

DISASTER MANAGEMENT PLAN

1.0 INTRODUCTION

Disasters disrupt progress and destroy years of painstaking development efforts, thereby pushing nations back by several decades. The impacts of disasters are particularly strong in case of developing nations in terms of recovery therefore, both pre-disaster efforts in terms of preparedness, capacity building, awareness along with an efficient response mechanism, recovery and reconstruction would lessen the loss of lives and property.

The possible risks in the case of River Bed mining project are Bank Erosion, floods, accidents due to transportation.

Shri Mahendra Singh Rajawat has casted Disaster Management Plan to ensure that all components of Disaster Management get addressed to facilitate planning, preparedness, operational, coordination and community participation.

1.1 Aim & Objectives

The aim of the DMP is to ensure that the following components of DM are addressed to facilitate planning, preparedness, operational coordination and community participation:-

- Putting in place a streamlined and institutional techno-legal framework for the creation of an enabling regulatory environment and a compliance regime.
- Developing contemporary forecasting and early warning systems backed by responsive and fail-safe communications with Information Technology (IT) support.
- Ensuring efficient response and relief with a caring approach;
- Undertaking reconstruction as an opportunity to build disaster resilient structures and habitats.
- Undertaking recovery to bring back the community to a better and safer level than the pre-disaster stage.
- Promoting a culture of prevention and preparedness, so that DM receives the highest priority at all levels.
- Encouraging mitigation measures based on state-of-the-art technology and environmental sustainability.

The overall objectives of the Disaster Management plan are:

- (a) To localize the emergency and, if possible eliminate it; and
- (b) To minimize the effect of the accident on people and property.

Elimination requires well planned process/technology and its effective implementation, so that such situation should either not arises or if it comes, a pre warning is received for timely action in built or by preparedness for zeroing the effects.

Minimizing the effects may include prompt action, rescue, First aid, and evacuation, fire fighting and also passing on information promptly to people living nearby depending upon nature of disaster.

2.0 Hazard Vulnerability and Risk Analysis (HVRA)

“Hazard Identification”

“Hazard is an event or occurrence that has the potential to cause damage to life, property and environment. Hazard Identification is the process of studying the nature of hazards determining its essential features i.e., degree of severity, duration, and the extent of the impact area.”

“Risk Assessment”

Risk has been defined by the United Nations as a measure of the expected losses due to a hazard event of a particular magnitude occurring in a given area over a specific time period. The level of risk depends upon the nature of the hazard, the vulnerability of the elements that are affected and the economic value of those elements. Risk is also defined as a probability that negative consequences may arise when hazards interact with vulnerable areas, people, property, and environment.

Risk analysis is a methodology to determine the nature and extent of risk by analyzing potential hazards and evaluating existing conditions of vulnerability that together could potentially harm exposed people, property and environment on which they depend.

Therefore, Risk assessment is a function of hazard and vulnerability and is often based on an assumption and uncertainty, which contains some degree of errors.

“Vulnerability Analysis”

The vulnerability of a particular element of community is defined as the degree of loss, which it would suffer as a result of a specific hazard event. The nature of vulnerability and its assessment vary according to whether the element involved represents people and social structures, physical structures, or economic assets and activities. Therefore, the vulnerability of an area is determined by the capacity of its social, physical and economic structures to withstand and respond to hazard events.

HVRA is considered to be the first step towards Disaster Risk Reduction (DRR). Risk assessment studies have both spatial and temporal dimensions. Thus, there is a need to decide the scale at which the risk assessment is to be conducted with reference to the timeline for it. The risk maps thus need updation at regular intervals.

HVRA is essential to develop a strong and effective plan; which would focus on the preparedness, prevention, mitigation, and response and recovery measures.

2.1 Hazard Analysis & Mitigation

The major possible hazard in the case of River Bed mining project is floods. To deal with the above emergencies, the DM Plan has been prepared by Shri Mahendra Singh

Rajawat. The DM Act, 2005 & several guidelines issued by National Disaster Management Authority will be followed.

2.1.1 Floods

Though most parts of Rajasthan receive scanty rainfall, the State has a history of floods and inundations. River Banas & Kothari are the main river existing in the project area.

2.1.1.1 River Banas

River Banas originates in the Khamnor hills of the Aravali range (about 5 km from Kumbhalgarh) and flows along its entire length through Rajasthan. Banas is a major tributary of the River Chambal, the two rivers meeting near village Rameshwar in Khandar Block in Sawai Madhopur District. The total length of the river is about 512 km.

The total catchment area of Banas River Basin in Rajasthan is 45,833 km².

Table -1
River Banas Details

Particulars	Details
Catchment Area	45,833 km ²
Longitudes	73°25' and 77°00' E
Latitudes	24°15' and 27°20' N
Tributaries	Berach and Menali on the right, and Kothari, Khari, Dai, Dheel, Sohadara, Morel and Kalisil on the left

Reference: <http://waterresources.rajasthan.gov.in>

2.1.1.2 River Kothari

River Kothari originates in the eastern slopes of the Aravali range near Horera village in Bhilwara District. The river flows through Rajsamand and Bhilwara Districts for about 51 km in a hilly region, and 100 km through plains, before joining the Banas near Nandrai village in Bhilwara District.

The total catchment area of Kothari River Basin in Rajasthan is 2341 km².

Table -2
River Kothari Details

Particulars	Details
Catchment Area	2,341 km ²
Longitudes	73°47'30" and 75°3'30"
Latitudes	25°14'30" and 25°34'45"
Tributaries	Bahamani

Reference: <http://waterresources.rajasthan.gov.in>

2.1.1.3 Project Area & Vicinity Details

Proposed area is a part of River Banas & Kothari. The river bed mining project of Bajri (Area-1191.37 ha) is located at Tehsil-Kotri, District: Bhilwara (Rajasthan). Geographical extents are 25°14'30" N to 25°30'30"N and 74°45'00" E to 75°04'00"E.

Bhilwara River Map



Fig: 1 Bhilwara River Map

2.1.1.4 Climatic Condition

The area has semi arid zone type climate. Average rainfall remains 704 mm per year. The maximum, minimum and mean temperatures of the area are 45°C, 3°C and 24°C respectively.

The dry season is extreme hot during day hours and cold season is extreme cold during night hours. The sandy winds are common during the day hours in hot season.

The temperature starts rising from March and reaches maximum in the month of May/June. Hottest months are April, May & June with scorching sun always over the sky.

2.1.1.5 Rainfall Condition

The rainfall in the area is scanty averaging about 704 mm per annum. About 80% of the rainfall is during the months of July to September. The variation of annual rainfall from year to year is very large. On an average, there are about 30 rainy days in a year. During the southwest monsoon season relative humidity is generally 60% and during the rest of the year is 30%. During summer season sometimes, humidity drops as low as 15%.



Fig 2: Isohyets of average annual rainfall of Rajasthan. (Source: P. Narain, 2005)

Disaster Management Plan

HYDROMET DIVISION, NEW DELHI
 METEOROLOGICAL DEPARTMENT
 DISTRICT RAINFALL (mm) FOR LAST FIVE YEARS

District : BHILWARA

Note : (1) The District Rainfall in millimeters (R/F) shown below are the arithmetic averages of Rainfall of Stations under the District.
 (2) % Dep. are the Departures of rainfall from the long period averages of rainfall for the District.
 (3) Blank spaces show non-availability of data.

YEAR	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER
OCTOBER	NOVEMBER	DECEMBER							
R/F %DEP.	R/F %DEP.	R/F %DEP.	R/F %DEP.	R/F %DEP.	R/F %DEP.	R/F %DEP.	R/F %DEP.	R/F %DEP.	R/F %DEP.
2009	0.0 -100	0.0 -100	7.4 100	0.0 -100	1.3 -88	25.3 -60	214.6 -3	88.8 -64	12.5 -88
	4.5 -63	4.2 -48	0.0 -100						
2010	2.2 -49	0.0 -100	0.0 -100	0.0 -100	0.0 -100	29.5 -53	147.4 -33	262.1 7	126.7 26
	0.0 -100	132.4 1535	5.5 4						
2011	0.0 -100	1.9 -50	0.0 -100	0.0 -100	0.0 -100	128.0 113	167.9 -21	287.5 32	133.7 49
	0.0 -100	0.0 -100	0.0 -100						
2012	0.0 -100	0.0 -100	0.0 -100	6.5 117	19.5 88	18.2 -70	118.0 -45	349.0 60	129.7 45
	0.0 -100	0.1 -99	0.0 -100						
2013	0.0 -100	19.4 411	0.0 -100	0.4 -87	0.9 -91	58.0 -3	268.9 26	232.5 7	103.0 15
	8.0 -32	0.0 -100	0.0 -100						

Fig 3 Rainfall data of Bhilwara district for Five years (2009-13) (Ref: <http://www.imd.gov.in/section/hydro/distrainfall/webrain/rajasthan/bhilwara.txt> & http://waterresources.rajasthan.gov.in/Daily_Rainfall_Data/2011.htm)

2.1.1.6 FLOOD HAZARD ZONATION OF THE AREA

As per the “Vulnerability Atlas – 2nd Addition; Peer Group, MoH & UPA; based on digitized data of SOI, GOI; Flood Atlas, Task Force Report, C.W.C., GOI” the project site does not fall under “area liable to flood”. Figure shown below depicts Flood Hazard Zones.

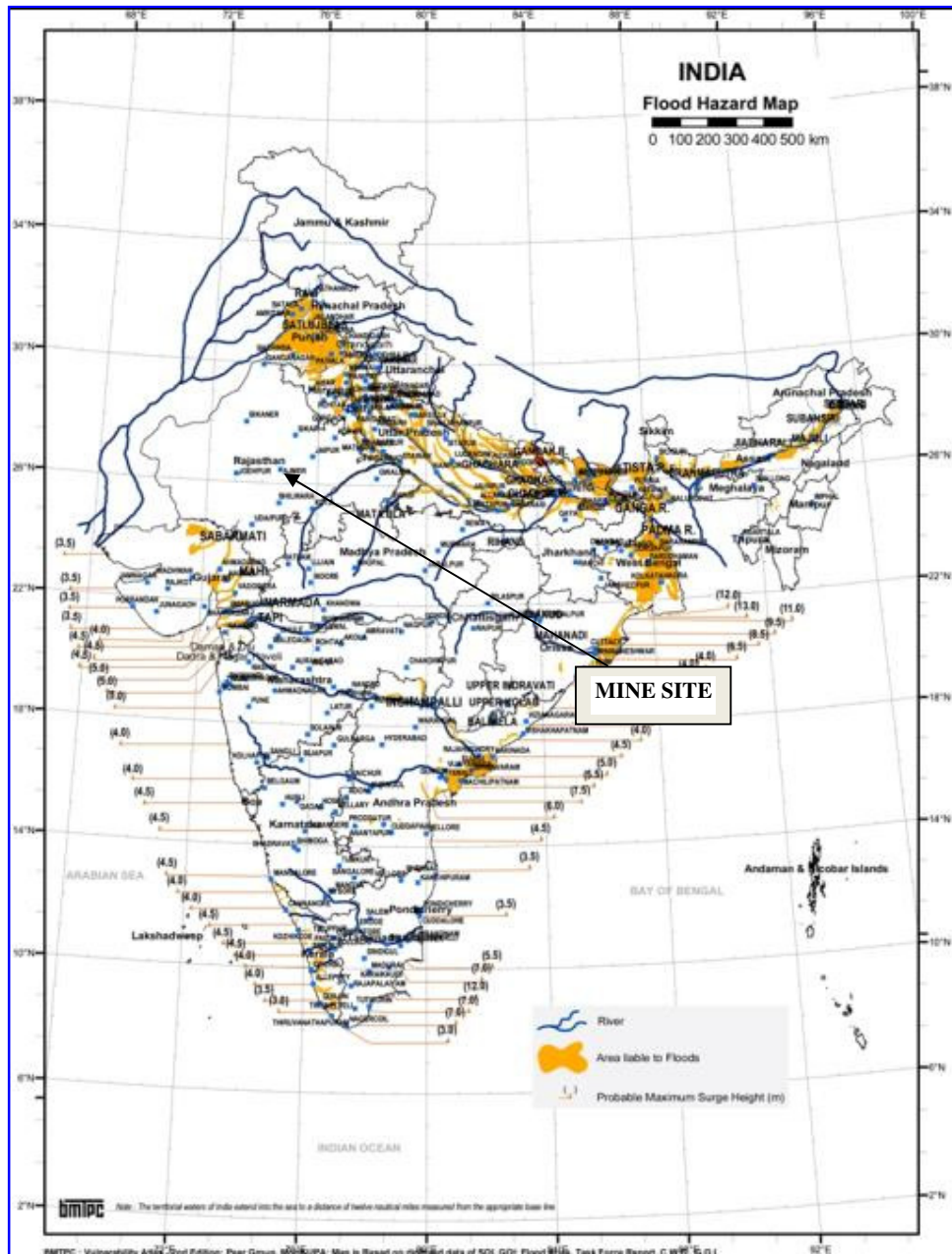


Fig 4: Flood Hazard Zonation Map as per the “Vulnerability Atlas based on digitized data of SOI, GOI.

The flood prone areas of Rajasthan include major parts of the basins and sub basins of River Luni in Barmer, Pali, Sirahi and Jalore; and the basins and sub basins of River

Chambal in Baran, Kota and Bundi districts. Also, major portions of Bharatpur districts falling under the basin of River Banganga, and the basin of River Ghaggar in Sriganganagar are prone to floods.

Pali District is categorized as “LOW” for under Flood Hazard Profiling by Government of Rajasthan.



Fig 5: Flood Prone Areas in Rajasthan

The lower parts of the river basin are more at risk as compared to higher areas of various river basins in Rajasthan. The erratic and temporal occurrence of floods in Rajasthan adds to the difficulty of formulating a system. Documentation and analysis of flood damage and losses would be major exercise in itself cataloguing of flood prone areas.

2.1.2 Onsite Emergency Plan

The onsite emergency management of Shri Mahendra Singh Rajawat is given here, as the same will be applied in case of proposed riverbed mining project.

2.1.2.1 Disaster Control Management system

Disaster Management Committee plays an important role in combating emergency in a systematic manner. Schematic representation of Emergency Control Team involved during emergency is shown below in the figure given below. In addition; the implementation of an Emergency Response Plan relies on a number of response functions, which deal with different aspects of emergency, with the most important ones being:

- Communication and Co-ordination;
- Fire and Rescue (Emergency Mitigation) Emergency Control Team at Incident Site;
- Medical Services;
- Security;
- Administration (Logistics and Welfare);
- Co-ordination with external agencies;

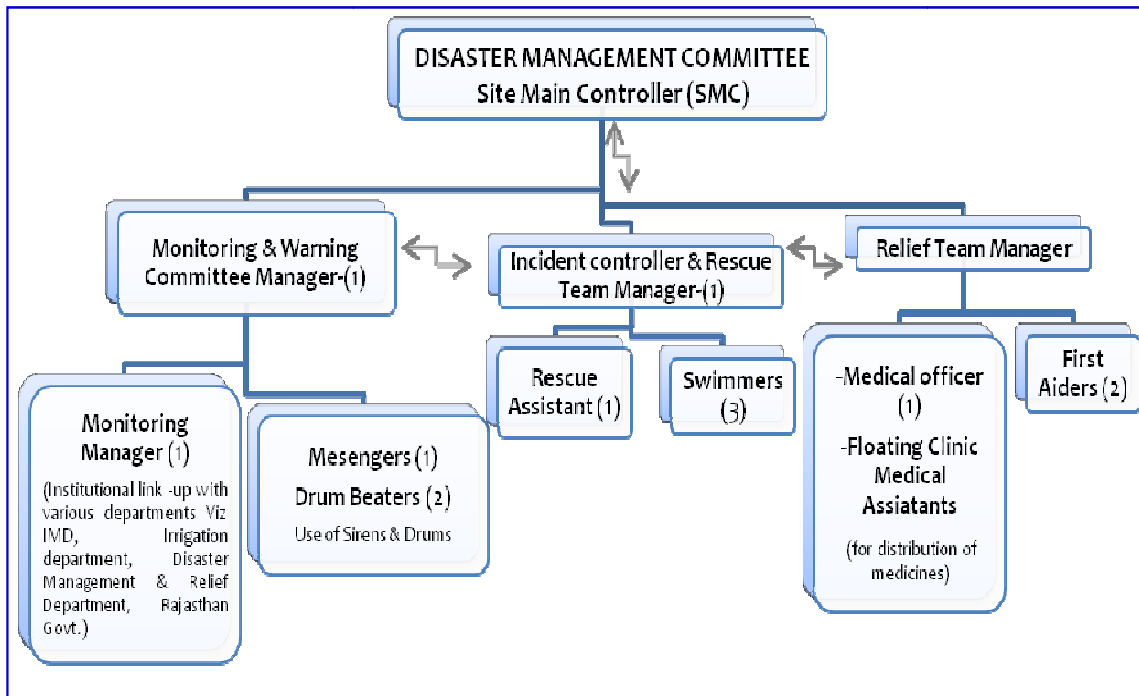


Figure 6 - : Team Involved During Emergency- Structural Representation

2.1.2.2 Emergency Control Centre (ECC)

An Emergency Control Centre (ECC) is established from which emergency operations are directed and co-ordinated. Centre will be activated as soon as on-site

emergency is declared. During an emergency, the Emergency Management Staff, including the main controller will gather in the ECC.

Therefore, the ECC will be equipped with adequate communication systems in the form of mobile phones and other equipments to allow unhampered organization and other nearby facility personnel. . The ECC will be located at some of the blocks.

Manning of ECC during Emergency is as follows:

- Site Main Controller (SMC)
- Assistant to SMC
- Telephone Attendant
- Messengers
- Key Personnel & Team (Monitoring & Warning Committee Manager, Incident controller & Rescue Team Manager, Relief Team) as per the DM Committee;

The ECC will have its own emergency lighting arrangement and electric communication systems operation. The ECC will always be ready for operation and provided with the equipment and supplies necessary during the emergency such as:

- Hazard identification chart, DM response plans;
- Area map of surrounding villages;
- Population in nearby the riverbed mine area- Upstream & Downstream;
- Internal telephone connections and External telephone connections;
- A list of key personnel, with addresses, telephone numbers, etc.;
- Connection to district collector, police control room, Hospital etc.;
- Note pads and ball pens to record message received and instructions;
- Updated copies of the On-site Disaster Management Plan
- Emergency lights
- Personal protective equipment(PPE)
- Life Vests & Jackets,
- Rescue Boards
- Rescue Tubes & Rescue Cans
- Rescue Ring Buoys
- Dive Bricks & Dive Rings



- Swim Safety Buoys & Pool Lifelines
- Spin boards & Head Immobilizers
- First Aid Kit

2.1.2.3 Emergency Communication

Emergency Communication comprises of:

- a) Built in safety measures, alarms, trips and interlocks etc.
- b) Standard safe operating and maintenance procedures permit system etc.
- c) Training of all the involved staff in normal and emergency operating procedures.
- d) Training of all employees in safety, fire fighting and first aid.

Internal Mobile phone systems will be provided at work place including Walkie Talkie for immediate communication to all concerned.

2.1.2.4 PREVENTIVE MEASURES FOR FLOOD & RIVER BANK PROTECTION.

The details of preventive measures to be taken for Flood & river bank protection are given as below:

- (i) No mining will be done during monsoon season.
- (ii) Mining will be stopped well before the warning stage.
- (iii) Mine Facilities & manpower will be made available for evacuation & warning purposes.
- (iv) No mining will be done across the river channel.
- (v) Adequate width as safety margin will be left on both sides of river banks during bajri collection.
- (vi) Mining will proceed along the river in the direction from downstream to upstream in each block.
- (vii) Markers showing water level will be provided on the site.
- (viii) In order to make adequate replenishment, blocks will be mined in alternate year, so that one block is kept idle/ non-working while the other is being worked.
- (ix) Access roads/ramps to river bed will be breached before onset of monsoon to permit unhindered flow of river.
- (x) The mineral will be mined out in a uniform way so that the river flow/course shall not get disturbed in its uniformity.
- (xi) Unused material including bajri will not be stocked on the banks as it will hinder the flow of river in monsoon season.

2.1.2.5 FLOOD CONTROL MITIGATION MEASURES

Disaster management committee of Shri Mahendra Singh Rajawat headed by Site Main Controller (SMC) has been formed in such a way to execute timely management the three stages:

- **Stage-1-** Alert and Warning Stage;
- **Stage-2-** Disaster Stage;
- **Stage-3-** Response and Rehabilitation Stage.

DM Committee comprises of Monitoring & Warning Committee (stage-1 coordination), Incident Controller & Rescue Team Manager (stage-2 coordination), and Relief Team (stage 3 coordination) to ensure efficient implementation & DM Plan & disaster risk reduction. Stage wise Flood Control Mitigation Measures for river bed mine are as follows:-

I. **AT ALERT AND WARNING STAGE:-**

1. No mining will be done during monsoon season.
2. Mining will be stopped well before the warning stage.
3. Mine Facilities & manpower will be made available for evacuation & warning purposes.
4. **Timely warnings upstream & downstream:-**
 - Direct communication will be done through Drum beating & sirens for passage of Warnings.
 - Timely warnings will be given to the people in surrounding villages in upstream;
 - Passing of warnings in downstream areas giving sufficient time before river overflow for evacuation of villagers;
 - During monsoon/ heavy rains, carry out inspections of dams/ reservoirs on a daily basis
 - Check the water level for issuance of alerts and warnings to locals.
5. **Rainfall data Update, documentation & Interpretation**
 - Rainfall data will be kept updated on daily basis so as to have sufficient time before the water from rainfall could reach upstream areas.
 - Updated documents will be kept readily available at ECC.
 - Interpretation of rainfall data that whether or not rainfall is above the normal level & to forecast disastrous implication, if any.
6. **CWC National Flood Forecasting Network & Institutional tie-ups:-**
 - Ensure coordinated movement of all departments, officials and agencies for combating the disaster;
 - Link-up & Coordination with CWC & IMD for effective & timely forecast by means of real time data communication network from the forecasting stations

7. Co-operation at all government levels

- To implement the basic principles and approaches, co-operation to all government levels,
- Follow sectoral policies regarding environmental protection, physical planning, agriculture, transport and social development.

8. Arrange regular meetings for updating the apex body of DM Committee on a daily basis.

9. Use knowledge innovation and education to build a culture of safety and resilience at all levels.

10. Document the experiences and best practices.

11. Separate fund for flood control mitigation measures & financial assistance will be provided.

II. AT DISASTER STAGE:-

- Assist & coordinate with Govt. Organizations & departments. DM committee of Shri Mahendra Singh Rajawat will ensure to follow instructions passed by the government.
- Volunteer's Assistance will be provided to Government DM authority for emergency response, as necessary;
- Swimmers will be there to help the victims, as necessary.

III. AT RESPONSE AND REHABILITATION STAGE :-

- Floating clinics with medical practitioners, doctors & first aiders will roam around the affected villages for treatment & distribution of medicines;
- Assist local administration in rescue and relief operation as required;
- Assistance of police for searching the lost persons, if any;
- Food packets, clothes & shelter arrangement will be provided;
- First aiders & Swimmers will be there to help the victims;
- Training awareness;
- Regardless of the precautions taken, the flood event always creates deep psychological trauma suffered by the victims. Victim assistance and rescue will systematically include psychological support, whose activity will be extended throughout several months subsequent to the event.
- **Post Disaster Analysis and Evaluation:-**
When the emergency is over, the team will carry out an analysis, evaluate the influence of various factors and find out the procedures to minimize them in future. At the same time adequacy of disaster management plan shall be evaluated and shortcomings shall be rectified to improve the plan.

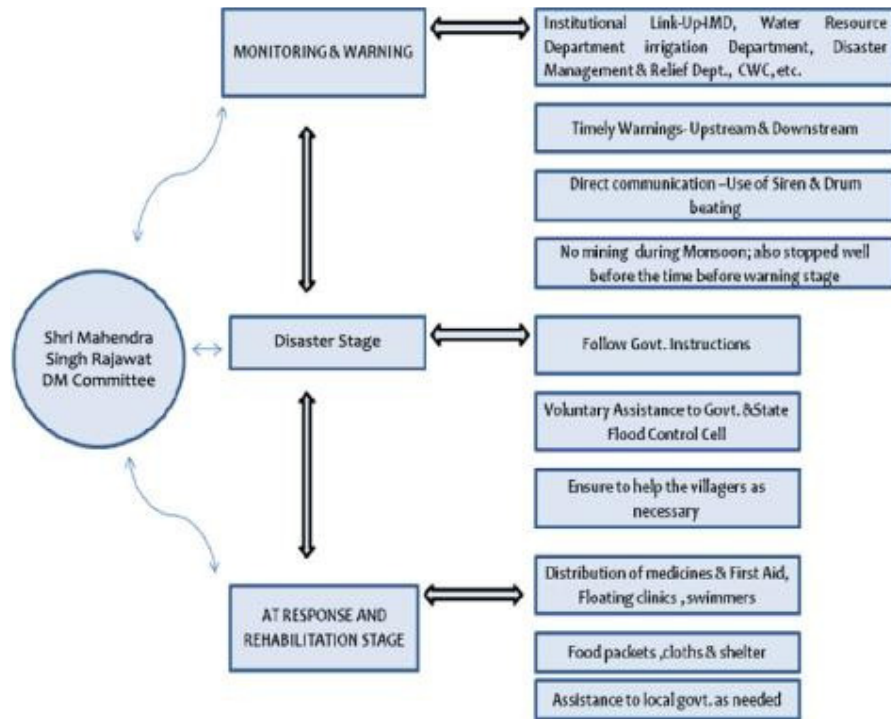


Fig 7: - Schematic representation for flood control mitigation measures

2.1.3 OFF-SITE EMERGENCY PLANNING

The off-site emergency plan is an integral part of any hazard control system. It is based on those accidents identified by the works management, which could affect people and the environment outside the works. Thus, the off-site plan follows logically from the analysis that took place to provide the basis for the on-site plan and the two plans therefore complement each other.

The responsibility for the off-site plan will be likely to rest either with the works management or with the local authority. Schematic representation of various organisation involved during emergency is shown below.

Monitoring Manager (Emergency Coordinating Officer) will take overall command of the off-site activities & related co-ordination. As with the on-site plan, an emergency control center will be required within which the emergency coordinating officer can operate.

2.1.3.1 Organization

Details of warning systems, implementation procedures, emergency control centers, name and appointments of incident controller, site main controller, their deputies

and other key personnel.



Figure -8: Schematic presentation of Various Organizations- Institutional Approach

2.1.3.2 Communications

Identification of personnel involved, communication center, call signs, network, displaying the list of telephone numbers.

Table-3

List of Contact Nos in Bhilwara District

S.No.	Particulars	Telephone No.
1.	Flood Control Room, SE Office, Bhilwara	01482-226540
2.	Police Control Room	100
3.	Fire Brigade	101
4.	Ambulance	102
5.	Emergency Services	108
6.	MG Hospital, Bhilwara (District Hospital)	(01482) 235639
7.	CM&HO, Bhilwara	01482-232641
8.	Officer In-charge, Meteorological Office, Ajmer	0145-2692341
9.	Superintendent of Police, Bhilwara	01482-232001
10.	Raj panchayat	0141-2227847
11.	Secretary, Relief Department, Rajasthan	0141-2227014

S.No.	Particulars	Telephone No.
12.	Superintending Engineer, PHED Circle, Bhilwara	01482-240641
13.	Director, Doordarshan Kendra, Jhalana Doongari, Jaipur	2711519, 2710628, PBX 2711696 Ext.203, 2710697
14.	M.L.V. Govt. College, Bhilwara	01482239970, 01482 231810
15.	SME, Department of Mines And Geology, Bhilwara	240783 / 94141-09911
16.	DCF, Department of Forest, Bhilwara	+91 (1482) 252693
17.	URBAN IMPROVEMENT TRUST, bhilwara	01482- 264736 (O)

2.1.3.3 Special Emergency Equipments

Details of availability and location of Emergency Equipments as listed above in Item No. 2.1.2.2

2.1.3.4 Institutions & Voluntary Organizations

Details of organizations, telephone numbers, resources, etc. as listed above in table.

2.1.3.5 Meteorological information

Arrangements for obtaining details of weather conditions prevailing at the time and weather forecasts will be made.

2.1.3.6 Humanitarian Arrangements

Transport, evacuation centers, emergency feeding, floating clinics for distribution of medicines & first aid treatment, ambulances.

2.1.3.7 Public Information

Arrangements for: -

- Dealing with the media-press office
- Informing relatives, etc.

2.1.3.8 Assessment

Arrangements for: -

- (i) Collecting information on the causes of the emergency
- (ii) Reviewing the efficiency and effectiveness of all aspects of the emergency plan.

2.1.3.9 Role of local authority

Local Authorities like Panchayat, Sabha, Samity, municipalities can help in combating emergency situation after assessing the impact scenario in rescue phase.

2.1.3.10 ROLE OF THE POLICE

The police normally assume the overall control of an emergency, with a senior officer designated as emergency coordinating officer.

Formal duties of the police during an emergency include protecting life and property and controlling traffic movements.

The functions include controlling bystanders, evacuating the public, identifying the dead and dealing with casualties and informing relatives of dead or injured.

2.1.3.11 Role of The Health Authorities

Health authorities, including doctors, surgeons, hospitals, ambulances and so on, have a vital part to play following a major accident and they should form an integral part of any emergency plan.

2.1.3.12 ROLES OF THE GOVERNMENT SAFETY AUTHORITY

The Inspectors of Director General of Mines Safety would like to satisfy themselves that the organization responsible for safety & risk management including the off-site plan has made adequate arrangements for handling emergencies of all types including major emergencies.

