsoons.

5.10 NGOs and other stakeholders coordination

The NGO which are working in development sector as well as disaster management sector can be used for different purposes such as Post Disaster Need Assessment. The NGO workers or volunteers should be trained regarding their work during L0 phase of disasters and during the issue of warning, NGO officials can be communicated and can be used. Also in case f temporary shelter preparation, water and sanitation etc. can be managed by NGO with the support and monitoring of government officials.

5.11 Seasonal preparedness

Identifying Risks: Listing out various risks from hazards like floods, fire to the infrastructures and facilities. This will decrease the geographical susceptibility of the structure. Identifying vulnerability of the objects and structures are also an important process of the preparedness. Hence this identification process will focus on the prevention and mitigation of any damages that can take place in the future.

Identifying Resources: The DDMA shall identify resources available in the district for assistance in a disastrous situation and sources which can lower the damage and the risks.

Decreasing Risks: Once the list of risks and vulnerabilities are prepared and specified, then the DDMA shall conduct and formulate a program making arrangement of activities that can decrease the risks. This can be done with the help and association of various line departments.

Sensitization of community about the needs of persons with disabilities

People with disability are some of the most likely impacted groups during any disaster with high risk of death, injury, additional impairment. Various initiatives have been taken to deal with the group and make things accessible to them. Among them one of the initiatives is sensitization of communities about the needs of disabled people. Even in disaster risk reduction measures disability- inclusion is one of the important point. Some of the following measures are to be taken for person with disability in community preparedness.

Task	Activity
Identification	• Identification of person with disability in community with the kind of disability. • Making the area of stay and work in the village.
Awareness and dissemination of Information	• Awareness programs related to disasters and vulnerabilities in their area. • Capacity building training with on rescue and emergency exits • Conducting mock drills including people with disability.
Monitoring	• Basic provisions for person with disability in Safe shelter with light, toilet, sanitation. • Accessibility of the safe shelter through ramps for them. • Ensuring safety evacuation doors for them.

5.12 Community Preparedness

Community preparedness plays a crucial part in disaster management. Community is one seem to be one of the exposed entity in any disaster risk. The two main elements to be explored in the community preparedness are community based and people centric. Community based disaster management is believed to have direct involvement of community in every phases of disaster. It is vital that community members themselves are aware and self-reliant in getting the knowledge and information of the risks and vulnerabilities of the area. The core activities where community people could get involved are

Risk Knowledge	• Knowledge about historical hazards. • Identification of hazards and disaster prone areas. • What are the pattern and frequency of disaster.
Dissemination and communication	• Develop community based early warning system. • Dissemination of information to vulnerable communities • Dissemination of information to person with disability.
Monitoring	• Parameters for the development of early warning. • Parameters for structural development and implementation.
Response Capabilities	• Take all the prevention, mitigation and preparedness measures. • Capacity building and awareness programs. • Provide support to conduct post disaster assessment studies.

5.13 Standard Operating Procedures (SOPs)

5.13.1 Protocol and arrangements for VIP visits

In case of post disaster scenario, the physical presence of high authority government officers and/or local elected representatives/ministers is unavoidable as it helps to control the public sentiments as well as provides interactive participation from the community. The visit to the position of incidence by government functionaries is based on the system protocols.

These visits attract lot of public and media attention and can aggravate public sentiments. Hence, it is suggested to minimize the movements by VIPs and VVIPs until situation is under control and proper information regarding the gravity of the situation is made available to VIPs and VVIPs. Normally incident commander may accompany them during this visit.

5.13.2 Procurement (essentials Tents, blankets, tarpaulins etc., SOP for Rate contracts)

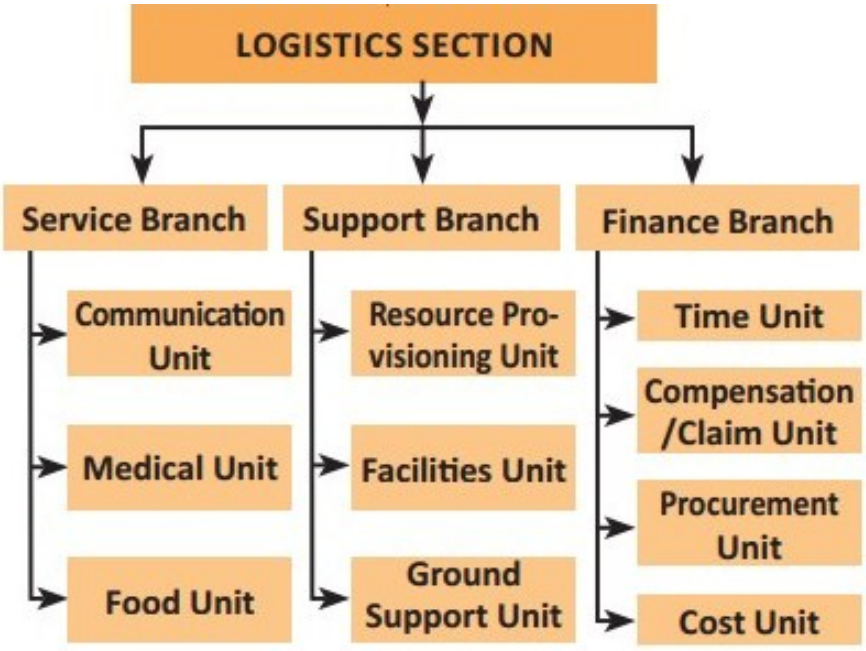
Based on the type of disaster, the relief material is needed to be provided. This material can be in different forms such as food grain, utensils and other household items. In the last 2-3 disasters it was noticed that all the material made available by the public, NGOs and private companies is routed through the centralized distribution system which is under the guidance of either divisional commissioner or district magistrate for L2/ L3 level disasters.

In case of L1 level disasters such as building collapse, small fires this procurement of material and distribution system is carried out at the tahasil level.

Procurement at the government level is done by the rate contract decided by state government and in case of any item not included in the list, DM can procure such items after approval from DDMA with the available funds for management of emergencies.

5.13.3 Logistics

Logistics in case of emergencies is governed by the incident commander through the officer made in charge of logistics. Logistics involves three branches- Service, Support and Finance.



5.14 Knowledge Management, networking and sharing

Knowledge management is all about getting right knowledge, in right place and at the right time. Preparedness is to develop, support and enhance the organizational knowledge process of knowledge creation, storage, retrieval, transfer and application. The management focuses on capturing, organizing and converting organizational knowledge into common database, for further effective retrieval of relevant contents through advanced searches from the data base. At the lower end organizations focuses on learning, sharing and collaborating through physical interactions, workshops, documentation of experiences or sharing through web portals. The networking comprises of all the SDMD, DDMD, and administrative training institutes.

Task	Activity	Responsibility
Knowledge Management	• Disaster management activities carried out at various levels. • Documentation and dissemination of information to line departments. • Training and awareness programs • Government, community and private organization resource mapping. • Recording of best practices, lessons learnt, work experience and sharing with stakeholders in meetings, workshops and seminars.	• Revenue Department • DDMA • Technical Department.

5.14.1 Uploading of information on resources on IDRN and SDRN sites

IDRN is a web based common information system for managing the inventory of equipment, skilled human resources and critical supplies for emergency response. It manages the district level resource database throughout the nation. The primary focus is to enable the decision makers to find answers on availability of equipment and human resources required to combat any emergency situation. This database also enables the organization to assess the level of

preparedness for specific vulnerabilities. Total 266 technical items are listed in the resource inventory. The districts have been given the username and password through which they can perform data entry and data updating on IDRN for resources available in the district. The IDRN network has functionality of generating multiple query options based on specific equipment, skilled human resources and supplies with their location and contact details. Every year the resource inventory has been updated at the district level by DDMOs. Whereas NIC provides its technical assistance by updating it in website.

5.14.2 Documentation of lessons learnt and best practices after each event

The documentation of any disaster is essential to identify the gaps in all three phases of disaster management. This helps the authorities in order to prevent occurrence of such disasters by taking additional measures in terms of capacity building, resource management, financial management and logistics.

This can act as a resource material for research also.

The shortfalls identified in this document can be incorporated in department d.m. plan and add in preparedness. The capacity building can also be amended based on lesions learnt.

The best practices helps other districts to make their essential changes in their operation system

5.14.3 Community registries to collate basic contact information for persons with disabilities

Community registries should be maintained by collating basic contact information of the persons with disabilities (physical and mental). This data can be collected through VDMP and should be updated at least once in a year.

One of the best practice can be identifying probable ares where village level vulnerable families can be transported. This information can be incorporated in village level plans.

The inputs can be taken from government agencies and NGO's working for disables or for various sections of society who can not respond on their own

5.15 Media management / information dissemination

Mass media and communication system plays vital role in predicting and dissemination of information in advance. The communication system has significantly developed to a great extent in predicting and disseminating information about the disaster, there has been an impact on how public learns of and perceives the impact of disasters. Both the electronic and printing media has been linked to the disaster preparedness in awareness programs, warning dissemination, and evacuation, alerts government officials and in coordination with various stakeholders. Communication virtually links all the hazards mitigation process. The capabilities of communication, data gathering and data management technology have leaped forward in parallel with the increase knowledge about the origin and behaviour of natural hazards. The advancement in mass and

telecommunication with technology had major contribution in forecasting and dissemination of information.

5.15.1 Training and interaction strategies with Media/pre-event awareness for Media.

A. To control the rumours spreading via various sources such as social media and issue strict warnings and instructions to public and government stakeholders.
B. To establish a system to monitor social media such as Whatsapp, Twitter, Facebook, etc.
C. Depute a responsible officer under IRS system to give correct information to print and electronic media and ensure that incorrect information is not spread through print and electronic media.

5.15.2 Identification and training of the Official Spokesperson

Normally PRO deputed at DM office is well aware about his responsibility as a spokesperson and passes on the information only after approval by DM. However, at the disasters scaling L1 and L2 i.e. on tahasil and village level, such spokesperson is not available and local available officer may not be aware of media management.

A special training module is required to be developed for such officers/ spokespersons including Tahasildar.

5.16 Medical Preparedness and mass casualty management

For medical preparedness, the details of all the hospitals available in the district should be made available in the DDMA or Control room. In preparedness phase, the hospital authorities, management, doctors and other staffs should be trained in emergency management. Details of medical equipment and manpower available in each region should be made available and in case of emergency, the transportation of injured people should be made accordingly. During emergency, first aid for injured and triage in case of heavy causality is the duty of medical professional in the Taluka or district level. Based on the need for critical care facilities, Surgical Services, Transfusion Services etc. victims should be allotted to different hospitals as per the available resources.

Chapter 6

Capacity Building and Training Measures

Chapter 6 Capacity Building and Training Measures

6.1 Approach

Capacity building of the various stakeholders and periodic training is important factor in the preparedness. As government officials are mainly engaged in daily roles and responsibilities periodic trainings become important to build their capacities.

The modules will be specific to the participants by conducting TNA and references will be taken from NDMA, NIDM and state level ATI directives.

Developing the capacities of the public is essentially important as disaster management should be 'To the people, by the people, for the people'.

As the neighbour is first responder for any disaster scenario, it is very essential to develop capacity of the public which not only will be available in golden hour, but will be helpful to government functionaries in order to prevent or mitigate the disasters.

Hence, training at all levels to all stakeholders becomes extremely essential, irrespective of hazard.

6.2 Capacity Building Plan

A year-long training, capacity building plan should be made available and discussed with DDMA, including financials involved therein.

This plan should include all stakeholders from public ,NGOs, VOs, elected members and government officials.

6.2.1 Institutional capacity building

6.2.1.1 Officials / policy makers

District level institutional mechanism runs from District collector to village level functionaries such as Talathi and Gram-sevak; who represent revenue department, which is responsible for Disaster Management and PRI who are policy makers and elected members from respective area. They have good communication in their constituency which is essential for effectiveness in 3 phases of Disaster Management. In addition to this, the capacity should be developed for all line department stakeholders e.g. Irrigation, Public works department, Health, animal husbandry, police, state transport etc. Who are government agencies and have capacity to support revenue dept.

6.2.1.2 Engineers, Architects, Masons, Doctors, Nurses, Teachers etc.

Professionals from various fields in the private sectors should be trained in including disaster management perspective into their profession. Their skills in the respective fields can also be used during and post disaster period when required.

6.2.1.3.Police, Fire Services, SDRF

Police, Fire Services, SDRF and TDRF are mainly responsible for responding in the first phase of disaster scenario and are normally first to reach to the position of the incidence. Hence, the modules designed to train these forces should be focussed on first aid, search and rescue and fire safety by using the available equipment and manpower.

Special focus should be given to the periodic maintenance of equipment and repairing their-off. A special focus on maintaining of the spares should be also considered in these modules.

6.2.2 Community capacity building and Community Based Disaster Management

a) Community as a whole is main component in the DRR. As they are the sufferers from any natural or manmade disasters, it is essential to convey the importance of understanding hazard and prevention and mitigation therein.

b) If proper capacity is developed at community level, it is possible that many of the hazards will be eliminated before they get converted into disaster.

c) The capacity of the community is inversely proportional to the intensity of the disaster. More the capacity of the community, lesser will be the losses due to disaster.

d) Separate modules are required to be designed for teachers, students, NSS, NCC, housing societies and VOs like home guard, civil defence and NYK.

6.2.3 Training of Trainers (ToT)

As reaching to all stakeholders at grassroots level is near impossible to any institution, it is required to train the master trainers specific to their expertise.
The knowledge and experience of these shortlisted master trainers helps in taking the subject further down the ladder.
These master trainers can be short listed from various sections of society e.g. teachers, Youth groups, Civil Defence, NSS, NCC, NYK etc.

6.3 Disaster Management Education

6.3.1 Schools

As school teachers are responsible in child development, it is very essential component that the knowledge of disaster management should be imbibed from the early age of education.

This can be done by training school teachers (at-least 2 teachers) from each school as Master trainer. Which in turn they can train other teachers and conduct training to students in dos and don'ts in various disasters.

Due to lack of knowledge, physical and mental frame, school students are not required to face emergency but are expected to understand type of disaster / situation and help others to alert and leave the affected area to safe place as soon as possible.

This can be done only by developing safety culture in schools.

The school safety program is initiated by central and state government and should be implemented in district on priority basis.

6.3.2 Colleges – (medical and engineering)

The college students plays vital role in specially post disaster situation. However with proper training and under guidance of government offices, their strength can be utilized in all three phases of disaster.

With developed mindset and physical ability, they can contribute in all phases depending upon their branch / profession. This contribution can be from capacity building, community awareness, and technical support to responders, running first aid centers, relief camp etc.

NSS, NCC, NYK are taking positive stand in bring youth to main stream of disaster management.

6.4 Skill up gradation and follow up training programmes

As occurrence of disasters, is unpredictable, it is likely that for a larger time period if no disaster is occurred, training of the stakeholders happened in the past will be forgotten or obsolete.

This becomes responsibility of the DDMA to conduct periodic training of the participants by making yearlong activity calendar.

6.5 Inventory of trained professionals Attached in annexure.

Engineers, architects, masons, medical professionals, rescue specialists etc. (All details in the annexure)

This information of trainers is to be uploaded on IDRN site.

The list of Tahasil-wise trained personal is included in Tahasil level information attached in Annex.

6.6 Data Documentation with sectorial emphasis for various vulnerable groups.

Chapter 7

Response planning (multi-hazard), preparedness and assessment

7.1 Response Planning (multi-hazard), preparedness and assessment

7.1.1 Quick assessment of damages and need

Damage and loss assessment should be done immediately after rescue operations. It helps to understand the extent of damage in the region. Data regarding the following details should be collected, including the extent of damage such as partial or complete.

Table 2 Showing the Format for Damage Data Collection

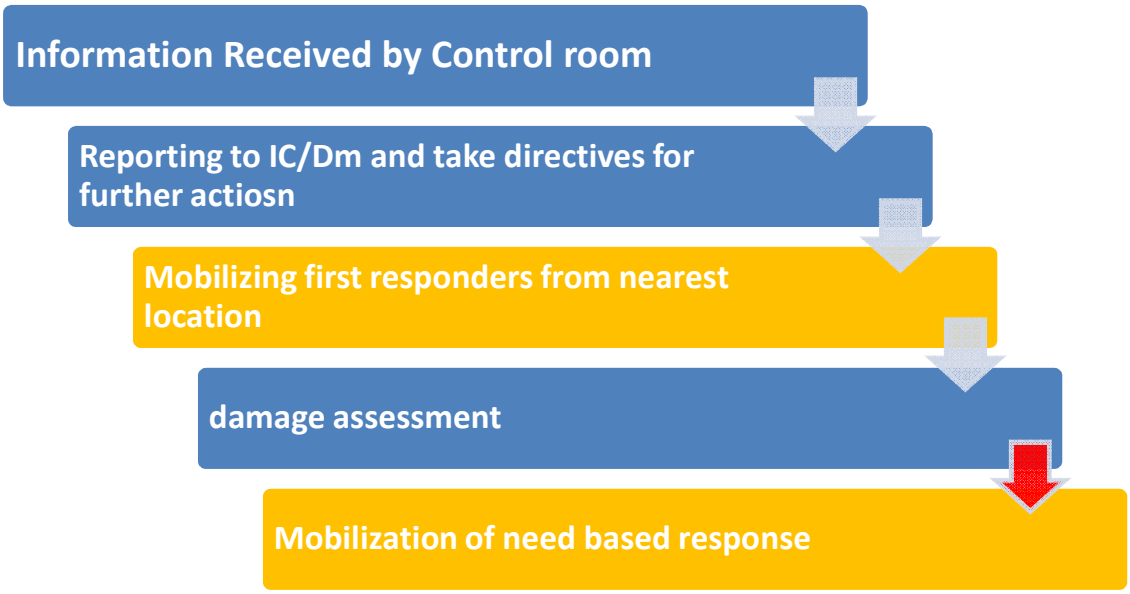
Type	**Number**	**Remarks**
Number of affected population		
Number of affected families		
Loss of life		
Injured		
Missing		
No of house fully damaged		
No. of house partially damaged		
Crops fully damaged (acre)		
Crops partially damaged (acre)		
Fully damaged educational institutions		
Partially damaged educational institutions		
No of water sources damaged/not functioning		
No of latrine damaged		
Loss of livestock's (no.)		
Embankment Fully damaged(km)		
Embankment partially damaged (km		

7.1.2 Response flowchart

In case of any disaster, quick response is a key to reduce losses. For this, platinum time (i.e. first 15 minutes after disaster) and golden time i.e. first 60 minutes after disaster are to be considered while planning response activity.

In general, the response, activities is under the guidance of incident commander (DM, Tahsildar or HOD of concerned department).

At district level, the stakeholders for response are- NDRF, SDRF, DDRF, TDRF, village response force and Civil defence, Home Guards etc.. However, involvement of NGOSs who have specific expertise depending upon the nature of the disaster and the life-saving/ rescue equipment available with them. As a normal practice, such NGOs are part of DDMA and are directly involved in addition to the government agencies and voluntary organizations.



7.1.3 Warning and alert

Early Warning Systems: Two way communication system between village, tahasil and district is established via land line phone, mobile phone, wireless system used by Police and Irrigation depts..

In addition to this HAM operators and infrastructure available with them within the district is also used. The repeaters installed can be useful in case of disaster. District administration will take measures to strengthen this network.

Warning dissemination: Arrangements for dissemination to the last person DDMA to translate the alert warning in local language(s) and disseminate the same through various medium. Withdrawal of warning should also be done by DDMA

7.1.4 District CMG meeting

The crises management group essentially need to mobilize at the issue of early warning system.

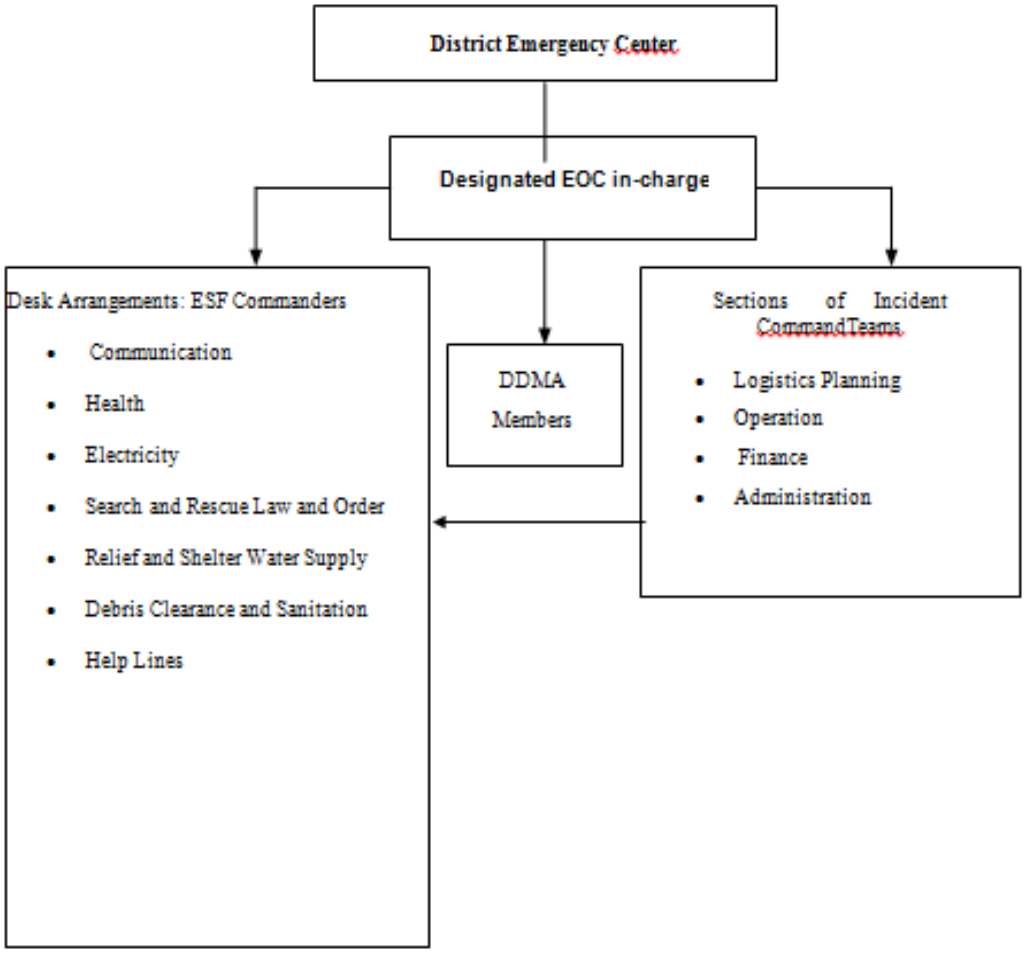
Under the guidance of DDMA, depending upon type and intensity of disaster, this crises group will conduct meeting and plan coordination with other agencies (RDMC, TDMC, NDRF etc)

In general, this meeting is conducted as and when required or when DDMA feels necessary activation of CMG.

7.1.4 Activation of EOC

Sr.No.	Emergency Management Functions / Tasks	Function / Tasks Lead	Support Function Officer Agencies
1	Direction ,Control , Coordination	DM	SP, Resident, DY.Collector, Tahasildar,
2	Information Collection Analysis and Damage Survey	DM	SP, Resident, DY.Collector (RDC), Tahasildar, DIO, DDO, Ex.Engr, R & D from PWD Irrigation, MSEB, Kokan Railway and other line Departments
3	Communication	RDC	Nayab Tahasildar, Mobile Operators, TV, Radio, Police, Forests Dept. Fire. HAM Operators
4	Alert and Warning	RDC / SP	EOC, Tahasildar, District Information Officer (DIO). Taluka EOC
5	Transport (ESF Evacuation relief Supply)	RTO / DTO	RDC,CAFO, DSO, SP, DHO.
6	SAR (Search and Rescue	SP / Civil Defence / SDFR /NDRF	Fire, Civil Defence, Home Guards & SDRF (When magnitude of any disaster would beyond coping capabilities of these response agencies, NDRF may be requisitioned for search & rescue operations)
7	Emergency Public Protection	DIO	EOC / Police / Transport / Forest
8	Law and Order / Public Information	SP	Dy. SP, Home Guards Commandant, NGOs, Para-Military, and Armed Forces
9	Public Works	Ex.Engr.R & B	Irrigation, Ex.Engr, Panchayat, NGOs, Water Supply Board, Municipalities, Home Guards, Police.
10	Mass Care / Emergency Assistance / Shelters	Dist. Primary Education Officer	School Principle, Teachers Health, PHC State Transport, Water Supply, RTO, Tahasildar
11	Health and Medical Services, Psycho social Care.	Chief District Health Officer (CDHO)	Supt.Govt.Hospital, Municipalities, PHCs, Red Cross, Fire Brigade, Civil Defence, R & B, NGOs, Doctors, , Tahasildar.

12	Animal Health & Welfare	Dy. Director Animal Husbandry	NGOs. Livestock Development Officer (LDO)
13	Water Supply and Sanitation	Ex.Engr. Water Works	Dy. Ex.Engr.Talathi, Tahasildar, TDO Health, Dy.Engineer
14	Power	Supt. Engr. Electricity Board	Ex.Engr, Ex.Engr. Technical, EB, Transport.
15	Resource Management (Including food and relief supplies and other logistic support)	Civil Supplies Officer	RTO, DSO, Private & Public sector, Municipal Water Supply Board, Tahasildar, Dis.Supply Tahasildar
16	Dist. EOC and Coordination between Dept and outside Agencies		DDMO



7.1.5 Activation of EOC.

The operation of the EOC will be at L0 level of maintenance pursuing the following activities:

Regular Functions of EOC during Normal Times

1. Updating and Maintenance duties of the EOC
2. Managing Inventories and reviewing existing logistic facilities
3. Keeping updated with other hazard, weather and terror events across the world.
4. Tracking and documenting new forms of disaster response measures and technology used around the world.
5. Capacity Building including mock exercises and other preparedness and training exercises.
6. To ensure the continuous operation of the regular Public Safety facilities at all times.
7. The EOC is normally staffed twenty-four hours a day during seasons of extreme weather events and therefore it can quickly be activated for any emergency. When a major emergency occurs, or is imminent, it will be the responsibility of the Emergency Coordinator to set up and staff an appropriate Emergency Operations Center (EOC). The EOC is usually activated at the orders by Chief Secretary at the State level or the collector in the district level respectively. The activation of EOC should normally occur when the Government proclaims a State of Emergency affecting the area due to weather, hazardous materials, terrorism, etc. It also depends upon the severity and nature of the hazard event. It should be noted that the activation of EOC should be followed by the issuance of warning by nodal technical agencies. When the situation returns to normal, automatically the response operations cease and the EOC staff strength also reduced automatically. The deactivation of EOC takes place upon the receipt of Chief Secretary's order.
8. In case of extreme disasters such as chemical disasters, bomb blasts and terrorist attacks, national security and control takes precedence. The Ministry of Home has to establish special measures to ensure the security of the nation by sealing and evacuating strategic government and national institutions well within 3-4 hours of the occurrence. National borders, air and sea space also have to be protected and if need be, sealed off. The designated officers of the Home Guards at the EOC will provide security to the EOC entrance points. In addition to EOC staff, the authorized individuals are allowed by the Home Guards to enter theEOC.

EOC Levels of Operation

The EOC activation at various levels depends on the level of disaster. The National/state/district EOCs are activated in the L3, L2 and L1 levels of disasters respectively.

EOC Levels of Operation

Level	Nature of EOC Operation
Level 0 (L0)	**Normal**: Situation is monitored by EOC in charge
Level 1 (L1)	**Watch**: When an event / disaster may occur, notification is made to agencies and support staff who would need to take action as part of their responsibilities.
Level 2 (L2)	Partial Activation: Limited activation of EOC when an event / disaster is very probable or following an event which doesn't require full activation. All primary or lead staff will be notified and will staff the EOC.
Level 3 (L3)	Full Scale Activation: All primary and support agencies are notified. All EOC Support personnel will staff the EOC.

Immediate Tasks on EOC Activation

The Chief Secretary will initiate the activation of the emergency services of the EOC as established.

Immediate Tasks upon EOC activation

1	The Chief Secretary will determine what staff he/she deems necessary to effectively operate the EOC apart from the prescribed staff. The Personnel from various departments and agencies are called to work in the EOC.
2	Orders are faxed from the crisis management committee to related ministries and departments for additional resources.
3	The emergency operation taskforces are asked to send report on the situation and the immediate resource requirements to the EOC within 4-8 hours of activation.
4	The EOC produces a situation report summarizing there ports.
5	Records will be maintained in the emergency control room.

EOC Tasks during emergency phase as suggested by HPC

Time	Task
First 24 hours of the emergency	1. Establishing Control rooms at the airport with information desks at the arrival, departure and assembly points. 2. Set up General Information Desk at airport EOC. 3. Establish and activate emergency phone lines and help lines immediately within few hours of the disaster. 4. Set up separate desks for each ESF and international aid/NGO. 5. Set up desks for donations (cash and material). 6. Establish contact with the affected State EOC. 7. Set up EOC at neigh boring States. 8. Establish contact with NRSA/ISRO/Defence for aerial and satellite imageries of the affected area. 9. Provide information and standard operating procedures for civilian population such as media, researchers, volunteers, field workers, etc. through: o Organize/coordinate aerial surveys for rescue operations o Establish contact with the disaster site which will have Incident Command Systems placed at the disaster site based on the scale of the disaster o Deploy Incident Commanders in consultation with the Center at strategic incident commands.
Next 48 Hours	EOCs at the State and the central levels will be jointly involved in the following: 1. Set up information desks at critical locations 2. Identify and channelize different categories of workers under the following at the information desks and provide identification tags for the following: - Media - Researchers - NGO/International Agency

Time	Task
	- Fieldworkers/Volunteers - Government officials 3. Place situation reports at bulletin boards outside information desks and E OC. 4. Direct Central and international agencies to priority areas (worst affected areas). 5. Identify locations for international and other NGO agencies to set up their site offices for the uniform distribution of aid in all parts of the affected area. 6. Communicate with the District Magistrate and the SRC for local information through: - Information flow chart of Information and Arrival Centre at airport. - Material/Manpower flow chart of Information and Arrival Centre at airport. - Information flow chart of EOC at Centre. - Information flow chart of desk for ESF. - Information flow chart of NGOs. - Information flow chart of media. - Information flow chart of researchers.

EOC Communication

The Telecommunication Task Force Leader of the EOC shall ensure immediate restoration of disrupted communication facility or infrastructure to ensure uninterrupted communication for effective disaster management operations. The task force will also ensure that the communication shall be brief and simple, and no chaotic situations arise. Telephones or Hot Lines shall be used wherever possible to avoid congestion of radio communication. All task force members shall communicate only through their allotted frequency channel to avoid congestion in the particular channel. The personnel who use radios should be acquainted with the operation of the equipment, various channels, code words, length of speech, etc. The EOC has an important role in issuing early warning.

EOC Information Center Management

The principal role of information center in the EOC constitutes collection of data, analysis and dissemination of information to relevant organization. Upon the activation of EOC, this center coordinates the flow of information with respect to activities associated with relief operations. During normal times, it maintains a systematic database of the resources available, important phone numbers, name and addresses of important government officials, EOC emergency staff members, trained officials and first responders, international aid agencies and NGOs. The EOC- information center does damage assessment of the affected areas, collect all related information of government schemes for smooth management, monitors different disaster mitigation programmes, coordinate with different organizations, also conducts evaluation of the programmes and immediately takes up.

Preliminary Steps to Set up an Emergency Operations Centre

While setting up of an EOC, the following aspects should be given due consideration:

- **Number of people involved:** The number of people at an EOC should be limited to the people directly involved in the EOCoperations.
- **Presence of decision makers and operations staff:** All key individuals involved in decision making and executing them needs to be present at the EOC, as and when policy decisions are being taken.
- **Communications and other equipment:** The EOC should have sufficient physical space and support equipment to enable staff to operate effectively. An EOC requires the best available communications and other equipment to operate efficiently. However, the lack of equipment should not be used as an excuse for not setting-up an EOC. Runners can work in the place of radios, paper and pens in the place of computers and printers, and chalk boards in the place of whiteboards.
- **Information Resources:** The EOC should contain maps and documentation on other relevant resources needed to respond to adisaster.
- **Alternate sites:** There should always be an alternate site for the EOC in case it has to be abandoned.
- **Knowledge of the EOC location**: Only those who need to know where the EOC is located should be told its exactlocation.

EOC Basic Requirements

- **Site or Location of the EOC:** The Emergency operation center (EOC) should be established near the office of key government functionaries and is ideal to be positioned away from the disaster scene. As per the recommendations of the HPC, a network of EOCs is to be set up in national, state capitals and headquarters of disaster prone or vulnerabledistricts.
- **EOC Space Requirements:** Table 15 suggests the space required for specific functions of theEOC.

TABLE 3EOC SPACE REQUIREMENTS

Functions	Space Requirement
Policy Makers	A separate room from the main EOC area, often designed also as a conference room.
Media Information Provision	Separated from the main EOC area.
Communication and Data Processing	Designed separately from the main EOC as a Radio Room. It should include computer servers and similar equipment's.
Incident	Separate cabin for the Incident Commander
Task Forces	Space for up to 15 Task Forces members with separate desks, which is able to host atleast 3-4 persons at a desk at a time.
Logistics	Desks and space to host five persons
Administrative	Desks and space to host five persons
Finance Personnel	Desks and space to host five persons
Restrooms and	Restrooms and toilets for personnel at EOC

While designing EOCs, specific attention should also be given to aspects related to the electrical/data circuit layout, security considerations, lighting considerations, projection displays, visual aids, equipment, communication considerations, UPS/backup power considerations, and functional considerations with a view toward avoiding potential pitfalls in design, construction, and equipment functionality.

EOC Equipment

List of Essential items in control room
Furniture
1. Suitable table and chairs (for minimum 4 staff members + cabin for DDMO)
2. Storage cupboards (capacity to hold atleast 50 files + one loft to store old record)
3. storage drawers for Maps Large size 5 ft x 4 ft minimum)
4. Computer tables 4 nos.
5. Air conditioner
6. Fan – (1 fan to cover 50 sq ft)
7. Drinking water facility (dispenser + cooler)
8. Rest room for staff with bunks for at-least 2 persons
9. Toilet with wash basin
10. Two exit doors (main entrance plus one emergency)
11. Conference table with chairs (to accommodate 6 chairs around the table with projection facility)
12. T.V, set with cable connection.
13. Projector
14. Screen
15. Copy Machine
16. Fax
17. Printer (colour / black & white 2 nos-)
18. Scanner plus copier
19. Adequate ventilation (exhaust fan with flaps)
20. Adequate lighting arrangement
21. UPS with at-least 6 hours back up (Full Load condition – computer,

fans, lighting +)
22. Filing cabinet
23. Firefighting equipments (smoke detectors, sprinklers, extinguishers, buckets, blankets etc) 24. separate space to store search and rescue equipments. 25. Separate electrical connection from main meter with overload circuit breakers. 26. Note :- all furniture must be made up of fire proof material. (no carpets or leather or wool / wood furniture or carpets, mattress etc.
Reading and reference material
1. Copy of D.M. Act
2. Copies of all G.Rs
3. Record of previous occurrences and case studies
4. D.M. Plan of city or district / village plans
5. Copies of all Word / Tahasil plans
6. Resource inventory of equipments available with District, Nagar palika, nagar panchayat, Tahasils, village and with private and NGOs (Ref IDRN)
7. Guidelines given by NDMA, NIDM, State Govt. 8. Reading and reference material along with case studies from outside Maharashtra
9. Directory of all essential tel. numbers
10. D.M. Plans of line departments such as MSEB, Irrigation, railway, Police and neighboring districts with road map and essential s & R equipments in border area. 11. Details of shelters and facilities available in identified shelters.
Maps (all maps that of size 4 ft x 3 ft, coloured)
1. District map showing road, rail network
2. Tahasil maps showing road, rail network
3. Tahasil maps showing dams and rivers With villages on the bank of river.
4. Tahasil map showing Hazardous industries
5. Hazard Map of district and all Tahasils. 6. Tahasil map showing Resources such as- fire stations, rescue boats, S & R equipments, civil defence and home guards, S.T Depot, MSEB, food supply godowns, HT lines grids, etc

Log books/ Record books
1. Entry and exit in control room
2. communication record of important call record
3. wireless communication
4. testing and maintenance record of various equipments (S & R, Battery, Gen Set, Electrical Equipments etc
5. Handing and taking over of shift
6. Record of faults
7. Record of equipments maintenance
8. attendance register
9. Inventory of equipment and furniture
10. Video conf. Facility usage record (Dept. Date, time, and duration of use)
11. Record of first information from various sources about occurrence of disaster situation.
12. Record of various trainings.
13. Record of cash received and utilization of same
14. Check in record (daily or routine check of communication equipments as per schedule)

A list of equipment that is essential for the Emergency Communication Centre of the EOC is given in below.

- Radio communications supported with capabilities on all public safety frequencies
- Amateur radios (multiple bands in UHF, VHF)
- Secure satellite telephone
- Doppler weather radar and infrared satellite imagery
- Quick-call and community siren warning system
- Emergency Alert System encoder/decoder
- Primary telephones, backup phone system and dedicated circuits
- Group paging terminals
- Fax machines
- Internet – leased line and wifi (using dongal)

Emergency Communication Centre – Essential Equipment

Back up Control Room

In case of rare incidents or disasters, the EOC building may be severely damaged and cease to function. In that case a backup EOC or a temporary set up can be used for coordination and control of emergency operation. In district, this alternative control room can be either from divisional commissioner office or nearby municipal corporation or in case of extreme situation, the control room can be shifted to nearby district HQ.

However, if IRS is formed and is established in the staging area, then this alternative control room can be operational from staging area itself.

7.1.6 Resource mobilization

The resources are normally identified at village and tahasil level as well as RDMC, municipal councils and corporations. The detailed information of available material and manpower is available on IDRN network. Also, it is attached in the annexure.

7.1.7 Seeking external help for assistance

In case of L2 or L3 level disasters, where the capacity developed at the local level or in the affected area is not adequate. Outside help is required and is called from surrounding tahasils or districts. These can be NDRF or SDRF or from nearby states. The army can also be called where the resources, equipment and manpower available with NDRF, SDRF is not sufficient and extent of affected area is large.

This can be asked after approval from DDMA and consent taken from SDMA or DMU, Mantralaya Mumbai.

7.1.8 Psycho Social care

Psyche Social care of affected population (Availability of psychosocial support service personnel that have the capacity to assist persons with disabilities affected by disasters)

District administration should identify the expert manpower of counsellors, psychiatrist etc. available in the district to provide psycho social care in case of disaster. Trainings of task forces should be organized on psycho social care with the help of experts from NIMHANS, AIIMS etc. so that they are capable of handling people in trauma.

7.1.9 First assessment report

Normally first assessment report is generated immediately after occurrence of the disaster. This is generated by local revenue department officer available at site (tahasildar, mandal adhikari or talathi) they are supported by gram sevek, police patil, school teacher etc).

The first assessment normally gives first extent of damage (life, live stock or structure)

7.1.10 Media management / coordination / information dissemination

Mass media and communication system plays vital role in predicting and dissemination of information in advance. The communication system has significantly developed to a great extent in predicting and disseminating information about the disaster, there has been an impact on how public learns of and perceives the impact of disasters. Both the electronic and printing media has been linked to the disaster preparedness in awareness programs, warning dissemination, and evacuation, alerts government officials and in coordination with various stakeholders. Communication virtually links all the hazards mitigation process. The

capabilities of communication, data gathering and data management technology have leaped forward in parallel with the increase knowledge about the origin and behaviour of natural hazards. The advancement in mass and telecommunication with technology had major contribution in forecasting and dissemination of information.

6.1.11 Development of SOPs/Checklists/formats

related to Emergency Support Functions (ESFs) etc (Specific details to be provided in the Annexure)

(Details Not available at present)

6.1.12 Reporting:

This topic is covered in detail in IRS, responsibility of information and media officer.

6.1.13 Demobilization and winding- up:

This topic is covered in detail in IRS planning section.

7.2 Responsibility Matrix

This should be evolved for each response measure within a time frame and the responsibility matrix for major stakeholders should be given in annexure

7.2.1 Hazard Specific "Responsibility Matrix"

for emergency response functions for sudden disasters where Early Warning is available:

7.2.1 Hazard Specific "responsibility Metrix where early warning is available

Time	Task	Department / Agency	Activity
D-72 Hr	Activate the EOC Establish communication with irrigation	Revenue Dept.	
D-48 Hr			
D-24 Hr			
D0 Hr			
D +15 Min			
D +30 Min			
D + 1 Hr			
D +2 Hr			
D +3 Hr			
D +6 Hr			
D +12 Hr			
D +24 Hr			

7.2.2. Hazard Specific"Responsibility Matrix"where Early Warning is not available

Time	Task	Department / Agency	Activities
D +15 Min			
D +30 Min			
D + 1 Hr			
D +2 Hr			
D +3 Hr			
D +6 Hr			
D +12 Hr			
D + 24 Hr			

Chapter 8

Reconstruction, Rehabilitation and Recovery Measures

Reconstruction should also take into consideration to various businesses so that they can restart their business and go back to their normal life cycle. In this case government may give tax waivers, infrastructural facilities such as construction of road, communication, restore availability water, drainage system electricity etc. These measures will help to reconstruct businesses and bring back the normal life for business as well as for the people working.

The best case study for reconstruction activity can be rehabilitation of landslide in village Malin in Pune district.

After reconstruction of the infrastructure, rehabilitation process comes into picture. In the structural part of rehabilitation- housing, school, health facilities and other basic civic amenities are developed so that, community can go back to their houses, area and start living. Whereas, in the non-structural rehabilitation, focus should be given on regenerating livelihood of the affecting communities. Livelihood needs to consider the needs of landless, farmers, local businesses, industries affected. While supporting communities for income generation activities, preference should be given to widow women, single parent mothers and women in general. For livelihood support, various government schemes can be used. For sustainability of these inputs and efforts, preferably support should be provided to beneficiaries through the self-help groups, farmer groups. In case of disaster where agriculture is severely affected, daily wage earners who are dependent on the agriculture works for livelihood are severely affected. As farmer has no resources to invest in the farming, daily wage earners are left without work. Also, as they do not have any land or business activities, they are not often covered under the compensations provided by the government. Therefore, the district administration should also take this part into consideration and use this workforce into reconstruction and other works as and when required. MGNREGA can be very effectively used to engage the productive workforce of the community in the work. Otherwise, lack of work might divert them towards engagement into addiction, thefts etc.

DDMP will describe the strategy required to restore normalcy to the lives and livelihoods of the affected population as per the guidelines set by the NDMA and NIDM. These guidelines will be specific to the needs of the district and can be included in the DDMP after approval from DDMA.

Short-term reconstruction requires return of vital life support systems to minimum operating standards while long term rehabilitation will continue till complete redevelopment of the area takes place.

8.1 General Policy Guidelines

In the post disaster situation the normal life is disrupted and day to day activities including livelihood are affected, it becomes DDMA's responsibility to provide assistance to the affected community.

Even though Reconstruction, Rehabilitation and Recovery is primarily responsibility of the district administration, due to limited resources the DDMA needs to rely on state and central government directives and resources. For this, the guidelines issued by NDMA and NIDM are need to be referred and must be moulded to suit the

capacity of the district administration, type of disaster as well as the damage assessment done.

8.2 Relief and Recovery coordination to and when be done by DDMA :

District collector to announce the support by other agencies which depends upon the type of disaster, no. of affected people, chances of spreading. Disaster may can be of different nature but can affect in different ways which can be linked to the different line departments. These line departments will have to utilise their resources- man power and equipment, essentially for providing relief and recovery to the affected community. E.g. in flood affected areas, MSEDCL will be responsible for restoring eclectic supply in fastest possible way. Similarly, PWD will be involved in repairs of roads, bridges so that relief material can be mobilized at fast speeds. By involving all line departments, relief and recovery process becomes prime responsibility of DDMA.

To achieve this, district plan as well as department wise plans need to be in place and properly updated.

8.3 Detailed damage and loss assessment

Damage and loss assessment is essential part in post disaster situation as this helps district and state government to make long term planning in case of L2/L3 disasters.

After the occurrence of disaster, it is first priority of the government to prepare a detailed document which will give a fair and clear idea about the losses in terms of life, property and environment. This assessment will be further broken down to the losses incurred due to disaster. These losses can be of different types e.g. life, damage to buildings, roads, other structural damages. In this assessment, the tentative cost should also be mentioned which may not be accurate but can give a fair idea to the authorities, which will help them in planning response and relief . these assessment s can be done in 2 sections. 1. Immediately after incident which can be done by locally available government officials such as Talathi, gramsevak / Tahsildar. 2. In second option, damage/loss assessment can be carried out by involving district/state or even central government agencies in some cases, so that essential funds and long term rehabilitation activity can be undertaken by funds and expertise made available to the district administration.

8.4 Restoration

8.4.1 Basic infrastructure

In the affected communities, where all basic amenities are lost, and getting support from outside is difficult. If intensity of disaster and damage is high,in such cases, the restoration of basic amenities such as providing electricity, drinking water, food, sanitation facilities becomes the need of time. These bare necessities can only be made available with proper inter departmental coordination

8.4.2 Essential service as per the relief code of the State /District

The essential services such as transport, electricity, drainage, health need to be restored as soon as possible. This is essential for bring the life to normal level within first few days of disaster, If the line department plans are up to date including

department wise hazard mapping and the resources available is in place, such restoration is not a far reality.

It is responsibility of the administration to write their own relief code in line with the guidelines issued by the central government. This relief code is categorised hazard wise and

An INGO called Sphere has developed the guidelines which are useful for providing minimum standards of living for food, WASH, first aid, shelter and non food items for affected people due to various causes. This ranges from refugees to communities affected by disasters.

8.4.3 Livelihoods

Outcome of any disaster is loss of livelihood at various levels. The low income group looses maximum livelihood in any form of losses. For them, recovery becomes very difficult as due to non-availability of customers. They are pushed to search for better opportunities and move to nearby urban areas in search of livelihood. Its is imminent that, in any case of disaster, it takes about 5 to 7 days to bring back minimum living conditions- which is very difficult for petty businesses- e.g. cobblers, street vendors, labourers etc. Once they migrate outside the existing location, it becomes difficult for local community as these services can not be rendered and day to day life gets affected.

8.5 Reconstruction/repair

This reconstruction will be done after assessment of situation, type of disaster, number of people, family affected, and type of livelihood they have lost. In case of disasters such as earthquake, floods, building collapse, Landslides, the damage to human, animal and also structure is imminent. In such cases the livelihood is also lost along with the home. In such cases it becomes priority of the government to undertake reconstruction of the affected community. This reconstruction can be in terms of relocating the community to different location or provide assistance to reconstruct their homes.

8.6 Recovery Programme

S/N	Task	Department/ agency	Activities	Time period	Cost	Source of Fund

8.7 Insurance

Losses in terms of the revenues are very large after any disaster. Government needs to raise huge amount of funds for reconstruction, rehabilitation and recovery process. For this, insurance sector can support by and large to the affected community which in turn can reduce financial burden on the government. It is recommended that the government authorities ensure that all the likely losses should be covered under insurance. This includes insurance of animals, crops, construction, etc. This will help in reducing post disaster financial burden on the government.

Chapter 9

Financial Resources for implementation of DDMP

Chapter 9 Financial Resources for implementation of DDMP

This chapter highlights the budget and other financial allocations to be made at district level in preparedness and execution of the disaster management plan, all relevant Government Orders (GOs) issued from time to time.

9.1 State

Establishment of funds by the State Government

Disaster management act 2005 point number 53 of chapter 9 highlights and talks about finance account and audit of the funds during the post disaster situation.

The State Government shall immediately after notifications issued for constituting the State Authority and the District Authorities, establish for the purposes of this Act the following funds, namely :-

1. The fund to be called the District Disaster Response Fund;
2. The fund to be called the District Disaster Mitigation Fund;

9.2.1 State Mitigation fund.

Where by reason of any threatening disaster situation or disaster, the National Authority or the District Authority is satisfied that immediate procurement of provisions or materials or the immediate application of resources are necessary for rescue or relief, -

1. It may authorize the concerned department or authority to make the emergency procurement and in such case, the standard procedure requiring inviting of tenders shall be deemed to be waived.
2. A certificate about utilization of provisions or materials by the controlling officer authorized by the National Authority, State Authority or District Authority, as the case may be, shall be deemed to be a valid document or voucher for the purpose of accounting of emergency, procurement of such provisions or materials.

9.2. Linking with the development plans.

Disaster management is no more confined to revenue department. It is a subject of all the departments. The following activities have been considered in mainstreaming it into development activities.

1. The Disaster Management has been included in school curriculum at CBSE level.
2. The Disaster Management is also made compulsory to NSS / NCC students at college level. So that during disasters they can be called upon for certain help.
3. Various Disaster Management courses have been offered in different institutions, colleges, universities taking its significance into account.
4. In construction work the civil engineers have to follow Bureau of Indian Standards (BIS) to construct resistant structures.
5. Special budget at district, taluka and village level should be allocated for training of various teams against disaster, purchasing of equipments to save the

life and property of the people, organizing mock drills to create awareness among the people, updating the disaster management plans, etc.

6. Government officers, staff are also trained under disaster management, so that their skill will be helpful at the time of disaster.
7. Earthquake resistant principle may be followed in Indira Awas Yojana, lifeline structures, all buildings may be insured by bank, private companies.
8. At district, Taluka and Panchayat level the plan should be adopted to reduce the risk and vulnerability in various activities.
9. Fund allocation should be made by Zilla Parishad, Panchayat Samiti and Gram Panchayat to carry out the following DRM activities:-
    a. To train Search and Rescue, First Aid groups
    b. To create awareness among the people
    c. To procure search and rescue materials
    d. To evacuate and set up temporary shelters for disaster victims.

9.3 Disaster risk insurance

most of the insurance companies provide insurance for life and property many of them have covered animals and crops insurance also

Insurance should be made mandatory for all life and property as well as vehicles as it can provide essential financial support to individual or family in case of loss of life and property for disability

Insurance should be made mandatory for all all that is life property as well as vehicle as it can provide essential financial support to individual or family in case of loss of life injury or damage to the property due to disaster or in case of accident

Proper insurance can reduce the burden on the government as government need to spend large amount from their Corpus fund in in distributing humanitarian help in post disaster situation same funds can be utilised in development of affected area if if Basic support is provided bye by means of insurance

9.4 Other financial options

Other financing options for restoration of infrastructure oblique livelihoods like utilisation of Flexi funds within centrally sponsored scheme for mitigation Restoration activities in the event of natural calamities or in accordance with the broad objective of the central section scheme.

In addition to the funds available with the government at various levels in most of the disasters it is noticed that local as well as International NGOs come forward to help the affected community in various ways.

International NGOs such as United Nations, World Bank human habitat European Union Red Cross they all come forward during the emergency and provide financial and Technical Support to the local authorities. Such positive response should be always considered as disaster management and specially rehabilitation part should be seen as to the people by the people and for the people. District administration can coordinate with such NGOs to avoid duplication of work by NGO and optimum utilisation of the resources.

The classic example of involvement of local NGOs was seen during Malin landslide in Pune district in which the NGOs helped district administration in reconstruction of entire village at different location.

Chapter 10

Procedure and methodology for monitoring, evaluation, updation and Maintenance of DDMP

Procedure and methodology for monitoring, evaluation, updating and maintenance of DDMP

10.1 Authority for maintaining and reviewing the DDMP

As a normal practice, in order to maintain correct information and adopt developments and new strategies, it is necessary to review the DDMP periodically. This timeframe can be set by DDMA during scheduled meeting or as and when required. However it is suggest that the plan should be updated and reviewed after occurance of each L2 / L3 level disaster. This will help authorities and Managers to plan and reduce losses and response time. This will also help to help departments to update their plan and man and material resources

For tahasil level plans, the responsibility will be that of Tahasildar to update information and provide inputs to district authorities to update their plans,

10.2 Proper monitoring and evaluation of the DDMP

The purpose of evaluation of DDMP is to determine

1. Understand changing nature of Hazards and its frequency.
2. Adequacy of resources
3. Co-ordination between various agencies.
4. Community participation
5. Partnership with NGOs
6. The plan can be updated to bridge shortfalls notice during handling emergencies.
7. Update and understand Organizational structures and whos who.
8. Effective use of Technology and how new technologies can be adopted for betterness of society and handling of disaster situation in all 3 phases.
9. Plan and conduct Mock drills to help Response mechanism following gaps and findings in drills or exercises
10. open strong line of communication with state and divisional level government agenciesIndentify shortfalls in role and responsibilities of various stake holders at district and tahasil level.

Individuals and agencies assigned specific responsibilities within this Plan will prepare appropriate supporting plans and related standard operating procedures, periodically review and update alerting procedures and resource listings, and maintain an acceptable level of preparedness.

10.3 Post-disaster evaluation mechanism for DDMP

After documenting the event of disaster, the gaps identified and the shortfalls in the system will surface and are needed to be repaired. This should reflect in the next update of DDMP, so that the gaps are bridged in time which will help to reduce the losses which may incur in future disasters.

10.4 Schedule for updation of DDMP :

Regular updation process for the DDMP, reflecting sections that need updation at various intervals

The existence of proper disaster management plan plan plays vital role during management of Disaster in all 3 phases. Hence it is essential that this paln should be updated at routine interval along with information collected at Tahasil level. This will provide up-to-date information to Managers in terms of Man and Equipments. This will effect speeding up the rescue and relief operations, but also in developing capacity building models up to village level functionaries.

The proper maintenance of equipments will reduce occurrences of eleventh hour failure of equipments and resource. Such document will also help in boosting the morale of Task force .

Disaster plan also helps in pre-disaster stage, when warnings could be issued. It also proves as a indicator to officials at the critical time and precious time is saved which might otherwise be lost in consultations with senior officers and getting formal approval from the respective authorities.

In short for the betterment of people of district and to control the losses the DDMP must be evaluated and updated by the district administration in association with all line department in L1 time i.e. (normal time).

The DDMP is a “living document” and the Chairman of DDMA (Hon. Collector) along with all line departments will update it each year taking into consideration

1. The resource requirements
2. Update of human resources
3. Technology to be used
4. Co-ordination issues
5. Standard operating procedures and role and responsibilities)

An annual workshop for updating DDMP under chairmanship of Hon collector and as per guidance of DDMA members will help in this regard. . All concerned departments and agencies would participate and give recommendations on specific issues

10.5 Uploading of updated plans at DDMA/ SDMA on websites

DDMA is be responsible for approval of DDMP and make it available on district administration website. , which will be avaible to public, as well as can be a reference document for other stakeholders in case of emergency situation.

10.6 Conducting Mock drill

Conducting mock drills at district and sub district levels, at least once in a year (annually). It will ensure that all parties understand their roles and responsibilities clearly and deliver as and when required by the situation.
All the stake holders including NGOs, government agencies should be involved in the actual exercise. It would also help to test the efficacy of the response plan prepared. Based on feedback from such simulated exercises, the plans will have to be revised and capacity enhanced to fill the gaps. While indicating the mock drill plan of action, it is essential to list down

The Responsible parties for organizing district drills,

Each of the line departments should conduct mock drills at least twice a year- one for manmade and one for natural disaster.
Monitoring and gap evaluation.

This should be carried out by outside agency or responsible officer appointed by department or DDMA. The outcome of such mock drill should be documented highlighting the gaps observed and lacunas in human resource and equipment. The same should be made available to DDMA for their response and necessary changes in district plan.

Based on the gaps, department head should make arrangements to update skills of staff and help them to enhance their skills to face emergency. The equipments should also be maintained / updated / procured as to face emergency.

Check that the on –site /off-site emergency plan of major chemical, industrial and nuclear installations are received at DC Office.

10.7 Monitoring and Gap evaluation

Chapter 11

Coordination Mechanism for Implementation of DDMP

11.1 Intra and inter-Department coordination with horizontal linkages

Involvement of all line departments in three phases of handling of any emergency situation is extremely essential as management of disaster is not in the scope of any single department or community. Hence, all line departments need to work hand in hand and by following the guidelines of IRS.

This horizontal coordination should be as detailed into the tahasil and district plans and the SOPs set therein.

Depending upon the type of hazard, incident commander will depute his deputy. This deputy who is responsible for handling the particular disaster, will advise the IC regarding the horizontal system established in his department and will plan coordination and response with other line departments by communicating needs and gaps with horizontal equivalent officers.

This will expedite the response process.

11.2 Coordination mechanism

NGOs, CBOs, Self Help Group (SHGs), Industries, private schools and hospitals with horizontal and vertical linkages

The help from NGOs and VOs is extremely essential in pre, during and post disaster scenario as all above mentioned can share the responsibility of the district administration to generate awareness, spreading early warning and also act as first responders.

In the DDMC, it is essential that all these NGOS and VOs should be identified and their scope of work in terms of man and material is listed so that, there should be no gap during the actual implementation.

11.3 Coordination with block/ village level Task Force(s) with vertical linkages as also inter-block and inter-village coordination with horizontal linkages

During preparation of VDMP, the resources and manpower available at village level is also identified. The efforts are being made to train them and develop their capacity as village level task force, who will assist block level emergencies. This task force in general will be composition of volunteers, who are capable in various skills such as meson work, repairing of electrical equipment, catering of first aid, fire fighting, swimming (well, river, dam) etc.

In case of development of any emergency, this task force should be capable to control the situation till the external resources reach to the location of incidence.

11.4 Coordination system with state departments and training institutes at state and district level

Disaster Management Unit at Mantralaya has well equipped control room and is connected to all district HQs, RDMCs and other emergency services.

In case of occurrence of any disaster even at village level, immediate information is sent to state control room for their information.

If the situation is under control of the district administration then, no further help is requested to state control room.

If the situation is beyond the control of district administration and involvement of outside agencies such as military, NDRF, SDRF is required, then the request is made by DDMA for further assistance.

State training institute is located at YASHADA Pune. This institute is responsible for policy advocacy to state and district government and also prepare training module and conduct trainings in guidelines of NDMA, NIDM.

13.5 Intra-block and intra-village coordination

Considering thee L1 level disasters/emergencies. Those can be managed at block and village level with the help of capacity developed and available resources in the block or village. Strengthening the infrastructure at block and village level should be the prime objective of capacity building program of the district.

11.6 Coordination with local self government (Panchayat Raj - Zila Parishad, intermediate level, if any, and Gram Panchayat and Urban Local Bodies).

The responsibilities of local authorities are already listed in the Act. However, these local authorities are required to function "subject to the direction of district authority" (section 41 of the DM Act 2005); and ensure that all the employees are trained in disaster management. In case of any emergency, all LSGs are to make available manpower and resources to DDMA.

11.7 Linkage with DDMPs of neighbouring districts

In case of any disaster located at the boarder of districts, it is advisable to get assistance from neighbouring districts who may have adequate infrastructure available in their districts. This will expedite response process and will save time resulting reducing the loss.

Such help from the neighbouring district can be made from one district to the other district after approval from DDMA.

11.8 Linkage with SDMP

The SDMP focuses on to larger scope and mainly focuses on L2 L3 level disasters where districts have their own limitations in terms of manpower and resources.

The references are needed to be drawn from SDMP while preparing DDMP.

Chapter 12

Standard Operating Procedures (SOPs) and Checklist

Chapter 12 Standard Operating Procedures (SOPs) and Checklist

SOPs and checklists could be prepared for various stakeholders effective response. These can be made based on the functioning of Emergency Support Function (ESF) groups or IRS. Depending on the hazard profile and level of exposure the district should decide in a participatory way the number of ESF covering all the above. The SOPs would briefly describe the following:

Roles and responsibilities of Departments and stakeholders

Revenue Department

Normal Time Activities

- A map of disaster prone areas in the district, history of the district, geographical conditions occupational details, settlements, rain, irrigation and industries etc.
- Safe alternative routes to utilize during disaster in the disaster prone areas.
- Key officers of all the departments, staff, vehicles and buildings.
- Details of control room arrangement.
- Details of geographical groups and assignment of Zonal Officer.
- Details of food grain storage places in the district and the Fair Price Shops.
- Details of vehicles, boats and equipments available in the district for rescue operation.
- Setting up of communication to communicate the messages from village to village.
- Details of operating systems for District Disaster Management Committee.
- List of NGOs and self help groups and their addresses and phone numbers in the district in the prescribed annexure
- Orientation Training to various District level officers and departments for effective functioning of control room, co-ordinations and operations.
- Details of salt pan workers and fisherman who can become the victims of Disasters and sufficient arrangement to contact the owners of saltpan.
- Special appointments of persons in charge of control room.
- Hazard analysis, seasons, and possibilities of disasters and review of disaster history.
- Review of disaster prone areas, risks, response plan, resource and utility of resources and equipments.
- Strategy for disaster management
- To update the DDMP.
- To check the condition of safe shelter during his visits in the district places and if necessary gets it repaired by co-coordinating with the local authorities, available financial resources and voluntary organizations.
- Repairing of roads and ways leading to safe shelters by co-ordinating with various development plans/schemes.
- Evacuation plan as a part of DDMP.
- To undertake development projects like rural housing, scarcity of relief works, disposal of rainwater and water conservation and water harvesting.
- To co-ordinate scheme for poverty eradication, self-employment and the schemes of other departments.

On receiving the warning

- Will review the alarming situation in the meeting of DDMC.
- Assigning the work as to what to be done by which officer in case the disaster hits.

- Will review and have co-ordination task
- Will alert and activate the functionaries' related to early warning and communication looking to the possibilities of disaster and will see that the messages are intimated to the members.
- Distribution of work for operation of round the clock control room.
- Will send the vehicles with mikes and sound system for the areas of top priorities.
- Will instruct all the staff to remain present at their respective places.
- Shifting the people living in low lying areas, seashores, and economically weaker people socially and economically backward families and houseless families to safe places.
- Will work out the arrangements for search and rescue operation, shifting of people and utilization of human resources as per necessity with the help of DMTs and local community through zonal officers.
- Will arrange for temporary shelter for the people evacuated by giving the warning in advance.
- Will provide the vehicles to shift the people to the safer place when necessary.
- Will undertake the operation of forceful evacuation of people if they are not ready to leave even after warning.
- Will arrange for food, drinking water, medicines at temporary shelters and relief camps with the help of local NGOs, doctors, industrial houses,etc.
- Will make in advance preparations for relief activities through local NGOs, industrial houses, and donors over and above normal norms of the relief.
- Will work out the financial estimates for search and rescue and immediate relief.

Post Disaster Activities

- Will segregate the villagers and areas victimized by the disaster and activate the DMTs.
- Will start relief activities including emergency relief distribution and work out the strategy of damage assessment and provide the formats for the same and explain to all the staff members.
- Will guide the team members about the payments of relief accident to damage as per the rules and policies of the government before the start of duty.
- Will make arrangements for the transportation and distribution of Govt. relief amount and materials.
- Will make due arrangements to see that there should be no haphazard distribution of relief material so that needy people are not deprived ofit.
- Will arrange for drinking water and essential things at community kitchen / relief camps as per the necessity.
- Will work out the primary estimates of the damage.
- Will undertake the rescue operations to save the trapped people through DMTs trained police personnel and swimmers on needbase.
- Will requisite more vehicles for rescue work, shifting the people to temporary/permanent dispensary for treatment through DMTs, NCC, Home Guards, Local Police, and Para Military Forces etc.
- Will arrange for identification of the people, who died, maintain the dead bodies till legal procedure is over.

Police Department

A. Normal Time Activities

The Superintendent of Police will co-ordinate the work of disaster management as nodal officer. He will prepare a separate and comprehensive plan of district regarding the department of police and also prepare details of resources as a part of DDMP. He will consider the following in it.

- Details of contacts of all the staff members under the district.
- Maps and statistical data of district areas.
- Resources and human resources useful at the time of disaster.
- Details of police staff and retired officers/staff of the police and the control room.
- Details of functions of staff of the district control room.
- Appointment of the nodal officer in the control room.
- Traffic arrangements towards the disaster affected areas.
- Details of anti social elements.
- Security arrangements at relief camps and food storages.
- Security for the transportation of the relief material.
- Immediate police procedures for human death.
- To assist the authorities for the evacuation of people from disaster affected areas.
- Adequate equipments for communication.
- List of swimmers.
- Wireless stations in the district and communication network.
- To update the related details of Disaster Management Plan.

B. ON RECEIVING THE WARNING

- Will contact the district collector.
- Make advance preparation to implement the action plan for search and rescue.
- Will prepare a plan for police personnel for search and rescue.
- Will arrange to communicate the messages through all the equipments of communication and vehicles as per then necessity.
- Willrequisitevehiclesafterobtainingtheordersforthesamefromthedistrictauthorities.

C. POST DISASTER ACTIVITIES

- Will arrange law and order against theft in the disaster affected area.
- Will co-ordinate the search and rescue operation through NCC/VTF/NGO.
- Will arrange for security at the relief camps/relief materials storages.
- Will see the law and order is maintained at the time of distribution of relief material.
- Will assist the authorities for evacuation of people to the safer places.
- Will make due arrangements for post mortem of dead persons, and legal procedure for speedy disposal.

Health Department

A . Normal Time Activities

While preparing the DDMP / updating the same, the health department shall take care to include the following particulars carefully.

- A separate plan for disaster management regarding health.

- Arrangements for exchange of information in the control room.
- Appointment of nodal officer.
- Advance arrangements for life saving medicines, insecticides and vaccines.
- Maintenance of vehicles such as ambulance, jeep and other equipments such as generators etc.
- Distribution of work by forming groups of staff during emergency.
- List of private practicing doctors / medical facilities.
- Arrangement for survey of disaster.
- Mobile dispensary units.
- Information regarding proper places for on the spot medical services in various villages during disaster.
- Dissemination of information among the people regarding the death, injury.
- Primary information of disaster related relief activities to all the staff members.
- Training to PHC / Community Health Centre staff to prevent spreading of diseases among the people, animals, and advance planning for the same.
- Blood group wise list of blood donors with contact telephone numbers and addresses.
- Training of DMTs regarding first aid.
- To prepare an action plan for the availability of equipments to be useful at the time of disaster management for medical treatment.
- Co-ordination with various government agencies – schemes to meet the necessity of equipments in emergency.
- To see that all vehicles like ambulance, jeep and equipments like generators and equipments essential for health care are in working condition.

B. ON RECEIVING THE WARNING

- Will ensure the availability of important medicines, life saving medicines, insecticides and if necessary contact for additional supply.
- Round the clock control room at the district level.
- Will send the health staff for duty in their areas as per the plan of disaster management.
- Activate the mobile health units for the post disaster situation.
- Will organize in advance to mobilize the local doctors and local voluntary agency for emergency work.
- Will contact the blood donors for blood donation, on the basis of lists prepared.

C. POST DISASTER ACTIVITIES

- Provide first aid to the injured and shifting of seriously injured people to the nearby hospital.
- Send sufficient stock of medicines to the affected areas immediately.
- Will make arrangements for the available additional health staff in the affected areas deputed by the state authority.
- Will organize to get the insecticides to prevent spreading of diseases.
- Will ensure the purity of drinking water by testing the sources of water.
- Will depute the mobile units for first aid.
- Distribution of chlorine tablets and other necessary medicines from house to house.
- Will shift the seriously injured people to the hospital.

- Will immediately start the procedure for post mortem of the dead persons as per the rules.

Water Supply Department

A. Normal time activities

- The water supply dept. shall ensure the following to be included in the DDMP:-
- Setting up of control room and arrangement for the control room operator.
- Assign the responsibility as nodal officer to the Executive Engineer or any other officer.
- Prepare an alternative contingency plan to provide drinking water in case of failure of regular water distribution system during disaster.
- Detailed information of available water resources throughout the district.
- Arrangement of Govt. or private tankers to provide water temporary and immediately.
- Preventive measures for water borne diseases and chlorination of water.
- Availability of safe drinking water in the affected areas.
- Inform the staff about the disaster.

ON RECEIVING THE WARNING.

- Organize the teams to check the sources of water / drinking water.
- Standby arrangements of tankers for drinking water through tankers or any other available source.
- Will make available chlorine tablets insufficient quantity and arrange to distribute through DMTs.

B. POST DISASTER WORK.

- Implement the alternative contingency plan to provide drinking water in case of failure of regular water distribution systems duringdisaster.
- Will start work for immediate repairing of water pipes in case of damage.
- Will arrange to check the water tanks, overhead tanks, and pumps, reservoirs and other water resources.
- Will contact the electricity authorities to re-establish the electric supply in case of failure.
- Will provide chlorinated water either by activating group water supply schemes individual schemes or through tankers.
- Will provide drinking water to the relief camps / relief kitchens, shelters etc. through available resources.

Irrigation Department

A. Normal time activities

The irrigation department shall carefully include the following particulars while preparing / updating the DDMP:-

- Contact address and phone numbers of all the staff / officers, vehicles and swimmers of the District.
- Details of irrigation related factors in the district such as rivers, pools canals, large and medium dams ,etc.

- Control room arrangements and appointment of Nodal Officer.
- Details of damage prone areas.
- Location of water level gauge station for flood situation.
- To disseminate information /warning to the damage prone areas in case offload situation.
- Details of immediate action to be taken in case of leakage in large water storage reservoirs.
- Supervision over major storage /reservoirs.
- Very clear explanation of disaster and priorities during disasters to all the staff.
- Effective working of control room at every major dam.
- Enough and ultra modern equipments for communication.
- Periodical checking of Dam /Waste veer, canal –tunnel, roads leading to Dams etc. for maintenance during normal time.

B. ON RECEIVING WARNING

- Ensure that communication equipments like telephone, mobile phone, wireless set and siren etc. are in working conditions.
- Keep the technical and non-technical staff under control, ready and alert.
- Get status report of ponds, dam, canal and small dams through technical persons.
- Will take decision to release the water in consultation with the competent authority and immediately warn the people living in low lying areas in case of increasing flow of water or overflow.
- Keep the alternative arrangements ready in case of damage to the structure of dam / check dam to leakage or overflow in the reservoirs.
- Make due arrangements to disseminate the information about the increasing and decreasing water level whatever it may be to the community, media etc.
- A senior office will remain and work accordingly at large storage reservoirs.
- Will arrange to provide the dewatering pumps, generators, trucks and bulldozers, excavator, boats for search and rescue operations wherever required.

A. POST DISASTER WORK.

- Will obtain the clear picture of the condition of all the reservoirs through teams of technical officers.
- Ensure about no overflow or no leakage.
- If overflow or leakage is found, start immediate action to avoid adverse effect to the reservoir as per the action plan.
- If there is no possibility and risk, keep the people and media informed about “everything is safe”.
- If overflow or any leakage is found, he will immediately warn the people living in the low lying areas.

- Will take due care for the transportation of drinking water if drinking water is provided through irrigation scheme.
- Will assist the local administration to use boats, dewatering pumps, etc. search and rescue operations.

Agriculture Department

A. Normal time activities

- All the details of his subordinate staff with addresses and phone numbers and resources of irrigation for agriculture in all the villages.
- Details of buildings, vehicles and equipments under his control and list of contractors with vehicles and equipments used by them.
- Maps showing details of agricultural resource laboratory, seed center, agriculture training school with statistical data.
- Details regarding agricultural production, extension, seed growth centres, agriculture university campus, training centersetc;
- Action plan regarding the repair/alternative arrangement in case of agricultural production related facilities are disrupted.
- Will prepare the action plans to avail the technical, semi technical and administrative employees along with vehicles from near by district and taluka offices.
- Will inspect the sub-ordinate offices, other centres and sub-centres under his control, which are damage prone.
- Will prepare a sub-plan for timely and speedy availability of machines and equipments to restoration of the economic activities in case of loss of properties as well ascrops.
- Will maintain the departmental equipments such as diesel generators, dumpers, generator, cutters, tree cutters, ladders, ropes, flood lights, shovels, axes, hammers, RCC cutters, cable wires, fire equipments, de-dusting equipments etc; which can be used during emergency and ensure every 3 months those are in working condition.
- Will prepare a list of public properties related to agriculture in the damage prone areas and will in advance make arrangements to lessen the damage.
- Will take due care to see that the emergency services at hospital, shelters, with special reference to agriculture are not disrupted.

B. ON RECEIVING WARNING

- Will immediately contact the District Control Room and will assist in the work assigned to him as a part of his duty.
- Will ensure that the staff under this control is on duty at the headquarters.
- Will assign the work to his subordinate officers and staff the work to be done regarding agriculture under DDMP and will send them to their sites.
- Will receive instruction from the district liaison officer and will take necessary action.
- Will ensure the availability of resources included in the DDMP and will make due arrangement to get those during emergency.

- Will make groups having vehicles for emergencywork and will assign the areas to them.
- Will set up a temporary Control Room for the dissemination of information for emergency work and will appoint a nodal officer.

C . POST DISASTER ACTIVITIES

- Will follow the instruction of the District LiaisonOfficer.
- Will carry out the duty assigned to him for search and rescue work.
- Will deploy the resources and manpower available to manage the disaster.
- Will review the matters regarding discontinuation of movement for safety measures and will see that it is restarted very soon.
- Will send DMTs with necessary equipments in case the crop is washed away, and if there is water logging in a very large amount.
- Will act in such a way that the human life is restored again speedily and timely in the priority areas.
- Will contact the circle office or central control room if machines equipments, vehicles, man power, technical personnel are required to restore the agricultural activities.
- Will make arrangement to avail the external helps to manage to disaster.
- Will collect the details of loss of crops to send it to the district administration.
- Should have the details of village wise various crops in the district.
- Will prepare a primary survey report of crop damage in the area and will send the same to district control room and also to the administrative head
- Will immediately put the action plan in real action during the emergency.

M.S.E.D.C

A. Normal time activities

While preparing a separate plan regarding M.S.E.D.C /Energy Department will prepare the list of available resource as a part of DDMP. It will include the following:

- Details of the staff members with their contact addresses and telephone numbers.
- Maps showing the power stations, sub-stations, Diversification of Power units (DPs), transformers and major electric lines with detail information.
- Otherimportantdetailslikewatersupplyschemedependingonelectricity,drainagesystems, railway stations, bus-depots, ports, strategically important places, army, air force, navy camps, light houses, major hospitals and for that he will check and ensure of electric supply during emergency.
- Prepare an action plan for repairs *I* alternative arrangement in the case of electricity disruption as a part of DDMP.
- Inspect at every 3 months the power stations. Sub-stations etc; which are damage prone.
- The, plan should include for timely supply of electric poles, D.Ps, transformers etc; at the time of line disruption.

- To prepare an action plan for immediate procurement of the required tools and equipments for restoration of electric supply on temporary bases.
- To prepare a list of public properties related to M.S.E.D.C, which are in the damage prone areas and will make advance arrangements to minimize the damage.

B. ON RECEIVING THE WARNING

- To contact the District Control Room and assist in their work.
- To ensure that all the employees remain present on duty at the taluka headquarter.
- To assign work to all officers/employees related to M.S.E.D.C.
- Will ensure to make available the resources available and will establish contacts for the same to deploy those at the time of emergency, which are included in the DDMP.
- To consult the District Liaison Officer to discontinue the supply in case of damage in the line or for the safety of the people and property.
- To make groups having vehicles for the emergency work and will assign the areas.
- To immediately set up a temporary control room in the office for dissemination of information during the disaster and will appoint a nodal officer from MSEDC for this work.

C. POST DISASTER ACTIVITIES

- To follow the instructions of the district liaison officer.
- To perform the duties assigned for the search and rescue work.
- To deploy the resources and manpower required for the disaster management.
- To dispatch the task forces with necessary equipments to the place where the electric supply is disrupted and ensures that the same is restarted at the earliest.
- Contact the circle office or the Central Control Room of MSEDC to

  procure the machines and equipments, vehicles ,manpower, technical {personnel for restoration of the electric supply.

- To utilize the external resources and manpower allotted to him in a planed manner for disaster management.
- To immediately undertake the emergency repairing work as mentioned in the action plan.
- To prepare a primary survey report regarding damage in the area and send the same to the district control room and to the own administrative head immediately.
- To make temporary arrangement for electric supply to the places like hospitals, shelter, jail, police stations, bus depots etc; with D.G. stein.

Public Works Department A .Normal time activities

- Details of the staff members with their contact addresses and telephone numbers.
- Details of buildings, vehicles and equipment as well as the names of contractors and the vehicles & equipment used by them.

- Maps of the areas in the district with the statistical data related to available resources.
- The position of approach roads and other road of all the villages including bridges, railway crossing etc.
- To strictly observe the rules during the constructions regarding earthquake and cyclone proof materials.
- The PWD will inspect periodically the buildings, residences, high rise buildings under their control.
- Damage prone road bridges and arrangement for their inspections
- Action plan for emergency repairs.
- Will appoint an officer of the rank of Assistant Engineer to coordinate during emergency at the District Control Room.
- Will maintain the departmental equipments such as bulldozers, tractors, water tankers, dumpers, earthmovers excavator, de-watering pumps, generators, cutters, tree cutters, ladders, ropes, flood lights, shovels, axes, hammers, RCC cutters etc; which can be used during emergency and will quarterly check up these to ensure in working condition.

B. ON RECEIVING THE WARNING

- Will immediately contact the District Control Room forassistance.
- Will ensure that all the staff members remain on duty at the headquarters.
- Will send the officers and the staff assigning them specific duties for the DDMP
- Undertake all the action for the disaster management required to be done by the PWD after receiving instructions from district liaison officer.

C. POST DISASTER ACTIVITIES

- Will follow the instructions of the District Liaison Officer
- Will remain active for search and rescue activities
- Will provide all the available resources and manpower for disaster management.
- Will mobilize the service of technical personnel for the damage survey work to help the district administration
- Will prepare a primary report of damage in the affected area within 12 hrs / 24 hrs looking to the emerging situation
- Will make arrangements for electricity, water, and latrines in the temporary shelters. Will also inspect the approach roads leading to the temporary shelter and repair the same if so required.

Telephone Department

A. Normal time activities

- Details of the staff members with their contact addresses and telephone numbers.

- Details of buildings, vehicles and equipments including the contractors and the vehicles and equipments used by them.
- Maps showing the details of telephone exchanges, D.Ps, important telephone lines, hot lines, telex lines, microwave towers with statistical data.
- Details of telephone numbers of water supplies, Control Room, hospitals, drainage system, railway stations, bus depots, strategically important places, ports, Army, Air force, Navy camps, Jail, Police Station and other sensitive places, light houses, major industrial units, and other communication channels which can be used during emergency.
- Action plan for repairs/alternative arrangement in case of disruption of telephone line and microwave towers.
- Inspect the telephone exchanges/sub-exchanges in the damage prone area at every 3 months.
- To appoint an officer not below the rank of telephone inspector to co-ordinate the district control room during emergency.
- To maintain the equipments such as diesel generators, dumpers, generator, cutters,

  tree cutters, ladder &, ropes, flood lights, shovels, axes, hammers, RCC cutters, cable wires, fire equipments, etc; which can be used during emergency and ensure every month that these are in working condition.

- To ensure that the telephone lines at the shelters, emergency hospitals, police stations, control room and other places of emergency services, which can be used during disaster, are not disrupted.
- To prepare a list of public properties related to the telephone department which are in damage prone areas and will make arrangements to lessen the damage.

B. ON RECEIVING THE WARNING

- To contact the District Control Room and assist in the work.
- To ensure that the staff are on duty at the headquarters.
- To assign work to the subordinate officers asperse DDMP and send the mother sites.
- To receive the instructions from the District Liaison Officer and to do the needful.
- To ensure availability of resources included in the DDMP and establish contacts for the same during emergency.
- To setup a temporary control room for the exchange of information for emergency work and will appoint a nodal officer.

C. POST DISASTER ACTIVITIES

- To follow the instructions of District Liaison Officer.
- To perform the duties assigned for search and rescue work.
- To deploy the resources and manpower available to manage the disaster.
- To review the situation regarding disconnected telephone lines due to safety measures and re-establish the communication network as soon as possible.
- To send the Disaster Management Teams with the necessary equipments for restoration of the telephone lines speedily where the lines are disrupted and to such places, which are strategically important.

- To make arrangements to obtain external help to manage the disaster.
- To prepare a primary survey report of damage and to send the same to the District Control Room and also to the administrative head within 6hours.
- To arrange for temporary hotline services or temporary telephone connections at the District Control Room, hospitals, shelters, ports, jails, police station, bus depots, etc.
- To immediately undertake the emergency repairing work.

♦ To make an action plan to avail immediately and timely, telephone poles, D.Ps, transformer to the established the communication system.

♦ To prepare an action plan to avail temporarily, technical personnel from the near by district, staff and vehicles from the district office which are not affected in consultation with the district authority.

Animal Husbandry

A. Normal time activities

- Addresses of members with telephone numbers.
- Details of veterinary centres, artificial insemination centres, veterinary dispensary, veterinary colleges' buildings, vehicles, mobile dispensaries and equipments and also the details of vehicles and equipments used often by outsource.
- Maps showing the details of animal breeding laboratories, animal vaccination centres, animal husbandry training school with statistical data.
- Details of essential facilities to be provided at sensitive place such as important animal husbandry centres, veterinary college campus, training center etc;
- Arrangement of repairs/alternative arrangements in case the facilities related to animal husbandry and veterinary services are disrupted.
- To make arrangements to necessary medicines, vaccines and other material, for treatment of animals.
- To collect the details of cattle in each village of the taluka, details of safe places for the treatment of animal, milk dairies, other private veterinary doctors and facilities related to it.
- To appoint an employee not below the rank of livestock inspector to coordinate the District Control Room during emergency.
- To maintain the equipments available such as stands to keep animals, sharp instruments, insecticides, diesel generators, dumpers, generator, cutters, tree cutters, ladders, ropes, flood lights, shovels, axes, hammers, RCC cutters, cable wires, fire equipments, de- dusting equipments etc; which can be used during emergency and will also ensure that they are in working condition.
- To see that essential services related to animal husbandry and Veterinary services are not disrupted at the time of emergencies.
- To prepare a list of public properties related to animal husbandry, which are damage prone areas and will make advance planning to lessen the damage.

B. ON RECEIVING THE WARNING

- To immediately contact the District Control Room and will assist in the work.
- To ensure that the staff is on duty at the headquarters

- To assign the work to be done to the subordinate officers and staff and send them to their sites.
- To receive instructions from the district liaison officer and do the needful.
- To ensure the availability of resources included in the DDMP and will make necessary arrangements to obtain those during emergency.
- To consult the Liaison Officer to prevent the probable epidemic among the cattle and also for the safety measures.
- To make groups having vehicles for emergency work and will assign the areas totem.
- To set up a temporary control room for the exchange of information for emergency work and will appoint a nodal officer.

C. POST DISASTER ACTIVITIES

- To follow the instruction of the District Liaison Officer.
- To carry out the duty assigned to him for search and rescue work.
- To deploy the available resources and manpower to manage the disaster.
- To review the matters to restart the milk collection activity where it has been closed for security measures.
- To send DMTs with necessary equipments in case of cattle death are there in the affected areas for the disposal of carcass with a view to restoration of public life and result oriented work. To arrange to treat the injured cattle.
- To contact the State Director of A.H. if additional equipments vehicles, manpower, technical personnel etc; are required for restoration of the cattle related activities.

State Transport

A. Normal time activities

- Details of the staff with contact numbers, details of bus drivers, conductors, mechanical and supervisory staff.
- Details of location of buses in all the areas of the district available round the clock.
- Details of fuel arrangements for buses for emergencywork.
- Do's and Don'ts to be observed strictly during emergencies and details of priorities should be given to the staff.
- Arrangement for additional buses for evacuation of people from the affected areas.
- Details of buildings, vehicles and equipments under his control and list of contractors with vehicles and equipments used by them.
- Map showing S.T. depots, pick up stand, control point, S.T. garages and important routes with equipments of communication, telephone line, telex lines, megaphone, amplifiers with statistical data.
- Details of important telephone numbers of water supply schemes, control room hospitals, drainage system, railway stations, bus depots, strategically important places, ports, Army Air force Navy camps and other sensitive places, light houses, major industrial units, and other communication channels which can be used during emergency/calamity.

- Action plan regarding repairs/alternative arrangement in case of disruption of transport services.
- Alternative routes for the transportation and road network.
- To inspect the damage prone S. T. Depots, pick up stand, control points, garages etc; at the frequency of every three months.
- To plan out for restoration of goods transportation in case of damages observed, to the buses & parcel van.
- To prepare an action plan to procure temporary buses, the technical personnel from the near by district which are not affected.

♦ To maintain the equipments available such as cranes, diesel generator, earth over machines, de-dusting pumps, cutters, tree cutters, ladders, ropes, flood lights, shovels, axes, hammers, RCC cutters, etc. which can be used during emergency and will ensure that those are in the working conditions.

♦ To take due care to see that the transportation at shelters and emergency hospital is not disrupted during calamities.

♦ To prepare a list of public properties related to transport department, which are in the damage prone area and will arrange in advance to minimize the damage.

B. ON RECEIVING THE WARNING

- To set up a temporary special control room and information center at the main bus station.
- To immediately contact the district control room and will assist in the work.
- To ensure that the staff at the headquarter is on duty.
- To assign the work to be done by the subordinate officers and staff regarding transportation under DDMP and to send them to their sites.
- To receive instructions from the district liaison officer and will do the needful. To ensure for not allowing passenger buses to move out of the S.T. Depots during final warnings of cyclone, flood etc; to take safety measures for passengers who cannot return back to their home.
- To ensure the availability of resources included in the DDMP and will make due arrangements to get those during emergency.
- To consult the Liaison Officer to close the transportation in the damage prone areas for the safety of the people and the property.
- To make groups having vehicles for emergency work and will assign the areas tothem.
- To set up a temporary control room for the dissemination of information for emergency work and will appoint a nodal officer.
- To make available the sufficient number of S.T. buses to the state administration for the evacuation of the people to safe places from the disaster prone areas.
- To assist the administration to send the messages of warning to the remote areas through the drivers/conductors on transport routes.

C. POST DISASTER ACTIVITIES

♦ To follow the instructions of District Liaison Officer.

- To carry out the duty assigned for search and rescue work
  - To engage the resources and manpower available to manage the disaster.
  - To review the matter regarding closing of movement of buses for safety reason and see that those are restarted very soon.
  - To send DMTs with necessary equipments if the transportation is disrupted.
  - To contact the District Control Room if additional equipments, vehicles, manpower, technical personnel, which are required to restore the transportation related activities.
  - To prepare a primary survey report on damage in the area and will send it to the district control room and also to the administrative head within 6hours.
  - To make temporary arrangement of transportation for control rooms, hospitals, shelters, bus depots etc.
  - To immediately undertake repairs needed at the bus stations.
  - To collect the details of roads, damaged and will get them repaired

    in co-ordination with competent authority and will restore the bus services.

Forest Department

A. Normal time activities

- Addresses of members with telephone numbers.
- Details of veterinary centres, artificial insemination centres, veterinary dispensary, veterinary colleges' buildings, vehicles, mobile dispensaries and equipments under his control and also the details of vehicles and equipments used often by outsource.
- Maps showing the details of area with statistical data.
- Approach roads under forest department and their condition including bridges, causeways, railway crossing etc.
- Inspection of damage prone roads, bridges, check dams, causeways, under forest department
- To inspect periodically the buildings, residencies, high causeways under forest department
- To maintain the equipments available such as sharp instruments, insecticides, diesel generators, dumpers, generator, cutters, tree cutters, ladders, ropes, flood lights, shovels, axes, hammers, RCC cutters, cable wires, fire equipments, de-dusting equipments etc; which can be used during emergency and will also ensure that they are in working condition.
- To take care of public shelters, other places to be used for evacuation with primary facilities like water
- To prepare a list of public properties in the damage prone forest areas and will make advance arrangements to lessen the damage.

B. ON RECEIVING THE WARNING

- To immediately contact the district control room and will assist in the work.
- To ensure that the staff at the headquarter is on duty.
- To assign the work to be done by the subordinate officers and staff regarding transportation under DDMP and to send them to their sites.

- To arrange for wireless, telephones, manpower, forest guard in advance to disseminate information of the disaster in the damage prone areas and will play a key role with the district administration to warn the public.

♦ To make in advance arrangement for fuel wood and bamboos for priority areas.

C. POST DISASTER ACTIVITIES

♦ To follow the instructions of District Liaison Officer
♦ To carry out the duty assigned for search and rescue work.
♦ To engage the resources and manpower available to manage the disaster.
♦ To prepare a primary report of damage for the affected areas.
♦ To take actions to provide electricity, water and latrine to the temporary shelters in the forest areas.
♦ To send task forces with vehicles, tree cutters, ropes, flood light, generator in case of closure of roads due to felling of trees.

Port Office

A. Normal time activities

♦ Details of the staff with their address and phone numbers, details of port workers, securities, mechanics and supervisory staff. Details of location of ports & jetties in all the areas of the district working round the clock.
♦ Details of fuel arrangement for ships-mechanized launches at the time of emergency.
♦ Do's and Don'ts to be observed during emergencies and details of priorities should be given to thestaff.
♦ Set up for evacuation of people from affected area of the port area.
♦ Details of buildings, vehicles and equipments and list of contractors with vehicles and equipments.
♦ Map showing ports, Jetties, light houses, signals, as well as important routes, communication equipments, telephone line, telex lines, megaphone, amplifiers with statistical data.
♦ Details of important telephone numbers of water supplies, control room, hospitals, drainage system, railway stations, bus depots, strategically important places, Army Air force Navy camps and other sensitive places, light houses, major industrial units, and other communication channels which can be used during emergency.
♦ Arrangement for transportation & evacuation of people from the affected areas.
♦ Action plan regarding repairs and alternative ways in case of disruption of transportation.
♦ Plan showing the alternative routes and arrangement for transportation of goods etc; during emergencies.
♦ To inspect the port, jetties, lighthouses, signals, pick up stand, garages, control point etc; which are damage prone.
♦ To make due arrangement for materials to restore the facilities in case the movement of the materials and goods on the ports are damaged.
♦ To prepare an action plan to avail on temporary bases, the technical personnel from the near by district which is not affected. Will also collect the details of swimmers in the district.

- To make arrangement for sufficient fuel during emergency.
- To maintain the equipments available such as cranes, diesel generator, earth mover machines, de-dusting pumps, cutters, tree cutters, ladders, ropes, flood lights, shovels, axes, hammers, RCC cutters, etc. which can be used during emergency and willensurethat those are in the working conditions.
- To take due care to see that the transportation at shelters and emergency hospital is not disrupted during calamities.
- To prepare a list of public properties related to transport department, which are in the damage prone area and will arrange in advance to minimize the damage.

B. ON RECEIVING THE WARNING

- To set up a temporary special control room and information center at the main bus station.
- To immediately contact the district control room and will assist in the work
- To ensure that the staff is on duty at the headquarter.
- To assign the work to be done by the subordinate officers and staff regarding transportation under DDMP and to send them to their sites.
- To specifically take action to ensure that the port workers, tourists and fishermen do not move out for fishing as well as sailing during the final warnings of cyclone, flooded.
- To evacuate the fishermen and saltpan workers to a safe place and if they deny, to get it done forcefully.
- To ensure that the warning signals are received in time and shown immediately to the people.
- To undertake the work of search and rescue and also the relief work in co-ordination with Navy Coastguard.
- To ensure the availability of resources included in the DDMP and will make due arrangements to get those during emergency.
- To consult the liaison officer to close the ports and sailing in the sea, which is damage prone or dangerous for the safety of the people as well as the property.
- To assist the administration to send the messages regarding warning to the remote area as well as the coastal areas through the port staff.

C. POST DISASTER ACTIVITIES

- To follow the instructions of District Liaison Officer.
- To carry out the duty assigned for search and rescue work.
- To engage the resources and manpower available to manage the disaster.
- To review the matters regarding closing of movement at the port for safety measures and will ensure that it is restarted very soon.
- To contact the district control room if additional equipments, vehicles, manpower, technical personnel are necessary to restore the port related activities.
- To prepare a primary survey report of damage and send it to the Control Room and to the administrative head.
- To collect the details of ports, jetties, light houses as well as approach roads connecting the damaged ports and will get them repaired in co-ordination with the

competent authority and will help for restoration of the economic activities pertaining to ports.

Checklist of Various Department

Preparedness Checklist for the District Collector

- Preparation of the DDMAP with the assistance of DDMC.
- Setting up District Control Room.
- Under the DDMP, district level agencies would be responsible for directing field interventions through various agencies right from the stage of warning to relief and rehabilitation.
- At the disaster site, specific tasks to manage the disaster will be performed.
- Collector will be an integral part of the DCR.
- Collector will be assisted by SOC.
- SOC will be headed by a Site Manager.
- Site Manager will co-ordinate the activities at various camp sites and affected areas.
- The site Operations Centre will report to the District Control Room.
- The Collector will co-ordinate all the field responses which include, setting up Transit Camps, Relief Camps and Cattle Camps.

Preparedness Checklist for the Police Department

- The department is familiar with the disaster response plan and disaster response procedures are clearly defined.
- Orientation and training for disaster response plan and procedures undertaken.
- Special skills required during emergency operations imparted to the officials and the staff.
- Reviewed and updated the precautionary measures and procedures, the precautionstobetakentoprotectequipment,thepost-disasterprocedurestobefollowed.
- Adequate warning mechanisms established for evacuation.
- An Officer has been designated as Nodal Officer for Disaster Management.
- Sources of materials required for response operations have been identified.

Preparedness Checklist for the Health Department

- The department is familiar with the disaster response plan and disaster response procedures are clearly defined.
- Orientation and training for disaster response plan and procedures undertaken.
- Special skills required during emergency operations imparted to the officials and the staff.
- Reviewed and updated the precautionary measures and procedures, the precautions to be taken to protect equipment, the post-disaster procedures to be followed.
- A hospital plan for the facilities, equipment and staff of that particular hospital based on "The Guide to Health Management in Disasters" has been developed.
- Hospital staff is aware of which hospital rooms /buildings are damage-proof.
- All the staff of the hospital has been informed about the possible disasters in the district, likely damages and effects, and information about ways to protect life, equipment and property.

- An area of hospital identified for receiving large number for casualties.
- Emergency admission procedures with adequate recordkeeping developed.
- Field staff oriented about DDMP, standards of services, and procedures for tagging.
- An Officer has been designated as Nodal Officer for Disaster Management.
- Sources of materials required for response operations have been identified.

Preparedness Checklist for M.S.E.D.C

- The department is familiar with the disaster response plan and disaster response procedures are clearly defined.
- Orientation and training for disaster response plan and procedures undertaken.
- Special skills required during emergency operations imparted to the officials and the staff.
- Reviewed and updated the precautionary measures and procedures, the precautions to be taken to protect equipment ,tempo st-disaster procedures to be followed.
- An Officer has been designated as Nodal Officer for Disaster Management.
- Sources of materials required for response operations have been identified.

Preparedness Checklist for Water Supply Department

- The department is familiar with the disaster response plan and disaster response procedures are clearly defined.
- Orientation and training for disaster response plan and procedures undertaken.
- Special skills required during emergency operations imparted to the officials and the staff.
- Reviewed and updated the precautionary measures and procedures, the precautions to be taken to protect equipment, the post-disaster procedures to be followed.
- Adequate warning mechanisms for informing people to store an emergency supply of water have been developed.
- Procedures established for the emergency distribution of water if existing supply is disrupted.
- An Officer has been designated as Nodal Officer for Disaster Management.
- Sources of materials required for response operations have been identified.

Preparedness Checklist for Irrigation Department

- The department is familiar with the disaster response plan and disaster response procedures are clearly defined.
- Orientation and training for disaster response plan and procedures undertaken.
- Special skills required during emergency operations imparted to the officials and the staff.
- Reviewed and updated the precautionary measures and procedures,
- the precautions to be taken to protect equipment, the post-disaster procedures to be followed.
- Flood monitoring mechanisms can be activated in all flood prone areas from 1stofJune.

- All staff is well aware of the precautions to be taken to protect their lives and personal property.
- Each technical assistant has instructions and knows operating procedures for disaster conditions.
- Methods of monitoring and impounding the levels in the tanks evolved.
- Methods of alerting officers on other dam sites and the district control room, established.

Chapter 13

Annexure:

Chapter 13 Annexure:

Pls refer to volume II and III