

FOREWORD

"Flood Manual" for a State in grip of drought of varying severity, virtually perennially may sound strange but it is a fact that parts of State of Rajasthan do get flooded from time to time. Administration has to respond & take preparedness, mitigation reconstructive/ rehabilitative measures whenever any such situation arises in the State.

Floods by nature are among the most devastating disaster and may lead to great loss of life, damage to infrastructure, crops and may render lakhs of people homeless without any food, water, health or other survival requirements.

Need was being felt for an instructive manual/document which could be an asset in formulating an effective response in flood situation. The department of Disaster Management & Relief took up this onerous responsibility upon itself and has come up with a comprehensive document "Flood Manual", for the purpose.

Sensitizing about various aspects of floods, the manual details in a systematic & precise manner topics like preparedness, forecasting & warning, approach & strategies for control, emergency response and short/long term measures to be undertaken by the administration. Statement of cost of emergency relief measures, copy of the order of Government of Rajasthan Relief Department, flood zoning authority & its powers, requisition & derequisition of army by civil administration, public health & medical measures etc make it a very useful handy tool. The document clearly spells the multi sectoral nature of the response for effective management and delineates responsibilities and standard operating procedures for responders at various levels from various sectors.

I hope and wish that all the stake holders in flood & other disaster response shall find this endeavour of the department to be a great asset.

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CHAPTER – I

INTRODUCTION

1.0 General

Floods are indeed a part of the earth's natural water cycle and have been accruing right from the beginning. In fact earth's geography has time and again been altered by floods and changing courses of major river systems. However, the damage due to flood has tended to increase with time due to greater interference by man in natural process and encroachment of flood zones and even riverbeds by human beings.

Occurrence of floods is as old as the rivers and the hills themselves. The earliest references to floods are found in the Rigveda and to the "Deluge" in the Old Testament. They were believed to be divine punishment meted out to humans for their cause widespread devastation even now. It is recognized that floods are a natural phenomenon, which cannot be entirely eliminated. Man has, therefore, to learn to live with the floods and where possible, rectify the ecological mistakes.

The term "flood" denotes both the discharge of a river under condition of excessive rainfall and the inundation of low lying areas. It has been observed that floods in rivers have certain characteristics, depending on the topography, meteorology and hydrology of the regions through which the rivers flow. Some rivers are erratic in that they often change their course.

Floods are classified as downstream and upstream floods. The downstream floods are most spectacular and damages are more apparent and hence the upstream floods are not taken adequate notice of.

Floods may be caused in rivers by excessive downpour in their catchment areas. They may also be caused by cloudbursts in a specific area. In the case of river floods preventive measures can be undertaken. Since floods in the latter case cannot be anticipated, preventive measures are difficult to undertake. This distinction between the river floods and the cloud burst floods need to be borne in mind in relief administration..

1.1 **Causes of Floods** - In its strictest sense, a "river in flood" means overflowing of its water into the surrounding countryside. The height of the banks and consequently the flow of water may vary greatly within comparatively short stretches. The floods are caused due to the following factors:

- (1) Extra-ordinary heavy precipitation concentrated in the catchment over a period of few days;
- (2) Choking of the bed of the river with heavy detritus and the consequent change in the river course;
- (3) Artificial obstruction to natural river flow like inadequate waterways provided on railways or road bridges or road embankments.

The problem of floods faced by India is unique in several respects due to varied climate and rainfall pattern in different parts of the country. Of the country's total geographical area of about 328 million hectares, about 41 million hectare or nearly 12%, is considered flood-prone. Though most of the floods occur during the south-west monsoon season, which accounts for about 80% of the total annual precipitation, inundation of inhabitant land even in other parts of the year, too, is not uncommon. There are occasions, when one part of the country is experiencing floods while another is in the grip of severe drought.

Rajasthan is one of the driest states in the country. Though the State is generally deficit in rainfall, it has also experienced floods in many areas during monsoon period. In the State Water Resource Plan, the data on occurrence of flooding events has been compiled. The total number of river basins in the state are 14 and the area not covered under any river basins is termed as outside basins. These main basins are further subdivided into 59 sub basins (**Annexure-XI**). Under the guidance of I.M.D. and C.W.C. a network of different type of hydro meteorological stations such as Rain gauge stations, gauge discharge & meteorological observatories were set up in important river basin catchment areas:

S.No.	Name of Basin
1.	Shekhawati
2.	Ruparail
3.	Banganga
4.	Gambhiri
5.	Parbati
6.	Sabi
7.	Banas
8.	Chambal
9.	Mahi
10.	Sabarmati
11.	Luni
12.	West Banas
13.	Sukli
14.	Other Nallas
15.	Areas of Western Rajasthan

1.2 Flood Prone Areas:

Flood in urban areas can occur during monsoons due to faulty planning, choking of drainage systems and unplanned growth or settlements.

Rajasthan has faced situation in the past. The flash in Jaipur, Loonkransar and many other places caused heavy damage. Flood prone districts and areas in the State are broadly as follows:

Flood Prone Areas in the State

S.No.	Name of Basin	Name of Sub-Basin	Name of District with Important Towns/Villages	
1	2	3	4	
1	Luni	Luni	Ajmer Barmer Jalore	Ajmer City Balotra, Sindri, Guda Chitalwana, Bhawatra
1A	Luni	Luni	Jodhpur	Bilada
2.	Luni	Luni	Jodhpur	Kakelav, Kankani, Dudiya
3.	Luni	Jojari	Jodhpur	Benar, Barilya, Kalyanpura
4.	Luni	Bhundh Hemawas	Pali	Pali City, Kharchi, Gurwara,
5.	Luni	Sukri	Pali Jalore	Rani, Chanod Rama, Bhavrani, Debawas
6.	Luni	Jawai	Jalore	Ahore, Jalore
7.	Luni	Bandi	Sirohi Jalore	Pandiv, Jdwal Siynna, Bagra
8.	Luni	Sngi	Jalore	Jaswatpura, Nimbawas
9.	Sukli	Sukli	Sirohi	Karaunti

10.	West Banas	West Banas	Sirohi	Abu Road
11.	Banas	Banas	Udaipur	Udaipur City
12.	Banas	Berach	Chittorgarh	Chittorgarh City, Sambhupura
13.	Banas	Banas	Bundi	Khatoli, Tonk-Uniara
14.	Banas	Morel	Jaipur	Jaipur, Sanganer
15.	Banas	Mashi	Jaipur	Bichun
16.	Mahi	Som	Udaipur	Chillyand
17.	Mahi	Som	Udaipur	Jhadol
18.	Chambal	Mej	Bundi	Bundi City
19.	Chambal	Chambal	Kota	Kota City
20.	Chambal	Chambal	Kota	Kathun
21.	Chambal	Kali Sindh	Kota	Khajuri
22.	Chambal	Kali Sindh	Kota	Sangod
23.	Chambal	Kali Sindh	Jhalawar	Jhalawar City
24.	Chambal	Kali Sindh	Jhalawar	Richwa
25.	Chambal	Parwan	Jhalawar	Manohar Thana
26.	Chambal	Parwati	Baran	Chhabra, Baran, Karaiahat
27.	Chambal	Parwati	Baran	Baran Town
28.	Banganga	Banganga	Bharatpur	Kaman, Pahi, Bharatpur, Deeg, Bayana, Roopwas
29.	Sabi	Sabi	Alwar	Kotkasim, Tapukra, Patiabad
30.	Shekhawadati	Mehdha	Nagaur	Kuchaman
31.	Ghaggar	Ghaggar	Sriganganagar	Hanumangarh, Pilibanga, Suratgarh, Jetsar, Srivijaynagar

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.

1.3 Rainfall:

The average normal rainfall of India is about 883 mm, whereas the average normal rainfall of Rajasthan is 531 mm. Western Rajasthan receives average rainfall of 279 mm and Eastern Rajasthan receives average rainfall of 631 mm. The Indian Meteorological Department (IMD) has been maintaining one Meteorological Centre at Jaipur for collection of meteorological data on uniform scientific lines, and issues daily bulletin of weather forecasts for whole Rajasthan. The routine monitoring of rainfall and tank water level during the monsoon season is a important task for ID&R, Irrigation Unit Jaipur. At present it depends largely on voice communication by telephone or wireless and production of daily report is entirely manual.

Clarifications in respect of terminology used by the meteorological department in rainfall.

- Heavy rainfall will imply expected rainfall between 65 mm. to 124 mm. in 24 hours in the specified area.
- Very heavy rainfall will imply expected rainfall 125 mm. or more in 24 hours in the specified area.
- For special distribution terminology used is given below:

Terminology used Percentage area coverage under specified weather

Isolated	:	1 to 25 per cent.
Scattered	:	25 to 50 per cent.
Fairly wide spread	:	51 to 75 per cent.
Wide spread	:	75 to 100 per cent.

- 1.4 **Heavy rains** - "heavy-rains would normally mean rainfall above 125 mms. within 24 hours, as decided by the Meteorological Department and flood central authorities. However, criteria to be adopted for grant of relief to the persons, affected by heavy rains should not merely be physical dimensions of the rainfall, but the fact of actual damage caused to the community and the persons concerned." Persons affected by heavy rains are eligible to receive relief in the State hereafter mentioned.

1.5 **Method of data recording of rainfall:**

Various methods of data recording are as under:

Ordinary Rain gauges: The daily data at these stations are being collected manually. Only two observations are taken daily at 8.30 & 17.30 hrs. But this frequency of data observations is not adequate for rainfall behavioural studies.

River Gauging Stations: These are usually a series of gauges at different locations across the riverbed. Observations are taken two hourly during the monsoon season, by noting down the levels manually on gauges fixed in the riverbed. The "Slope Area Method" calculates discharge and finally daily/monthly flows are computed.

Meteorological observations: The Conventional Meteorological Stations have been set up to observe the minimum and maximum Temperatures, Wet & Dry bulb for humidity, Wind direction & velocity and Sun shine hours.

Modernized data recording system: Water resource projects are executed not only for Irrigation purposes in modern days but are also planned for other purposes, particularly for Domestic and Industrial Water Supply, producing Hydro-Electric Power, Navigation, recreation, fishing, wild life as well as flood control etc. There has been significant development in the country in this field and new techniques, methodology and latest designs have been developed in order to design suitable project. A successful Water Management requires various types of vital hydrological data as mentioned below:

1. Hydro-meteorological data
2. Stream flow data
3. Sediment data
4. Ground Water data
5. Water quality data
6. Miscellaneous data i.e. Topography, soil etc.

The main deficiency had been the lack of establishment of a properly designed data collection network and data storage and retrieval system to provide scientifically based hydrological and meteorological data of required quality and quantity for different purposes. The data collection activities in the field are mostly based on manual observations at almost all observation sites in Rajasthan.

Therefore, a project for modernization of Hydro meteorological Observations and Network using latest technique/instruments in Rajasthan is very urgent requirement.

CHAPTER II

FLOOD PREPAREDNESS

2.0 Preparedness

Those activities which governments, organisations, communities and individuals develop to minimize loss of life and damage and to organise and facilitate timely and effective rescue, relief and rehabilitation in case of disaster.

Preparedness is the "insurance policy" against disasters; it is undertaken because mitigation activities can not fully eliminate the occurrence of those events. Preparedness is supported by the necessary legislation and means a readiness to cope with disasters or similar emergencies, which can not be avoided. Preparedness is concerned with forecasting and warning. The education and training of the population, organisation for and management of disasters, including preparation of operational plans, training of relief groups, the stockpiling of supplies and the earmarking of the necessary fund.

2.1 Preventive Action

Disaster Preventive Action may be described as measures designed to prevent natural phenomena from causing or resulting in disaster or other related emergency situations.

Preventive Action concerns the formulation and implementation of long range policies and programmes to prevent or eliminate the occurrence of disasters. On the basis of vulnerability analysis of all risks, preventive action includes legislation and regulatory principally in the fields of physical and urban planning, public works and building.

2.2 Mitigation

The concept of mitigation spans the broad spectrum of disaster prevention and preparedness. Mitigation means reducing the actual or probable effects of extreme disaster or man and his environment. Thus an emergency plan if properly executed can have a mitigating effect on a disaster just as the proper observance of building and land use regulations designed to event disaster. Mitigation is, in fact, prevention to a degree.

Flood control and mitigation action at State Level

2.3 Normal Times

- i) Emergency operation room will keep a constant touch with IMD and Control Room of Irrigation Department and get daily reports on weather forecast. Based on the reports, appropriate feed back should be such to the districts so that necessary precautions are taken.

- ii) **Constitution of a weather watch Group**

A weather watch group would be constituted which will review the weather condition every week from the month of June to September. The Group will comprise of Relief Commissioner, CE Irrigation, Director IMD and Director Agriculture.

iii) Meeting of the State Flood Advisory Committee

The meeting of the State Advisory Committee would be convened in the month of May every year and the preparatory action taken by the various departments should be reviewed and concerned departments be directed to take all necessary preventive measures and equip themselves to meet any eventuality. Respective departments will also pass on similar directions to their field outfits.

iv) Nodal Department :

The government by a separate decision has designated some departments as Nodal Department to deal with all the matters relating to the respective disaster (copy of the order at **Annexure-X**). The responsibilities are:

- a) Take all necessary steps for prevention, preparedness and mitigation of the disaster.
- b) As soon as disaster occurs, inform the Chairman of Disaster Management Group and set the disaster Response Mechanism in motion without any delay.
- c) Co-ordinate various government/ non-government agencies for prevention, preparedness and adequate response to the disaster.
- d) Update Disaster Management and Contingency Plan from time to time and also take necessary steps for its effective implication in the field.
- e) To take necessary steps to educate and inform the masses on various issues relating to the disaster.

v) List of Important Telephone Numbers

The directory of important telephone numbers should be updated and kept in the Control Room and also circulated to all concerned in the month of May every year by the Relief Department.

vi) List of NGOs

A list of NGOs alongwith the telephone numbers who can assist in relief activities will be kept in the EOC & IDRN website by all Collectors.

vii) Roles and Responsibilities of various departments

The roles and responsibilities of various departments are as follows:

Meteorological Department

1. To keep track of any situation wherein the warning for floods/flash floods is to be issued. The information be conveyed to the Relief Commissioner on phone and EOC in writing without delay.
2. To keep weather stations fully functional.

Local Bodies Department

1. All the local bodies to timely clean, desilt the drainage system before rain.
2. To identify high lying areas nearby the localities likely to be flooded for temporary camps.
3. To make arrangements of pump sets for dewatering of accumulated rain/flood water.
4. Arrangement for disposal of carcass.

5. To ensure that water of gutter lines/rain water do not seep into the drinking water lines. A joint survey of the line alongwith PHED officers be taken every year in the month of April-May.
6. To remove the garbage, dead animals timely to prevent diseases.
7. To take preventive health measures like food and water safety, anti malarial measures, ban on sale of cut fruits and vegetables in the open etc.

Medical Department

1. To ensure that sufficient medicines are available in store to prevent and control diseases in the rainy season/disaster.
2. To keep the teams of doctors ready with medical mobile van for dispatch to the affected areas with required medicines, well in time.
3. To strictly enforce food and water safety measures.
4. To takes effective preventive steps against occurrence of epidemics.
5. To set up round the clock control room.
6. Disinfection of drinking water sources other than PHED.

Police and Wireless Department

1. To keep police force in readiness for rescue and relief operations when the disaster occurs.
2. To provide wireless communication network during emergencies.
3. Law and Order.

Irrigation Department

1. To identify vulnerable areas in each district and formulate a plan of action to face the hazard.
2. To make operational the wireless sets available.
3. To arrange for boats, life jackets, ropes, torches etc.
4. To identify other available resources in each district to be rushed to other districts in case they are required.
5. To identify NGOs and list the resource material available with each of them which can be put to use in case of disaster like situation.
6. To strengthen embankments of rivers and canals, make necessary repairs on bunds/dams and in case of vulnerability advise district administration to take suitable steps to avoid any impending disaster.
7. To grease the gates of dams and tanks and ensure that there are functional.
8. To maintain constant visits on dams and tanks during rainy season and issue advance warning to the district administration and the areas in the downstream about any impending danger.
9. Regularly update the Disaster Management Plans of the Department.

Fisheries Department

1. To identify the resources like boats, life jackets, expert fishermen and swimmers prepared list thereof etc. to be rushed to the place of disaster when required and send a copy to the EOC also.

P.H.E. Department

1. To make control room operational during rainy season.
2. To check any broken pipelines of drinking water and repair them for safe drinking water.
3. Arrangements for quick restoration of water supply in case of floods.

Public Works Department

1. To identify buildings which may collapse during rains they should be repaired or they if found unfit then they should be removed.
2. To identify high level areas for building construction on the basis of flood mapping.
3. To identify high level areas for rehabilitation camps in case of heavy rains, flash floods etc.
4. To identify resources which are essentially required during flood rescue relief operations.
5. Arrangement for quick relief operations for temporary and permanent restoration works.

Power Department

1. To take all necessary steps for no disruption in power supply and all life safety should also be ensured from falling electric lines poles during high winds and floods.
2. To restore power as early as possible during contingencies.
3. To check the loose connections installation before rains begin.
4. To make arrangements of power in rescue camps for the affected people.

Animal Husbandry Department

1. To store required medicines, vaccines etc. and keep them ready for dispatch in case of outbreak of disease.
2. Put in place proper disease surveillance and quick response mechanism.
3. To vaccinate the animals for preventive health care wherever required.
4. Arrangement of fodder and cattle feed in flood affected areas.
5. Advice to Gram Panchayats for safe disposal of dead animals

Food Department

1. To ensure sufficient storage of food and other essential commodities in advance in vulnerable areas.
2. To issue instructions to keep essential stocks of commodities for emergency requirements.
3. Arrange relief supplies of food and other necessities during the flood.

Relief Department

1. Co-ordinate the efforts of all the departments.
2. Respond to the demands of the district.
3. To make available funds for relief operations.
4. Co-ordinate with Army and Air force.
5. Timely dissemination of information regarding the disaster to all concerned.
6. Keep the collectors updated on the policy discussion regarding relief to be distributed.
7. Inform the public through DPIR about the situation.
8. Monitor and direct relief activities and put up progress reports to CM, Relief Minister and Chief Secretary.

9. Manage the Emergency Operations Centre.
10. Ensure timely up-dation of the DMAP's at State and District Level.
11. Convene the meeting of Disaster Management Group as soon as the information regarding the disaster is received.

Information and Public Relations Department

1. Maintain a close liaison with EOC and keep the public informed about the situation, relief measures taken by the government through newspapers, TV/Radio etc.
2. Brief the press on the factual situation and maintain close liaison with the media throughout the emergency.

Department of Information and Technology

1. Provide all necessary help to set up reliable modern communication system.
 2. To provide necessary wherewithal (Physical and human) to the EOC for computerized monitoring.
 3. Develop standardised software package for online monitoring of the relief and rescue operations.
 4. Maintain close liaison with NIC and ISRO for obtaining access to their resources/information for emergency control.
- 2.4 Although flood management is a combined responsibility of all concerned departments, still Irrigation Department has a special role to play as it has been made nodal agency of the State for flood management and mitigation.
- 2.5 A State level flood memorandum shall be prepared by the Irrigation Department every year and supplied to all concerned containing the following information:
- (i) Address & telephone Nos., of all the coordinating officers at district level.
 - (ii) List of Wireless stations.
 - (iii) List of High frequency Wireless stations.
 - (iv) List of river gauge discharge sites.
 - (v) Formats to report flood situation.
 - (vi) Model action plan.
 - (vii) Material required for maintenance.
 - (viii) List of flood prone areas.
 - (ix) Index plan of river such as Chambal, Banas, Banganga, Gambhiri, Mahi, Jakham, Som, Wakal, Sei, Sabarmati, West Banas, Sukli, Luni & Ghaggar River showing river gauge discharge sites and wireless stations.
- 2.6 **Collection of information at the level of Dy. Director, Hydrology:**
The data of rainfall, floods, river gauges and availability of water in different major and medium dams are published daily and circulated among the connected officers at the State level.
- 2.7 A Disaster contingent plan shall be prepared at every district level by respective nodal officer i.e. Executive Engineer in consultation with district authorities and Collector. The district wise contingent plan contains:
1. Location of all dams.
 - 2- Location of vulnerable points with regard to floods and identification of flood prone area and low lying lands and demarcation of Flood affected zones.

3. River high flood marks and likely submergence, alternate routes.
4. Location of wireless and telephones at various Head quarters.
5. Location of officers and officials available at different head quarters.
6. Location and quantity of different types of materials required in case of emergency such as empty cement bags, stones and grit, empty drums, wooden planks and ballies, wire crates, availability of de-watering pumps, sump pumps and water tankers etc.
7. Location of machinery available at different stations such as tractors, trolleys, dozers, trucks and dumpers, list of swimmers etc.
8. List of NGOs and divers and identification of nearest shelter points e.g. school etc.
9. Above information may put on website of IDRN for future use and it should be updated by regular intervals of six months.

All nodal agencies at division and sub division level connected with central room at Jaipur as well as control rooms established at district level by the district administration and the police control room. The nodal officer is respective Executive Engineer, Irrigation Department, Rajasthan.

2.8 Regular features observed by Dam Safety Organization

- (A) The State Dam Safety Organization shall inspect all the large dams which are 202 in nos. every year before and after onset of monsoon.
- (B) A health status prepared for the large dams based on pre and post monsoon inspection reports every year and the dams if found under disaster condition, they are reported to the State Government and action is proposed to over come the problem.
- (C) As per guidelines of Central Water Commission regarding hazard assessment and emergency preparedness plans the large dams of Rajasthan have been categorized and prioritization of dams has been done and the dams, which are beyond the permissible limits of hazard assessment are given more attention.
- (D) The meetings of State as well as district level flood committees are held regularly before 15th June to discuss the models, contingency plans and to fix responsibilities of all Govt. agencies (including Defence), para military forces, NGOs. The security areas are identified. Central as well as district level control room start functioning w.e.f., 15th June till 30th September.
- (E) Arrangement for vehicles, T&P, manpower, medicines, food grains including essential commodities are established including greasing, maintenance, repairs of gates of dams/canals are undertaken. Similarly gunny bags etc. are kept ready at vulnerable points. P&T department be requested to keep important telephones in working position.
- (F) Pre monsoon detail joint inspection shall be carried out by Railway and Irrigation Departments. This should be ensured by both departments that all necessary repair has been carried out to protect railway tracks as well as irrigation systems should not be disrupted by flood.
- (G) The important points of model action plan for disaster preparedness for flood are available at **Annexure-I**.

CHAPTER-III

FLOOD FORECASTING AND WARNING

3.0 Flood Forecasting

Flood forecasting is generally the responsibility of the hydrologists and meteorologists while warning the general public about the likely disaster is the responsibility of the District Collector and other civil authorities charged with the emergency operations namely rescues, evacuation and relief in the affected areas. For the successful implementation of the flood warning and rescue and relief operations, there should be closest coordination and cooperation between the two.

Services responsible for forecasts - In an organisation for disaster prevention and preparedness there are many components, each one of which is essential to the smooth functioning and efficiency of the organisation through out the approach, duration and the aftermath of a natural disaster. The responsibilities of providing forecasts and warning of natural disaster such as heavy rains, floods, etc. fall upon the national services concerned with meteorology, hydrology and hydrography. It is important that the authorities involved in planning and operation of the programme for disaster prevention and preparedness should have a good understanding of the work of the services responsible for the meteorology, hydrology and hydrography should appreciate their capabilities and limitations.

Forecasts of adverse weather - The Meteorological service is however well accustomed to preparing and issuing weather forecasts from day to day and also warnings of adverse weather, whenever appropriate. If sufficient advance warning is possible then the preparations can be made to meet the disaster. These warnings must however reach the responsible authorities in time and directly or indirectly to the general public. This coupled with well designed management machinery it should be possible to reduce the loss of life by advance evacuation and reduce loss of property to a considerable degree. With great advances of science and technology e.g. radar and satellite surveillance; computerised technique etc. the range and flexibility of forecasting methods have greatly expanded.

3.1 Flood warning

Although Rajasthan State does not have large flood plains, however, a number of areas alongside the important rivers have on occasion suffered from flood ravages during the monsoon. The concerned authorities have already been asked to identify the areas from their respective Districts, which usually get inundated by floodwaters.

In areas where flood control works have been undertaken, the authorities in charge of the works should every year inspect such works before the onset of the monsoon, and carry out repairs or strengthening of the works wherever necessary. The Collectors of the districts concerned should also be cautioned by the authorities in charge of maintenance about any threat of a breach in embankment etc. well in advance so as to give them adequate time to take necessary precautionary measures including evacuation of the people from the threatened area.

The objective of a flood warning service is to give timely warning to the people concerned and to the organisations responsible for flood fighting and rescue and evacuation operations. These organisations may receive flood warning from the forecasting centre or from the regional or local warning centres. Various points required to be attended to in deciding the issue of warnings are as follows:

- (a) Flood warning stages on all important rivers are to be fixed by Irrigation authorities. The warning stages also need to be periodically reviewed at intervals of five years depending upon the State Rivers and the revised stages published. Such a publication should include the names of the rivers, the tide gauge readings stationed on it, previous highest records of levels/ discharges/years of occurrences, its distance from important towns/villages down stream which are likely to be affected, etc. It should also indicate the levels at which White; Blue and Red signals would be given. The significance of the colours is as under:
 - (i) White signal should indicate advance approach of floods in the river in the reach concerned. The signal is in the nature of an alert signal for the concerned authorities regarding probability of incoming floods;
 - (ii) Blue signal should indicate immediate calling of greater alertness or readiness for evacuation;
 - (iii) Red signal is meant for flood control and district officials, calling their attention to the approach of high flood of such an order as may cause damage to flood protection works, and inundation of more than what is shown in the flood plan. The district authorities must then take action for dissemination of warning of the impending flood to the public and to the authorities responsible for organising evacuation of persons from the risk areas.
- (b) Installation of Police W/Ts. at Dam site before the commencement of Monsoon Season arrangements should be made by the Irrigation authorities in consultation with the Police to install Police wireless transmission sets on all Dam sites, so that flood warnings could be sent promptly to the Collectors and other authorities concerned.
- (c) Flood warning to general public.
 - (1) Members of public in the areas which are in danger of inundation by flood waters should be warned through the Regional A.I.R. and T.V. Stations These stations should be requested to broadcast special flood bulletins at frequent intervals;
 - (2) Arrangements may also be made for warning the general public in the threatened area through visual signals from towers or any other high-rise buildings in the area. If there is no electric power or if there is a power failure the visual signals may be given by using flags or lanterns.
 - (3) Sirens either electric sirens or hand operated sirens can also be used for sounding in predetermined manner both the warning of flood danger and the dewatering to indicate all clear situation.
 - (4) Local emergency communication system - It is necessary to ensure that the officials in the area, who are in charge of rescue, evacuation and relief operation, receive the flood warnings and other messages in good time. It is possible that the landline communication may break down due to adverse weather situation and the flooding of the area. Therefore apart from the bulletins broadcast by A.I.R. and T.V. Stations, arrangements should be made to establish contact with the local officers through field telephones or through police W/Ts.
 - (5) Review of flood warning system - Before the monsoon season, a testing exercise should be held by the Collector for the flood warning system not only to ensure that various components of the system are in good working order but also to familiarise all concerned officials and the population in the high rise areas of the working of the system and its importance.

3.2 Flash floods warning -

The flood warning system described in above paragraph pertains to the floods for which there are fairly long warning periods. Flash floods, which strike unexpectedly, require prompt detection of flood producing rainfall and timely warnings, if losses are to be reduced and lives saved, forecasting of flash floods is, however, most difficult particularly in hilly terrain. These are caused by intense rainfall with peak stage occurring in a matter of hours after the end of heavy rains. The problem of warning also differs greatly from one locality to another. Special devices are usually installed upstream and these set off an alarm when a selected water level is reached. Installation of such a device is however a highly technical and skilled job and will have to be handled by irrigation authorities on selected streams which pose greatest danger of flash floods.

CHAPTER-IV

APPROACH AND STRATEGIES FOR FLOOD CONTROL AND MANAGEMENT

4.0 Flood Policy

The Government of India announced the First National Flood Control Policy for adoption by the whole country in September 1954. A Central Flood Control Board was constituted by the Ministry of Irrigation and Power.

Now Government of India had set up Rashtriya Barh Ayog (RBA) in 1976 to carry out a review of the flood protection measures and to evolve a comprehensive approach to the problem of floods in the country. The Ayog submitted its report in 1980, which contains policy and guidelines for control of floods alongwith all related aspects. The report of the RBA contained 207 recommendations covering the entire gamut of flood management activities.

4.1 Various approaches for flood management can be broadly categorized as under:

- Modify the floods in order to keep the flood waters away from development and populated areas by decreasing runoff, by increasing channel capacity or by containing, diverting or storing flood waters.
- Modify the susceptibility of flood damage by keeping people and development subject to damage, out of the flood hazard areas or by making such development resistant to damage.
- Modify the loss burden by reducing the financial and social impact of flood through such measures as post flood assistance and insurance.
- Bearing the losses, i.e., living with floods.

The flood control measures generally adopted, so far, are structural measures like reservoirs, embankments, drainage improvement works, anti-erosion works, etc., and non- structural measures like flood plain zoning, flood forecasting, flood proofing, flood insurance, etc. Though a combination of structural and non-structural measures would be required to provide reasonable degree of protection, it would become imperative to depend more on non-structural measures. The strategies are given below.

Flood is a complex phenomenon and providing cent percent protection is difficult due to several constraints. However, successful flood management can be achieved with a certain degree probability. Flood management is done keeping a few risk factors depending on the type of area to be saved e.g. strategic locations, city, town, and agricultural area vis-a-vis the cost involved in the management. Flood can be managed with a particular designed magnitude, which should have some engineering, social and economic basis. However, in the event of excessive flood situation the non-structural measures e.g. evacuation of population/livestock, flood plain zoning and other non-structural measures have to be applied.

4.1 Factors contribute to danger from floods are:

- (1) Flowing of rivers their natural banks;
- (2) Meandering of rivers in plains;
- (3) Gradual erosion of banks, reducing the capacity of rivers for containing water;
- (4) Heavy rains in areas with poor drainage;

Floods leave a trail of damage and destruction. Amongst other factors that make floods dangerous, silting is most important. Rivers rising in the mountains flow very fast in the upper reaches and carry enormous sediment, which they deposit in their beds. As a result their beds silt up and the rivers begin to change their courses. Further, this silt reduces the floods carrying capacity of the river channels and causes extensive inundation, erosion of soil in an aspect related to silting. In certain reaches, where the soil is soft or the flow very forceful, the river erodes its banks, resulting in overflow and submergence of the rivering areas.

Synchronization of the floods in the main river and its tributaries is also a source of danger. The confluence gets congested and the waters will back into the tributary.

4.2 Structural and non-structural measures:-

The various structural measures for flood control can be categorized as follows:-

1. Repair/restoration and strengthening of existing structures (bunds, regulating and control structures and waste weirs) including repair/restoration /installation of gates and communication systems.
2. Restoration of design capacity of channels and removal of encroachments.
3. Repair/restoration of village/town protection bunds, and construction of new ring bunds.
4. Construction of river training works – revetments, spurs etc.
5. Construction of diversion structures (cross-regulators and channels)
6. Construction of auxiliary spillway and weirs and increasing the surplus capacity of existing ones.
7. Construction of flood regulation anicuts.
8. Construction of cross regulators.

The various non-structural measures for flood control can be categorized as follows:

1. Flood plain zoning.
2. Flood estimation and forecasting.
3. Flood proofing.
4. Flood warning.
5. Flood fighting and operation plan.

Flood Plain Zoning:- An Act namely ‘The Rajasthan Flood Plain Zoning Act, 1970 (Act No.15 of 1977) has already been notified in the Rajasthan gazette dated 4/10/1997. It is expected that flood zoning-authorities would act as per the provision of Act and intimate the demarcation flood plain zoning before the onset of monsoon in accordance with the Act.

Flood Proofing:- The flood proofing programme should be extended to all flood prone areas. The programme should cover the following thrust areas:

- (a) Quick drainage facilities.
- (b) Potable drinking water, sanitary arrangements and education.
- (c) Human dwellings and animals shelters.
- (d) Storage facilities for flood and fodder and other essential commodities.
- (e) Communication links—telephone/wireless/road/rail/boat.

To ensure the efficiency and effective management of natural and other calamities and to achieve a greater coordination and responsiveness to effect prevention and mitigation of disaster arising out of such calamities so as to provide better relief and rehabilitation to the victims a proper Disaster Management is required.

4.3 Role of Irrigation Department:

Irrigation Department prepares a Flood Memorandum, which contains various Performa for periodical inspections of dams, list of wireless and high frequency stations, existing river gauge discharge sites along with format for reporting flood situations and Modal Action Plan, EAP (Emergency Action Plan), material requirements along with direction for flood management and reporting the damages with list of flood prone areas in the State etc. This document is updated and published every year by Irrigation Department and circulated to all concerns.

In Rajasthan, every Executive Engineer of Irrigation of the district keeps a record of high flood marks, attained at different rivers and works in his jurisdiction. This enable him to keep a record as to how many and which villages get affected or will be affected whenever flood water attains that particular flood level. An index plan of the jurisdiction showing the areas affected is also sent to Chief Engineer, Irrigation for information. .

- 4.4 A state level disaster management committee has been formed under the chairmanship of the Chief Secretary. Irrigation Department has been nominated as Nodal Department for Dam burst related disaster. Accordingly on the guidelines of Trigger Mechanism, Flood Disaster has to be dealt in four steps namely as L-O, L-1, L-2 & L-3.

(i). **L-O:-** This is a preliminary stage before onset of monsoon where J.En, A.En, and XEn will thoroughly inspect the sites and ensure that the required material to meet any eventualities have been procured and stored as per **Annexure-I**. They will also collect the information as per check list given in **Annexure-I**, and also that network of communication system is working properly.

(ii). **L-I:-** It is a sort of first aid, in case of any disaster is reported about irrigation tank/reservoir. As soon as the information of any disaster like leakage, piping etc., takes place in reservoir immediate action is to be taken to safeguard the structure of the reservoir. It is to ensure that the public property and life of the people living near by the reservoir is safe, for which warning of alertness is to be given in time. For this action, the officer/official should not wait for seeking the approval of the higher authority and thereby wasting the time. The official/officer should also send such a message immediately through nearest available communication to his next higher officer.

(iii). **L-2:-** It is that stage where the officer/official finds that the situation is not under his control and the material which he has in his stock is insufficient to cope up with the situation then he should immediately inform to his next higher Authority i. e. E.E., S.E. and the Collector without wasting any time so that situation can be controlled with the combined efforts of the other agencies of the district.

(iv). **L-3:-** It is that stage when L-1 level of disaster becomes more severe and the basic initial disaster management which was made before onset of monsoon failed to meet this situation and the resources available as district level also seems to be insufficient to cope with the requirement to handle the disaster then matter should be brought in the notice of the Chief Engineer, Irrigation Rajasthan, Jaipur and meanwhile with the help of public and district administration every effort should be made to control the situation.

Fixing of responsibility at L-0, L-1 & L-2 level is to be done by Superintending Engineer, Irrigation of the Circle and copy is sent to the Chief Engineer, Irrigation and Central Flood Cell, I.D&R. unit, Jaipur before onset of monsoon.

4.5 Flood Control and Management

National Water Policy as well as State Water Policy has also accorded special reference for flood control & Drainage Management & is reproduced below:

1. There should be a master plan for flood control and management for each flood prone basin.
2. Adequate flood cushion should be provided in water storage projects, wherever feasible, to facilitate better flood management. In highly flood prone areas, flood control should be given overriding consideration in reservoir regulation policy even at the cost of sacrificing some irrigation or power benefits.
3. While physical flood protection works like embankments and dykes will continue to be necessary, increased emphasis should be laid on non – structural measures such as flood forecasting and warning, flood plain zoning and flood proofing for the minimisation of losses and to reduce the recurring expenditure on flood relief.
4. There should be strict regulation of settlements and economic activity in the flood plain zones along with flood proofing, to minimise the losses of life and property on account of floods.
5. The flood forecasting activities should be modernised, value added and extended to other uncovered areas. Inflow forecasting to reservoirs should be instituted for their effective regulation.

“Sound watershed management through extensive soil conservation, catchment area treatment, preservation of forests and increasing in forest area and construction of check dams shall be provided in the intensity of floods. Adequate flood cushion shall be provided in water storage projects whenever feasible to facilitate better flood management. An extensive network for flood forecasting shall be established for timely warning to the settlements in the flood plains along with the introduction of regulation for settlements in the flood plains and economic activity in the flood – prone zones to minimize loss of life and property caused by floods. Master Plan for flood control and management for each flood prone basin/area shall be got prepared. Due consideration to provide proper drainage shall also be given to build up capabilities to tackle water logging and salinity problems”.

CHAPTER V

RELIEF AND RESCUE MANAGEMENT

- 5.0 After the occurrence of flood all identified agencies should invariably get into action for facilitating relief and rescue operation in flood affected areas. Priorities will have to be accorded to the marooned areas, villages, towns, boats, vehicles; helicopters are to be pressed into service, not only for transporting the marooned people, cattle as well as for providing food stuff. Relief camps to be started as per guidelines in pre identified locations.

In the event of floods in particular area, the Govt., machinery will not be able to cater to all the problems, hence, the services of NGO's volunteers, home guards, charitable institutions will have to be deployed in flood relief operations.

Health services will also be put into service to cover health aspects i.e., first aid treatment of casualties, burial and cremation of dead, disposal of dead cattle, etc. Soon after the disasters first aid to be given and the casualties to be treated, hospitals, altered, specialists to be brought to attend to the injured. Site medical units play an important role in safeguarding the lives and giving health facilities. Identification and burial/cremation of the dead to be done by the District administration, if there are no claimants. This has to be done in the most hygienic way and with all dignity. The provisions and the speed with which it is done reflects the efficiency of the administration. With scientific development, flood forecasting is made much in advance. Public health measures can be well planned in advance in a systematic and scientific manner. Detailed Guidelines & check list for monitoring arrangement for Public Health & Medical problems in flood prone areas are available at **Annexure-IX**.

5.1 Stages in flood relief.

1) The preliminary stage –

In the preliminary stage, the Collector or its representatives of the District in which rivers get flooded generally should attend to the standing preparations in the flood relief scheme. He should check up whether –

- (a) the river gauge stations are in order;
- (b) the wireless stations are in working order;
- (c) the places where relief and evacuation centres are to be set up;
- (d) the some of State & country organisations to be contacted for relief, etc.

The Collector should be completely familiar with the relief scheme and take a review of all the above points. He should hold a meeting of the officials and non-officials to organise relief at a short notice.

2) The first stage –

People and animals should be evacuated from dangerously exposed village to safe villages or to safer predetermined places in the same village as soon as a warning of high floods is received. In any case when the water level is high and may be still rising, saving of human and animal life is the first duty of the administration. In a sudden and very heavy flood, men and cattle may have to be removed to high land, arrangements being subsequently made for food, drinking water, fuel and fodder. Well organised relief centres may have to be opened to deal with the situation. There is scope for collaboration between the non-official voluntary organisations and the officials organisations at this stage.

A great deal about evacuation will, of course, depend on the estimated intensity of the approaching floods.

- (a) Evacuation Centre – The Collector in consultation with local departments/public will determine the “safe villages/places, which will serve as Evacuation Centres”. Each Centre should cover a group of dangerously exposed village or parts of the village, the people of which should know before hand the names of such villages, which will serve as their Evacuation Centre. The Evacuation Centre should be properly selected. It should be closed to its group but safe from the ravages of floods. It should be fairly big place so it can, for a day or two shelter the evacuees and their cattle and their feeding can be possible. In selecting an “Evacuation Centre”, the following considerations may be kept in view.
- (i) Safety;
 - (ii) Proximity from its satellites;
 - (iii) Availability of good drinking water;
 - (iv) Its economic resources;
 - (v) Proximity and accessibility to its parent “Relief Centre”;
 - (vi) Availability of open space where carts, cattle, etc. of evacuees can be kept till they move to the relief centre.

In, each of these Evacuation Centre a committee of workers having organising ability and the spirit of service should be set up. There should be a panel of messengers. It may also be necessary to select a place for use as a community godown to keep stock of foodstuffs in such villages. These Centres will not be expected to shelter and feed evacuees for more than a few days or as soon as possible these people should, unless the Evacuation Centre is in a position to keep them longer, be moved to the parent “Relief Centre”. These “Evacuation Centres” may appropriately be described as the ‘First line of Defence against floods.’

It is necessary to provide for rescuing people from dangerously exposed villages because they may have neither the time nor the inclination to move to their Evacuation Centre before the floods overtake them. Such people with their belongings shall have to be rescued by boats and their animals by rafts, unless the animals can swim alongside the boats.

- (b) Relief Centres – Second line of Defence – Favourably situated big villages or towns or portions of villages/towns should be selected as Relief Centres. At the time of selection, care should be taken to ensure that communications can, as far as possible, be maintained between these Centres and Panchayat headquarters.
- Every Relief Centre shall have –
- (i) A local Relief Committee comprising of local officials, if any, and influential non-officials of all parties. These Committees shall be set up before hand and get acquainted with the role they will be required to play in the event of any emergency. The representatives of Collector shall set up such a Committee in consultation with the leading residents of the place -
 - (ii) A place for cooking food for distribution among evacuees as they arrive and for sending the same out with relief parties;
 - (iii) A place for storing food, tentage etc.
 - (iv) Selected sites for pitching tents, herding cattle, parking carts, storing cattle etc. and buildings ear-marked for housing evacuees;

- (v) A panel of active and vigorous workers capable of handling boat in rough or running water and who can punt rafts, swim and endure hardships. These will be the people who will go out as relief parties to rescue stranded people, bring in people from Evacuation Centres, accompany official relief parties etc.
- (vi) To select sites or building for serving as community kitchen;
- (vii) A panel of messengers for carrying messages, running errands so on.

The Sarpanch should maintain the closest possible contact with Relief Centres located in his Panchayat and render all possible help to the Relief Committees. It would be of advantage to maintain at each headquarter a list of all organisations, missions, societies, schools and colleges which are expected to contribute workers, funds, equipments, etc. for dealing with any emergency. A Panchayat Relief Committee of all such bodies should be set up at each headquarter and the task of collecting foodstuffs, clothing materials etc. be entrusted to them. In special circumstances, it may be even necessary to start kitchens at Panchayat headquarters for feeding evacuees, who do not report at the Relief Centres and for those sent with the Relief Parties.

Essential medicines can also be collected through this Committee, if influential members of the local business community are its members.

(3) The Second Stage –

At the intermediate stage, when the rescue work has been completed, the flood level being either stationary or beginning to fall, the main problem is to ensure that food and fuel are available to the destitute and some sort of temporary shelter for the homeless. The second and very important task is to encourage the villages to help one another and to save as much of the crops as possible. The relief work at this stage should be organised methodically, relief centres being opened at pre determined places. Particular care should be taken to ascertain the stocks of food grains, kerosene, etc. available in the villages. In vulnerable areas, the district officer should arrange building of adequate resources of food grains, kerosene, etc. before the monsoon, in collaboration with the Civil Supplies Department. Here there is scope for non-official agencies functioning in co-operation with official organisations. It may also be necessary to undertake health measures to protect against cholera, gastro-enteritis, etc. Cattle wealth also may need attention.

(4) The Third stage –

At the final stage, when the flood has subsided and conditions are becoming normal, gratuitous relief should be curtailed and detailed reports prepared and submitted to Government estimating the extent of the damage to crops and houses/huts with a view to rendering necessary relief.

CHAPTER-VI

EMERGENCY RELIEF ORGANISATION

A. Administrative Set up at the State Level

6.0 State level Co-ordination and Review Committee

The threat of floods can occur any time during the monsoon season. It shall therefore, be the duty of the Relief Commissioner to obtain orders of the Chief Secretary for activating the Standing State level Co-ordination and Review Committee (Disaster Management Group) by first week of April, for coordinating the work of disaster preparedness and disaster relief and rehabilitation. The Committee consists of the following members-

- | | | |
|-----|--|------------------|
| 1) | Chief Secretary to Government | Chairman |
| 2) | Principal Secretary, Water Resource | |
| 3) | Principal Secretary, Home | |
| 4) | Principal Secretary, DM&R | |
| 5) | Principal Secretary, Finance | |
| 6) | Principal Secretary, Energy | |
| 7) | Principal Secretary, Public Works Department | |
| 8) | Principal Secretary, UDH & LSG | |
| 9) | Principal Secretary, Medical & Health | |
| 10) | Secretary, PHED & GWD | |
| 11) | Secretary to Chief Minister | |
| 12) | Secretary, Irrigation | |
| 13) | Secretary, Agriculture | |
| 14) | Secretary, Animal Husbandry | |
| 15) | Secretary, Disaster Management & Relief | Member Secretary |
| 16) | Director General of Police | Member |
| 17) | Director General, Civil Defence | |
| 18) | General Manager, BSNL or his nominee | |
| 19) | General Manager, Northern-Western Railway or his nominee | |
| 20) | Any other member as and when required by the Chairman. | |

The State level Committee shall meet as frequently as the situation demands during the period the danger of natural disaster exists or till the emergency situation lasts.

It shall be open to the Chairman to call meeting of the full Committee or to call separate meetings of group of members who may be mainly concerned with the particular matter or matters before the Committee if such a course is found to be more conducive to the speedy disposal of the business before the Committee.

Chairman of the Committee shall during a natural calamity, set up a Task Force or a sub-committee under his Chairmanship for taking daily stock of the situation and for issuing necessary, directions for dealing with the situation.

6.1 Duties of Relief Commissioner

At the State level Relief Commissioner shall be in over all charge of Emergency Relief Operation. He shall ensure that the Collectors have, for their respective districts prepared

contingency plans for the intensive (high risk) and non-intensive (low risk) areas; that they are in a State of readiness to meet natural calamity when it strikes and that the contingency plan contain adequate provision in respect of rescue and evacuation operations; if and when found necessary.

The Relief Commissioner shall direct and exercise complete control over all branches of relief and rehabilitation. He shall frequently move about supervising relief operations, giving wherever possible advice and instructions on the spot, communicating freely by telephone, telex, police/W/T, telegram and letter with the Commissioner, Collector and Superior Officers of other concerned Departments with the object of securing promptitude in action, uniformity of procedure, reduction of correspondence by frequent personal conferences and speedy removal of any misunderstanding of orders.

He shall keep himself thoroughly informed of the whole course of events, watch the progress of relief and rehabilitation operation and the utilisation of grants placed at the disposal of the Commissioners, the Collectors and other authorities.

He shall initiate action for convening meetings of Disaster Management Authority and Coordination Committee and the Committee of Ministers, if any, set up for the purpose.

He shall from time to time report to Government all important developments concerning the plans for disaster preparedness, disaster mitigation and the relief and rehabilitation operations and shall carry out the orders of Government in that behalf.

6.2 Departmental Liaison Officers

All Secretaries of the Departments, which are concerned with any branch of Relief and Rehabilitation work, shall nominate liaison officers, who will render all necessary assistance to the Relief Commissioner in co-ordinating Relief and Rehabilitation operations.

All Central Government Departments/Authorities like AIR, TV, Railways, P&T and India Meteorology Department etc. and the local authorities like the Municipal Corporation may, where necessary be requested to appoint Liaison Officers for similar purposes.

Relief Commissioner may convene meetings of liaison Officers of both Central and State Government Departments for thrashing out interdepartmental issue.

6.3 Setting up of a Control room at State level

When according to the Flood warning (first stage) metropolitan area and areas around about the threatened by flood from Control room will be set up at the Relief Department and maintained round the clock which will be in constant touch with (i) Meteorological Department and Irrigation Department for getting the latest flood information (ii) Various Government Authorities and organisations for passing on the above information to them and (iii) Various Authorities in the threatened areas for conveying instructions for safety operations.

Of floods affecting large tracks of the State are anticipated, Irrigation Department, Relief Department may maintain a similar monitoring room at the State Head Quarters giving upto date position about situation and the areas likely to be affected.

B-Administrative set up at the District level

6.4 District level Coordination and Review Committee

The District level Coordination and Review Committee shall consist of the following members:-

1)	The Collector	Chairman
2)	The Superintendent of Police	Member
3)	The Chief Executive Officer, Zilla Parishad	Member
4)	The District Health Officer, Zilla Parishad	Member
5)	The Civil Surgeon	Member
6)	The Executive Engineer, PWD	Member
7)	The Executive Engineer, Irrigation	Member
8)	The Executive Engineer, RSEB(Company)	Member
9)	The Deputy Director of Agriculture	Member
10)	The Deputy Director, Animal Husbandry	Member
11)	The Executive Engineer, PHE &GWD	Member
12)	The Regional Transport Officer/DTO,	Member
13)	The Regional Manager/D.M., RSRTC	Member
14)	The District Publicity Officer	Member
15)	The District Supply Officer	Member
16)	The Local Station Director, AIR	Member
17)	The Local Station Director, Doordarshan	Member
18)	The District Commandant, Home Guards	Member
19)	The Divisional/District Forest Officer	Member
20)	Sub-Divisional Officer concerned	Member
21)	Tehsildars concerned	Member
22)	The Local Divisional Manager, Railways	Member
23)	The Local Asstt. Engineer P&T Dept.	Member
24)	Local Commandant, Army/Air Force	Member
25)	The Local Red Cross Society	Member
26)	The Local Lions Club	Member

The Collector may co-opt additional members as and when found necessary.

It shall be open to the Collector to call a meeting of the full Committee or to call a separate meeting of a group of members who may be mainly concerned with particular matter or matters, if such a course is found to be more conducive to the speedy disposal of the business before the Committee.

During the emergency the Collector may set up a sub-Committee under his Chairmanship consisting of some of the members of the Committee for taking daily stock of the situation and for issuing directions for dealing with the emergency.

6.5 Role of the Collector

- The Collector shall be responsible for (a) preparation of contingency plan and (b) for all rescue evacuation, relief and rehabilitation measures.
- Officers of all State Government Departments/Offices employed on or entrusted with any of the measures for rescue, evacuation, relief and rehabilitation measures shall obey his orders on all points not exclusively professional. In any case in which the Collector's order or decision is

questioned by any officer of other department, the Collector's order or decision shall be obeyed or carried out pending a reference which may be made to Government.

- The Collector may in the case of urgency of floods get in touch with the local Army/Air Force Establishment for assistance for rescue, evacuation and emergency relief measures.

Note :- In the case of areas falling within a Municipal Corporation, the Collector shall prepare the Contingency Plan in consultation with the Municipal Commissioner. The LSG Department may also set up a committee for this purpose under the Chairmanship of the Municipal Commissioner.

6.6 District Control Room

- A Central Control Room should be established at the Collectorate which will be in constant touch with (i) Meteorological Department for getting the latest cyclone information or (ii) with Irrigation authorities for getting information about water level in the river etc. and upto date position about flood situation and areas likely to be affected etc. The Control Room should be manned round the clock and it should get in touch with various authorities in the threatened areas for conveying instructions about safety operations. The Additional Collector should be placed in charge of this work.
- At the Tehsil head quarters a sub-control room should be established for similar purposes.

6.7 Contingency Plan

The Contingency Plan prepared in the District shall broadly provide for the following:-

- (i) Precautionary Measures:
 - (a) To identify, on the basis of past experience and available data, on floods, very vulnerable and vulnerable areas of the district tehsil wise.
 - (b) To place a responsible officers (not below the rank of Naib Tehsildar) incharge of each such zone or vulnerable areas for purposes of rescue evacuation and relief purposes. (such placement of special officers shall not amount to relieving the Tehsildar of his responsibility as in charge of the Tehsil)
 - (c) To select evacuation sites well in advance for evacuating people in the vulnerable areas in the case of emergency, such as schools, colleges, and to prepare list of such sites, etc. The concerned authorities like Municipality, Zila Parishad etc. should issue advance directions to the school/college authorities in this regard of observe full safety.
 - (d) The Public Works Department, Irrigation Department, Zila Parishad, Municipal Authorities etc. to inspect all major water storage systems, buildings, roads and bridges etc. in the vulnerable areas; to carry out all necessary repairs and to take precaution against breaching due to floods.
 - (e) Tehsildar to be provided with vehicles fitted with microphones and amplifiers for advising people from the vulnerable areas to evacuate to safer sites; to avoid panic, hand bills containing instructions giving details of evacuation centres and other relief arrangements should be distributed and these details announced in the localities by beat of drum.
 - (f) The Zonal Officer to ensure that the following steps are taken by them and the villagers, when a warning for floods is received:

- (i) Keep the radio on(open) and listen to the latest weather warnings/warnings of flood and pass on the information to all concerned.
- (ii) Do not get misled by rumours and pass on only the weather/flood warning issued by Meteorological Department/AIR.
- (iii) Get evacuated from low-lying areas or other locations which may be wet by flood waters. Leave sufficiently early, before the way to safer site gets flooded and don't delay and run the risk of getting marooned;
- (vi) Get extra food, especially things which can be eaten without cooking or with very little preparation and store extra drinking water.
- (v) Move the valuable articles on the upper floors to minimise flood damage;
- (vi) Have Haricane lanterns (petromax); flash lights and/or other emergency lights in working condition and keep them handy;
- (vii) Remove cattle to safe places as far as possible.
- (g) Irrigation sources and rivers in charge of Irrigation Department and Zila Parishads should be patrolled by department officers and information about water level condition of tank etc. should be passed on to the control room of the Collectorate and sub-control room at the Tehsil.
- (h) Public Works Department, High ways and Zila Parishad, Irrigation Department to store sufficient stock of gunny bags, sand etc. for emergency.
- (i) At Tehsil level storm warnings, water level of the tank, rivers and breaches of roads etc. to be communicated to the Electricity Department to enable it to take appropriate action.
- (j) Regional Transport Officer/Regional Manager, RSRTC to earmark and to arrange to provide vehicles to Zonal Officer/Tehsildar for evacuation purposes. The RSRTC to redirect its routes without touching the danger zones.
- (k) Station Masters of the nearby Railway Stations to be apprised of weather warnings water level of tanks, rivers etc. to enable them to take appropriate action.
- (l) The CM&HO shall ensure that adequate buffer stock of essential medicines like intravenous fluids, dressing materials, splints, oxygen cylinders, suction apparatus etc. is available in the area to meet the emergency, by procuring them from nearby hospitals where necessary. He shall also maintain uptodate list of the man-power of various categories that would be available in the district at short notice from various sources. He should also see that every Rural Hospital and Primary Health Centre has a post-mortem room.
- (m) Civil Supplies Department should see that sufficient quantities of rice, wheat, bazra, kerosene, matches, candles and fuel besides clothing are stocked at suitable places so as to meet the demand for these articles from the vulnerable areas.
- (ii) Rescue and Relief Operation:
- (n) Zonal Officer to draw up list of persons who are experts or trained persons in swimming and

rescue operations from IDRN website. Such lists should also be drawn up with the assistance of the Police specialised equipments such as country boats, stemboats, Manila ropes etc. should also be located and earmarked for rescue operations. Fisheries Department, Fire Services, Police, Home Guards personnel would provide necessary support in this regard. Assistance from Military/Navy/AIR Force could be called for rescue operations in extraordinary circumstances;

- (o) School, College buildings etc. already selected and earmarked should be utilised as camps for accommodating the evacuated persons. Adequate water supply, lightening and sanitation arrangements shall be provided at the camps; team of sanitary and health works should be in attendance round the clock.
- (p) Water supplies at the camps should be regularly disinfected.
- (q) Immediately after the storm/floods it would not be possible to distribute rice, wheat, kerosene etc. to the destitute persons. Hence cooked food should be distributed for two-three days initially. For this purpose control kitchens should be organised.
- (r) The camps will be under the direct control of the Zonal Officer. A proper record of inmates (under the heads men, women and children) should be maintained. For maintaining proper discipline at the camp sites police guards should be provided at the camp.
- (iii) Rehabilitation:
 - (s) Normally, those who take shelter in the camps will themselves move to their homes once the flood subsides or the water level recedes and their houses become habitable. Where the houses are damaged or destroyed steps will have to be taken to repair/reconstruct houses as per the provision of Relief Department.
- (iv) Distribution of Gratuitous Relief:
 - (t) It is also the responsibility of the Zonal Officer to make payment of gratuitous relief to the sufferers of natural calamity in accordance with the provision of Relief Department.
- (v) Village Level Committee:
 - (u) Since men have to be rescued and properly salvaged simultaneously immediately after the calamity it would be necessary to appoint a village level committee for assisting the official machinery in the above task.

6.8 Model action plan for disaster preparedness for floods

In order to ensure timely preparedness, an illustrative check lists - one for floods are given in **Annexure-I**. The Collector should see that before the monsoon season (in case of floods) these check lists are distributed to all nodal officers in the district and that necessary action in accordance with those check lists is taken and the whole machinery for disaster prevention and preparedness is energised.

Collector must always use computer website of IDRN and Relief Department. Both the websites are useful to get list of all the resources, which are required for Flood Disaster Management.

CHAPTER-VII

AFTER FLOOD

1. Administrative Arrangements and
2. Duties of different Officers and Establishments
3. Role of Armed Forces

7.0 Administrative Arrangements

Prompt visit to the scene of calamity by Revenue Officers-

In the case of floods, contemplate appointment of Zonal Officers for vulnerable areas. These Zonal Officers would, therefore, be in constant touch with the areas placed under their respective jurisdiction. They would promptly visit the scene of calamity and organise rescue, evacuation and relief operations as may be found necessary. Even in the case of other localised calamities like accidental fires, landslides etc. it is necessary to ensure that sufferers of the calamity are given prompt relief. For this it is essential that the concerned Revenue Officers (the Tehsildar and the Sub-Divisional Officer) visit the scene of the calamity, acquaint themselves with nature and extent of the damage to property caused and the loss of life, if any, which has taken place and the relief required to be given to the victims of the disaster. The local Revenue Officers should therefore, invariably visit the site of disaster immediately on receipt of the information of the disaster. In case of disaster involving loss of life and extensive damage to properties, the Collector should himself visit the site and see that all necessary relief measures and measures for restoration of communication and water supply, transmission lines etc. are undertaken without loss of time.

7.1 Submission of report to Government:

- i) **First Report** - It is very important that immediately after occurrence of the Natural Calamity, Collector immediate inform to the Chief Secretary and Relief Commissioner by telephone, fax message, telegram, telex or Police W/T.
- ii) **Detailed Report**- It is the policy of Government to see that persons rendered destitutes are given gratuitous relief immediately and that prompt measures are taken for their rehabilitation. The Collector should, therefore, ensure that a detailed report giving the nature and cause of the natural calamity, loss of human life, if any, and livestock, and the rough estimate of damage to public property; damage to private properties, agricultural lands, crops, public utilities, communications and the number of persons who have been rendered destitute and relief measures taken etc. is sent to the Relief Commissioner and other concerned departments within seven days.
- iii) **Estimate of Damage**

The Collector should also send subsequent report or reports within 15 days to authorities mentioned in sub-paragraph (2) after the picture is more clear. In so far as damage to houses and other private properties, agricultural land; crops, livestock, public buildings, Irrigation facilities, etc. is concerned, the Collector should send his subsequent reports to Government in Relief Department and other authorities/Departments after consulting the appropriate District Level Officers of the Departments concerned. The Collector should also ensure that estimates of damage is worked out by the concerned officers, after field visits and that these estimates are as accurate as possible.

In the case of flood damage, the Collector should along with his report furnish a statement (in triplicate) in **Annexure-II** tabulating the information regarding area affected, population affected, damage to crops, damage to houses, cattle lost, loss of life and damage to public utilities, caused by flood during the year under report. This information is required to be furnished to the Central Water Commission which maintains record of flood damage on all India basis. The Collector should, therefore, ensure that this information is tabulated as accurately as possible and submitted to Government as early as possible.

The Collector should also furnish to Government in due course a statement in **Annexure-III, IV, V & VI** giving details of damages caused by flood during the year and relief assistance granted to the sufferers of the flood.

7.2 Divisional Commissioner

The Divisional Commissioner shall exercise general supervision over the work of preparation of contingency plan undertaken by the Collectors in his Division and also on the relief and rehabilitation operations in districts.

He shall see that in the process of rescue, evacuation, relief and rehabilitation operations, there is complete coordination between officers of different state Government Departments and also the Central Government authorities and the voluntary organisations and that in the case of any natural calamity occurring in any part of his Division, these measures are implemented properly and with the desired speed.

7.3 Duties of Police Officers

The role of the Police in disaster preparedness and mitigation shall be as follows:-

- (a) Providing communication cover to Police Stations in the risk areas, where there are none;
- (b) Strengthening of the existing communication cover by provision of additional sets like HF, VHF, VHE and simplex sets and mobilising and positioning of spare parts like crystals, battery, masts etc. in strategic centres with a view to meeting any contingency in which normal means of communications may get disrupted and the district administration charged with rescue, evacuation and relief measures in case of natural calamities may not be hampered in sending storm/flood warnings to risk areas and in contacting zonal and other officers for receiving or passing or important messages concerning those operations;
- (c) Setting up in consultation with Irrigation Authorities, HF or VHF sets at strategic points like river bank, lakes, tanks, etc. which are likely to over flow and cause flooding, so that flood warnings to low lying areas could be conveyed without delay;
- (d) Assisting the Revenue Officers in preparing lists of persons from local fisherman and other classes of persons who are good swimmers or who may otherwise prove useful in flood fighting or rescue and evacuation work. The payment of swimmers and Boat Men which are requisitioned shall be made from the Relief Head at the rate of skilled labour prescribed by the Labour Department.
- (e) Giving assistance to Revenue authorities in mobilising equipment which may prove useful in rescue work such as country boats; parisals, shovels, pickaxes, manila ropes, first aid boxes, etc.

- (f) Tackling special problems of law and order arising due to (i) clamour for relief by people in distress, (ii) disturbances, if any, at relief camps; (iii) anti-social elements taking advantage of the situation and trying to look properties left behind by people who have taken shelter in safer areas or attempting to loot relief articles;
- (g) Providing guards for convoys carrying relief articles on written request of the Collector to that effect.
- (h) *Traffic Control*- After the flood disaster, the roads leading to the affected areas are likely to be choked up with people, animals and vehicles fleeing the area as well as with curious on lookers from outside. People are also likely to squat on these roads with their belongings, thus blocking the passage of essential vehicles. As a result, there may be serious delay in the relief services reaching the affected area. Traffic regulation by the police, therefore, becomes essential. They should keep the main roads leading to the disaster area free for the movement of essential personnel and relief supplies and equipments.
- (i) *Cordonings*- Damaged walls of buildings about to collapse, damaged but live electric lines etc. are potential sources of danger. Members of the public as well as relief workers may inadvertently expose themselves to unnecessary danger. Such dangerous spots or areas should be cordoned off by the police.
- (j) *Utilisation of RAC Companies*:- Two RAC companies which are equipped with flood rescue instruments with boats. They are stationed at Bharatpur and Kota can be utilised for the purpose of flood rescue operations.
- (k) *Requisition of Home Guards & Civil Defence*:- At the time of flood Collector can requisite Home Guard and Civil Defence personnels as per his requirement and daily allowance shall be paid from the Relief Head.
- (l) *Restoration of Communications*- Maintenance of communications with the affected areas is vitally important for relief work. In many cases, channels of communications, such as telephone and the telegraph, may be cut off following a disaster Police wireless vans will be helpful in such circumstances in providing alternative means of communication.
- (m) *Public Health* - Making necessary arrangements for the preservation of health of the people in the affected areas is the responsibility of Public Health Department. The assistance of the police may be required for enforcing the orders passed by such authorities with regard to the sealing of contaminated wells, destruction of contaminated food. etc. Health of the cattle also needs special attention for which the Directorate of Animal Husbandry would be responsible.
- (n) *Care and Welfare of unclaimed property* - Moveable property (including valuables) whose owners have either become casualties or have left their homes are likely to be left uncared for. Adequate steps should be taken to safeguard such property to prevent any looting. For this purpose, police patrols should be organised and the police force should be stationed in the affected areas immediately after the occurrence of the disaster. Besides, the property will have to be collected and kept in safe custody.
- (o) *Disposal of corpses*- Police assistance may be necessary in enquiring into the causes of deaths during and after the disaster and in the disposal of the corpses. The particulars regarding the dead persons that may be available with the police authorities will be required for being passed on to the next of kin, if known.

7.4 Duties of Health Officers-

7.4.1. Advance action

- (i) The primary responsibility of the Health Department in the case of a natural calamity is the medical treatment of the casualties affected by the disaster. It is necessary to identify before hand all those hospitals in the district that might serve as useful medical station in the even of the disaster. Very often the smaller hospitals are under equipped to manage mass casualties. However, the primary attention rendered to the patients in such places is very useful and also helps in identification of pathology of disaster. Advance survey of the hospitals both large and small, control as well as peripheral is necessary in order to define the Disaster Management capabilities so that optimum number of casualties that can be treated in those hospitals can be predetermined.
- (ii) *Control Room-* A control room should be set up in the office of the CM&HO, Superintendent of Hospital and Senior Medical Officer should be placed incharge of the both control rooms which should function round the clock. The fact that a control rooms has been so established (together with telephone numbers) should be made known to all concerned namely District Administration, Police, Irrigation and other departments.

7.4.2 Contact and Communication -

- (i) Information about occurrence of the disaster may be received by the CM&HO through the control room or through any Sr. Medical Officer to whom information is conveyed by the local Revenue, Police or other Department Officers or even by a member of the public.
- (ii) On receipt of the information the CM&HO and Superintendent of Hospital should see that pre-hospital phase plan is immediately put to operation.

7.4.3 Pre-Hospital phase plan -

This should provide for the following-

- (a) *Salvage and extreaction:* A field medical unit should be dispatched promptly to the disaster site to render medical aid to casualties not requiring hospitalisation and also to the members of rescue parties. It would also render basic life support to the casualties partly trapped in debris. The medical units will also periodically visit, relief camps where victims of the calamity are provided shelter, to render medicals help to the inmates. Provision of First Aid Box shall be made at such shelters and it shall be the duty of the concerned health authorities to ensure that stock of medicines in the First Aid Box in replenished regularly. The health authorities will also see that health instructions are given to the inmates as a preventive measure and steps taken to dis-infect the water supply made to the inmates.
- (b) *Evacuation of Casualties to Hospitals-* Rapid transportation of casualties to the District Hospital is important. If the first contact has been made in advance, the reception of the casualties to the hospital, can be well organised. A communication channel should be immediately established, with the assistance of Police where necessary, between the disaster site and the hospital so that proper information could be fed i.e. the number of expected casualties, the pathology and causative agent and the initiation time. Casualties can and may be diverted to other nearby hospitals if they are expected in a larger number than the capacity of the District Hospital.

- (c) *Public relations*- A public information cell can under a suitable medical officer should be set up immediately in the hospital so that identity list of the casualties can be released and the relatives can be contacted. This cell shall also be responsible for press and public communication so that medical personnel are allowed to function without interference. The organisation of blood and food donors will be an additional responsibility of this cell.
- (d) *Hospital to be made "Restricted Entry Area"* - Depending upon the number of casualties admitted and the number of throurging the hospital area, the Civil Surgeon may also decide to make the hospital a "Restricted Entry Area" with the help of the Police for such period as may in the circumstances of the case found minimum necessary.

7.5 (iii) Role of Armed Forces

7.5.1 *Role of Armed Forces* - Assistance by the Armed Forces in the case of flood and other natural calamities should be requisitioned by the Collector only when it becomes absolutely necessary and even then only for such special purposes as cannot be handled by the State Government machinery. Assistance by the Armed Forces should be requisitioned after telephonic sanction of Chief Secretary and in accordance with the blue book on "Instructions on aid to the Civil Authorities by the Armed Forces". The Guidelines for Requisitioning of Armed Forces in Aid of Civil Administration and requisition & derequisition Format is available at **Annexure-VIII**.

7.5.2 For the purpose of securing assistance of Army/Navy/Air Force, the Collector should before hand ascertain and maintain a list of names; designations and addresses of the officers of the three services who are to be contacted in case requisition of assistance by the Armed Forces is found necessary.

Important points

- 1 After requisition of Army and Helicopters aids by the Collectors. They must continue to take local help to save the people on site because actual reaching of army and Helicopters on site takes minimum 8 to 12 hours.
- 2 Helicopters are not helpful in night and also not feasible for evacuation of so many persons and place to land for Helicopter is also necessary.
- 3 Please also ensure that with Helicopter the dedicated fuel arrangements are also required simultaneously, otherwise your helicopter will stand still without fuel.
- 4 Past experience shows that before the arrival of Army and Helicopters, the local administration had often successfully evacuated the persons by local efforts.
- 5 Use of Helicopters is a costly affair so all the situations/circumstances should be considered before its demand.

7.5.3 Due to its multifarious training, operational and administrative commitments the Army has to perforce position the equipment keeping various constraints in view. Therefore, the desired type and quantity of material may not always be, readily available. The Collector who have flood

prone areas or areas vulnerable to flooding should therefore, see that to the extent possible the following type of equipment is procured or its local availability is explored.

- (i) Water tanks
- (ii) Water trucks/bowsers
- (iii) Boats of various types
- (iv) Bailey/equipment bridges
- (v) Radio signalling system.

7.5.4 *Role of Voluntary Organisations* - The voluntary organisation can play important role in Disaster Mitigation particularly in the field of child welfare, public health, environmental sanitation, nutrition etc. The voluntary organisation, which come forward to cooperate with the administration in disaster relief operations may be international, national or local in character. Again each voluntary organisation has specific geographic and proposed area of operation and specialises in one or more services like child welfare, health care, women's welfare etc. In order to make optimum use of their capabilities and subject to any general or special order of Government efforts should be made by the Collector detailed out their areas of interest and operations. There should then be communicated to concerned local officers at various levels.

CHAPTER-VIII

GRATUITOUS RELIEF TO SUFFERERS OF FLOOD

8.0 Purposes for which Gratuitous relief is payable - Gratuitous relief under this chapter is to be given on the principle that the Government aid is meant for supplementing private charity and shall be limited to providing to a sufferer of flood (hereinafter referred to as 'the sufferer')-

- (a) Food for a maximum period of 15 days from the date of occurrence of the flood; and
- (b) Clothing, utensil and other household articles immediately required by the sufferer.

8.1 Extent of Gratuitous relief admissible - Gratuitous relief may be granted to a sufferer in cash or in kind or partly in cash and partly in kind as per Relief Department guideline as follows:

- | | | |
|--|---|--------------------|
| <ul style="list-style-type: none">(a) Relief for the old, infirm and destitute children(b) Clothing and utensils for families whose house have been washed away | } | As per Govt. Rules |
|--|---|--------------------|

Note : Expenditure within the above limit may alternatively be incurred for running a common kitchen for a period not exceeding 15 days from the date of occurrence of the flood, at which the sufferers be given free cooked food.

8.2 Eligibility to receive Gratuitous relief -

8.2.1 All persons who are left in, indigent circumstances or have been rendered destitute as a result of any of the floods and heavy rains shall be eligible to receive Gratuitous relief under this chapter.

8.2.2 A person who answers to the description in sub-paragraph (1) above but who owns land or other property shall not on that account alone be held ineligible for grant of gratuitous relief, if he is found unable to secure for himself immediately food, clothing, utensils or temporary shelter.

8.3 Manner of payment of Gratuitous relief - Gratuitous relief admissible may be paid to a family i.e. a group of persons ordinarily residing in a single affected tenement or premises. Such payment shall be made to the head of the family in accordance with the procedure laid down in matter of payment of cash doles laid down in the Relief Department guidelines.

8.4 Provision of temporary shelter - The amount payable as gratuitous relief to sufferers of a flood shall not normally be used for the purpose of erecting a temporary shelter but such temporary shelters may where found necessary be provided by the Collector as far as possible in a common shed.

8.5 Authorities competent to sanction Gratuitous relief - Collector of the district.

8.6 Accounting - The expenditure on grant of gratuitous relief under this chapter shall be debitable to the budget head "2245-Relief on account of Natural Calamities."

CHAPTER-IX

ASSISTANCE TO AGRICULTURISTS WHO SUFFER DAMAGE TO THEIR CROPS, AGRICULTURAL LANDS AND HOUSES

- 9.0 Agriculturists eligible for assistance under this chapter: The following Agriculturists, who suffer damage to their crops or agricultural land due to specified natural calamity will be eligible to receive assistance under this chapter.
- (a) Agriculturist in whose case owing to heavy rains, landslides and floods, the sown area is completely inundated leading to loss of seeds or seedlings;
 - (b) Agriculturists whose standing crop is completely washed away by heavy rains, landslides or floods or is severely damaged by heavy rains, landslides, floods or hailstorm and the yield is likely to be more than 50 per cent of the normal yield, as determined by the Revenue Authorities on the basis of eye estimate; and
 - (c) Agriculturists to whose agricultural land severe damage has been caused, due to excessive rains and floods rendering the lands unfit for cultivation without some restoration work being undertaken.
- (1) The Agriculturist referred to in clauses (a) or (b) of Paragraph-1 i.e. those who have lost seed or seedlings or whose crop has been washed away or damaged shall be eligible to get supply of seed at the rate of prescribed by the Relief Department time to time.
 - (2) The assistance under sub-paragraph (i) will be limited in individual cases to small farmers and marginal farmers only.
- 9.1 Extent and nature of assistance admissible for land damage -
- 9.1.1 The Agriculturists referred to in clause (c) of Paragraph-1 i.e. those whose agricultural land has suffered damage will be eligible for grant of relief at the rate as per the Relief Department guidelines.
- 9.1.2 Extent of Relief -

Assistance to Small and Marginal Farmers for :-

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|---|---|---|
| <ul style="list-style-type: none">(a) Desilting etc.(b) Desilting, restoration, repair of fish farms(c) Agriculture input subsidy where crop loss was 50% and above(i) For agriculture crops, horticulture crops and annual plantation crops assured irrigation(ii) Perennial crops(d) Loss of substantial portion of land caused by landslide avalanche, change of course of rivers | } | As per direction of the Govt. time to time. |
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9.2 Sanctioning and Disbursing authorities -

9.2.1 After approval of the Relief Commissioner, the Collector shall be the sanctioning authority under the scheme and he shall be responsible for prompt sanction of relief to eligible Agriculturists under this chapter.

9.2.2 The Collector shall be responsible for disbursement of the relief. He shall ensure that once the relief is sanctioned by him the same is expeditiously distributed to all eligible agriculturists through the Revenue Agency and Block Development Officers and Gram Sevaks.

9.3 Submission of preliminary report to Government-

9.3.1 On the occurrence of any of the natural calamities (referred to in paragraph-1) causing damage to seeds, seedlings, standing crop or agricultural lands, the Patwari shall send a prompt intimation to the Circle Inspector/Circle Officer indicating the nature of the calamity and his preliminary assessment of the damage caused, etc. A copy of this report shall also be sent to the Tehsildar.

9.3.2 On receipt of the intimation from the Patwari or on receipt of the information about the occurrence of such a calamity from other sources, the Tehsildar (or in his absence the Naib Tehsildar) shall immediately inform the Sub-Divisional Officer and the Collector about the occurrence of the natural calamity. He shall then, forthwith proceed to the area which is afflicted by the calamity; ascertain the nature of the calamity and particularly make preliminary estimate of the damage, if any, caused to seed, seedling, crops or land by the calamity. He shall then submit his preliminary report to the Sub-Divisional Officer and simultaneously send copies thereof to the Collector and the Chief Executive Officer, Zila Parishad.

9.3.3 It shall be the responsibility of the Collector to ensure that an immediate report about the occurrence of the natural calamity is sent to Government in Revenue & Relief Department as well as in Agriculture and Cooperation Department within 48 hours of the receipt of the Tehsildar's report under sub-paragraph (2) either by telex or by wireless. A detailed report should then follow within a fortnight.

9.4 Detailed inquiry by the Tehsildar-

9.4.1 Immediately after dispatching his preliminary report, the Tehsildar shall:

- (a) make inquiries and satisfy himself that the natural calamity answers to the description of any of the calamities mentioned in paragraph-1.
- (b) With the assistance of Revenue Officers, the Tehsildar shall undertake a detailed spot inquiry and ascertain the details of damage, caused; and
- (c) get the lists (village wise) of the affected agriculturists prepared through the concerned Patwaris giving (i) names of Agriculturist in whose case seeds or seedlings are lost or in whose case crop is washed away or damaged qualifying them for assistance and the amount payable in each case names of and (ii) Agriculturist whose lands are damaged qualifying them for assistance and the amount payable in each case.

9.4.2 The Sub-Divisional Officer (and other officers of the rank of Deputy Collector if any, specially deputed by the Collector) shall undertake frequent tours of the affected area and keep close supervision over the work of preparing the lists referred in this chapter. The Sub-Divisional Officer and the Special Officer shall also check atleast ten per cent of the entries in the list and

verify whether the details of damage etc. given therein is consistent with the actual situation on the field.

- 9.4.3 The Tehsildar shall submit a detailed report to the Collector within a month from the date of occurrence of the calamity together with the lists referred to in sub-paragraph (2) for obtaining his sanction to the grant of assistance to the affected agriculturists.
- 9.5 Sanction of the Collector for distribution of relief-
- 9.5.1 On receipt of the detailed report of the Tehsildar, the Collector shall scrutinise the same on the basis of the reports/information received from the Sub-Divisional Officer, Zila Parishad, Agricultural Development Officer or from other sources, if any, concerning the calamity and the damage caused thereby.
- 9.5.2 The Collector shall thereafter decide in consultation with the Chief Executive Officer, Zila Parishad, whether the proposals made by the Tehsildar satisfy the tests laid down about eligibility for grant of assistance to Agriculturists, approve the proposals made by the Tehsildar about granting assistance to the affected agriculturists, with or without modifications and accord necessary sanction to the distribution of relief after proper approval of the Relief Commissioner.
- 9.5.3 The Collector shall send within 48 hours of the receipt of the Tehsildar's proposals, a detailed report to Government in Relief Department and also the Agricultural and Cooperation Department, in respect of the natural calamity; damaged caused and the assistance if any proposed to be granted to the affected Agriculturists. Collector send these report to Relief Commissioner as prescribed format at **Annexure-II**.
- 9.6 Disbursement of sanctioned assistance - After sanction for grant of assistance is received by the Relief Department, the Collector shall take steps to distribute the assistance to concerned Agriculturists through the Revenue Agency and the Block Development Officers and the Gramsevakhs.
- 9.7 Powers of Government to make modification in the Scheme- Government may make such modifications in the scheme including increase or reduction in the rate(s) of assistance or deleting any of the items of assistance as it deems it.
- 9.8 Provision for House Damage Assistance:-
Natural calamity such as floods, landslides and Heavy rains often cause damage to houses and cattle sheds in rural areas (including 'C' class Municipal areas) and in urban areas i.e. Municipal Corporation areas and areas from 'A' and 'B' class, Municipalities. Some times and particularly in the case of floods the houses (including cattle sheds) may get completely destroyed. Persons whose houses are so damaged or destroyed are often not in a position to carry out repairs to damaged houses or to reconstruct them without the assistance of the State. Under the scheme for granting house damage assistance to such persons which is described in subsequent paragraphs; assistance in the form of subsidy is to be granted to such persons having regard to the nature and extent of damage caused to their houses (including cattle sheds). While dealing with cases regarding grant of house damage assistance under this scheme, the Revenue Officers should however bear in mind that in the event of a natural calamity even well-to-do persons are some times rendered helpless and they find it difficult to obtain assistance from other sources to repair or reconstruct their house. Therefore, in determining whether a person is or is not in a position to repair or reconstruct in house it may not be correct merely to take into account the fact that the person concerned owns a fairly big house and deny him assistance on that account.

9.8.1 Assistance for repair/restoration of damaged houses

- | | | |
|--|----------------------------------|---|
| <p>(a) Fully damaged houses</p> <ul style="list-style-type: none">i) Pucca Houseii) Kuccha House | <p style="font-size: 4em;">}</p> | <p>As per direction of the Govt.
time to time</p> |
| <p>(b) Severely damaged houses</p> <ul style="list-style-type: none">i) Pucca Houseii) Kuccha House | | |
| <p>(c) Marginally damaged houses</p> | | |

9.9 Accounting - Expenditure on grant of assistance to Agriculturists under this Chapter shall be debited to the head "2245-Relief on Account of Natural calamity."

CHAPTER-X

SPECIFIC FLOOD DISASTER MITIGATION, TOOLS AND MEASURES

10.0 Flood Mitigation

Modifying susceptibility to flood damage and disruption is the floodplain management strategy of avoiding dangerous, uneconomic, undesirable or unwise use of the floodplain. The tools used to implement this strategy are regulations, development and redevelopment policies, flood proofing and elevation.

10.1 Regulations

This would include

- Not permitting unrestricted new development in the hazard prone areas
- Anchoring and flood proofing structures to be built in known flood prone areas
- Built-in safeguards for new water and sewage systems and utility lines from flooding
- Enforcing risk zone, base flood elevation and floodway requirements
- Prohibition on development in wetlands
- Prescribing standards for different flood zones on flood maps.

To meet these requirements, local governments will have to adopt specific floodplain management or stormwater management regulations into zoning and subdivision regulations, housing and building codes and resource protection regulations. The Rajasthan Flood Plain Zoning Act, 1990 is available at **Annexure-VII**

10.2 Safe siting in flood hazard areas

In low-lying areas, close to the coast, and on flat land in river valleys, there may be a potential for coastal or river flooding. In geologically younger river valleys, in mountains and foothills there may be a potential for flash flooding.

It is important to check the history of flooding in the area. wherever possible

- Map the extent of land covered by past floodwaters
- Get an indication of the depth of past floodwaters
- Find out about the severity of past floods; how much damage they have caused, how fast they flowed and how much debris they left behind and
- Find out how often flooding has happened, over at least the past 20 years.

Land morphology is the main factor in determining how safe a site is against floodwaters.

10.3 Development and Redevelopment Policies

In some cases, the only way to preclude future uses incompatible with the flood risk is to permanently evacuate a portion of a floodplain and to obtain full title on its development rights. Although this process (called "acquisition") is expensive, the long-term benefits in reduced floodplain losses, protection of natural resources and public use of the land, may make it worthwhile.

Most redevelopment relating to flood loss reduction occurs after one or more major floods. Usually, a temporary moratorium is imposed to allow evaluation and planning. Unfortunately, legislative and regulatory requirements often encourage a quick return to the preflood status quo, wasting opportunities to mitigate and revitalize the area.

10.4 Flood proofing and Elevation

Flood proofing is the use of permanent, contingent or emergency techniques to either prevent flood waters from entering buildings or to minimize the damages from water that does get in. Some of the techniques involve using water tight seals, closures or barriers, using water resistant materials, and temporarily relocating the contents of a building. Elevating a structure means raising it on fill, piers, or pilings so that it is above expected flood levels.

Most new floodplain structures should be designed to incorporate flood proofing and/or elevation. Flood proofing could be applied retroactively ("retrofitted") to existing structures.

10.5 Modifying Flooding

Modifying flooding is a floodplain management strategy of using structural means to divert the flood water. Structural measures dams, reservoirs, dikes, levies, floodwalls, channel alterations, high flow diversions, spillways, land treatment measures, shoreline protection works, and storm water management facilities - permit deliberate changes in the volume of works, and storm water management facilities - permit deliberate changes in the volume of run-off, peak stage of the flood, time of rise and duration of flood waters, location of flooding, extent of area flooded, and velocity and depth of flood waters. The effectiveness of these measures for protecting property and saving lives has been well demonstrated. Flood control projects can save people from anxiety, injury and death and prevent economic losses.

One of the issue that needs consideration is how to deal with the ageing inventory of existing flood control structures. Many dams and reservoirs may be nearing or even past their design lives and the flood control capacity of many reservoirs has been reduced by sedimentation. The financial resources are not available to undertake all required remedial actions.

Dams and Reservoirs

Storing flood water in reservoirs can modify floods by reducing the speed at which the water flows, limiting the area flooded and altering the timing of peak flows. However, misconceptions about or lack of understanding of dams can create an exaggerated sense of security. Reservoir sedimentation can significantly reduce flood control capacity. Competing uses of the reservoir can impair flood control. In addition, most dams are designed for purposes other than flood control, although they do have the temporary effect of flood reduction through storage.

The availability of water or power associated with dams, therefore, often attracts new developments, regardless of the flood risk or the ability of the dam to provide flood protection. Over time, without adequate land use regulations, encroachment into the floodplain downstream of dams can increase exposure to flooding. Once signs of dam failure become visible, breaching often occurs within minutes of a few hours, leaving little or no time for evacuation. The massive volume of water and its high velocity will cause severe damage.

Dikes, Levees and Flood walls

Dikes including levees and flood walls can be thought of as dams built roughly parallel to a stream rather than across its channel or parallel to the shorelines of lakes and other water bodies. Levees are generally constructed of earth, flood walls of masonry or steel. Although they can be effective in reducing flood losses, they are poorly designed and maintained.

Areas behind levees and flood walls may be at risk of greater than normal flood damage for several reasons. Many floodplain residents in those areas believe that they are protected from

floods and do not think it necessary to take proper precautions. Development may also continue or accelerate, based on expected flood protection. A levee breach or flood wall failure, like a dam break, can release a large wave of flood waters with high velocity. After a breach, the downstream portion of the levee system may also act like a dam, catching and prolonging flooding of the once protected area.

Channel Alterations

Channel alterations increase the flow-carrying capacity of a stream's channel and thereby reduce the height of a flood. The various types of alterations include straightening, deepening or widening the channel, removing debris, paving the channel, raising or enlarging bridges and culverts and removing other obstructions.

Alternative designs now developed include less straightening of channels, employ more gradual slopes and use natural vegetation or riprap rather than concrete lined channels. This minimizes destruction of fish and wildlife habitat, helps maintain water quality and avoids underisable downstream impacts.

High Flow Diversions

Diversions intercept flood waters upstream of a damage prone or constricted area and convey them around it through an artificial channel or a designated flow way. Diversions may either completely reroute a stream or collect and transport only excessive or potentially damaging flows. A negative aspect of such diversions is the false sense of security that may prevail in the protected areas along with a lack of awareness that the floodway actually exists.

Stormwater Management

Stormwater management is the removal of water that falls directly onto properties, as opposed to flood water, that flows onto the property, from upstream sources or an ocean surge. Stormwater networks have historically been constructed in urban and agricultural areas to remove these waters. A significant problem occurs when a agricultural zone with an adequate stormwater system is urbanised. Large areas are paved with roofs, roads, and parking, contributing to additional run-off. Often, shopping centres and other developments are placed on natural drainage ways. The pre-existing stormwater network becomes inadequate for its new urban use. Localised flooding then occurs. In an alternative approach often used in new developments today, run off may be retained on the site, within a regional system, and total run-off within a watershed may be managed, so that discharges from different units reach the main channel, at different times to reduce peak flows downstream. Natural drainage systems may be used, instead of concrete lined channels or enclosed pipes.

Watershed Management

Watershed Management measures reduce overland run-off from agricultural lands to streams or other waters by improving infiltration of rainfall into the soil, slowing and minimising run-off, and reducing the sedimentation that can clog stream channels or storage reservoirs. These techniques are most commonly, used in agricultural areas. They include maintaining trees, shrubbery and vegetative cover, terracing, slope stabilisation, using grass waterways, contour plowing, conservation tillage, and strip farming. Some measures involve building structures to retain or redirect run-off. Several land treatment measures involve little additional costs to the farmer and some such as no till or minimum tillage, actually reduce costs. Technical and financial assistance is provided through government and international development organisations. Although the impact of an individual measure is limited, extensive watershed management programs can effectively reduce flooding in small headwater areas.

ANNEXURE-I

MODEL ACTION PLAN FOR DISASTER PREPAREDNESS FOR FLOOD (CHECK LIST)

1. Is there a separate operations control centre? Is it equipped with a number of telephones, wireless sets etc.? Are there arrangements to work it round the clock?

Whether roster of duties kept ready to put into operation such a control centre at short notice?
2. Have all flood prone blocks, talukas, tehsils been identified?
3. Have steps been taken to see that all such blocks/talukas/tehsils can be reached over telephone/wireless sets in the event of flood?
4. Where are the flood warning signals received? Are they attended to immediately? Are Radio Stations instructed to issue flood warning in local and intelligible language?
5. Are stores of relief articles and essential medicines arranged and verified before monsoon to check up if there are adequate stocks of tents, boats, tarpaulins, blankets, ropes, bleaching powder, vaccines (anti-cholera, anti-typhoid vaccines and anti-snake venom serum) water purification tablet and insecticide (for antfly and anti-mosquito measures) Basic field Sanitary Engineering equipments, heavy duty pumpsets (for draining) and hand pump sets (for drinking water)?

Have local Army Commander been told of equipments, etc., needed in case of floods?
6. Are route chalked out in advance for despatch of relief goods to flood affected district and sub-divisions for evacuating the vulnerable population?
7. Has the operation of reservoirs been co-ordinated for providing flood operation? Have the reservoir Engineers been asked to be in continuous touch with the District Authorities before releasing water likely to inundate village etc.?
8. It is ensured that during flood season there will be no transfers and that leave vacancies are filled and nobody should leave post unless a substitute is available?
9. Have, the local A.I.R. and T.V. Station, Directors been requested to broadcast evacuation and informative talks on disaster preparedness for public and to issue flood warning round the clock held?
10. Is there a responsible Officer-in-charge of relief and antidisaster operations is the familiar with the field conditions of the flood areas meant? Is there clear division of responsibility for flood relief among the officer and the staff.
11. Is a log-book maintained to keep data about rise or fall of flood waters at regular intervals of the rivers and reservoirs in the State?
12. Is there a co-ordination committee for Relief? Are the District level officers of Health Irrigation, RSEB, Telephones and Police, represented on it.

Does it meet atleast 3 weeks before the onset of monsoon? Are the S.D.O.'s and B.D.O.'s of flood prone areas invariably asked to attend the meetings? Are Voluntary Relief Organisations of repute and standing and the District Branch of India Red Cross Associated with the Committee?

13. How is the flood warning communicated down the line? is there adequate arrangements for publicity through mobile units and microphone in the flood prone sub-division and blocks to issue the warning?
14. Sand bag for repairs of flood protection embankment are kept ready? Basic field sanitary Engineering equipment are available?
15. Has the Chief Medical Officer like-wise checked up the stock of essential medicines, vaccines, disinfectants, first-aid kits at the District/Sub-divisional medical store and kept the primary Health Centres in flood prone area well supplied with the following:

Disinfectants such as bleaching powder, chlorine liquid, water purifying tablets, phenyl/creasole berrecks bones and Pholoro copes (for ensuring quantity of free chlorine for supplying safe and potable drinking water).

Essential medicines for mobile team and dispensaries in the evacue camps such Stations provided with wireless set?

Can wireless sets/telephone be provided at still lower levels of administration?
16. Who is responsible for disseminating the flood warning at the village level?

Has the village Mukhia and/or the Sarpanch of the Gram Panchayats been given the responsibility?
17. Have flood shelter (Schools, Community Centres etc.) been identified?

Are the pucca building situated on raised ground beyond the reach of normal level of flood water?

What steps have been taken to make people awares of these shelters?
Has the list of such shelters been published in the local news papers and displayed and displayed in the blocks, taluka and tehsil office?
18. Are these shelter easily accessible?

DO the buildings have adequate space in and around them for storage of fodder and for keeping cattle?
19. Are the shelters provide with sources of drinking water?
20. What are the sanitary arrangements for these evacuation camps told to construct the following?

Deep trench laterins.
Temporary urinals with soak pit.
Incinarations of burying dry refimes.
21. Has the District Manager, F.C.I. checked up if sufficient stock of food grains are in position in the flood prone areas of the District before the monsoon starts?
22. Has the officer-in-charge of Civil Supplies ensured that the dealers keep sufficient stocks of the essential articals like pulses, edible oil, salt, kerosene, milk powders, baby food, matches and lanterns before the start of flood seasons?
23. Have the whole-sale consumers co-operative societies been requested to keep in readiness the stocks of aforesaid articles at the branch level.

24. Have people in low lying areas which are inundated in every flood been alerted first about the flood warning?
Are you searching for alternative sites which can be allotted to such families?
Have attempts been made to persuade such families to shift their dwellings to safer locations?
25. Has the concerned block identified and kept in readiness on shelf or projects of relief works which can be launched when the flood water recedes?
26. Have the villages water logged for a long time been identified?
27. Have the people in flood prone villages been trained in relief and rescues?
Have volunteers been grouped for patrolling of embankments round the clock in time of flood warning and trained to identify vulnerable place where the embankments are likely to give way?
28. Have pre-monsoon maintenance carried out at all irrigation works and the required safety certificate submitted to Chief Engineer, Irrigation, Jaipur before 15th June before on set of the monsoon.
29. Have all the gates and gearings on Irrigation works in the division have been checked, oiled, greased, operated and found in working order?
30. Have adequate arrangements of materials and patrolling of irrigation works round the clock been made for all the sites?
31. Have danger levels of all important rivers determined and all concerned informed of the same?
32. Have corresponding areas, villages, towns etc., been identified as well as affected on water crossing such danger levels?
33. Have flood posts indicating danger levels been fixed at all important abadi areas, towns and notified to all concerned?
34. Have higher ground and safer buildings been identified and well publicized for evacuation during distress?
35. Has training been imparted to police and Home Guard Personnel for flood fighting?
36. Have all the pumping sets and boats repaired and are in condition to be deployed with their accessories at likely distress areas?
37. If there is a complete inventory of boats, pumping sets, tools and plants and other pre-cautionary materials available at different places for utilisation during floods and informed to Chief Engineer, Irrigation, Jaipur before 1st June every year?
38. Have adequate number of rain gauge stations, self-recording rain gauge stations and river gauge sites established in different river basins which will give important parameters for flood forecast?
39. Have adequate arrangements made for establishing contact point for data collection and is there a reliable net work of transmission system of such data to the required points?
40. Have temporary telephones and wireless stations established at important places to transmit information about rainfall, river gauges?
41. Have the IDRN data regularly updated or not?

ANNEXURE-II

Statement of Flood Damage during : _____

Name of the District	Area affected in lakh hectares	Population affected in lakh	Damage to crops		Damage to houses	
			Area in lakh hectares	Value in Rs. lakhs	Nos.	Value in lakhs
1	2	3	4	5	6	7

Cattle lost Nos.	Human lives lost Nos.	Damage to public utilities in Rs. lakhs	Total damage to crops, houses and public utilities (Column 5+7+10) in Rs. lakhs	Remarks

ANNEXURE-III**Statement of damage caused by Floods**

Sl. No.	Name(s) of the district(s)	No. of the affected Blocks and Villages	Population affected (lakhs)	No. of human lives lost	Total area affected	Cropped area affected (lakh ha)		Value of crops damaged (Rs. in crores)
						More than 50%	Partially loss between 25-50%	
1	2	3	4	5	6	7	8	9

No. of cattle	Value of cattle lost	No. of houses damaged		Value of private houses/ hutments damaged (Partially/ fully) (Rs. in crores)	Extent of damage to public property (Rs./crores)	Total damage to crops, cattle, houses and public properties (Rs/ Crores) (Cols 8+10+12+13)
		Partially	Fully			
10	11	12	13	14	15	16

ANNEXURE-IV

Statement of damage of Public Properties by floods

Sl. No.	Name of Districts	Type of Public Property (Roads, Bridges, Buildings, Electrical, Installations, Embankments)	Description of damage	Estimated cost of repairs/ restoration	Amount which can be spent during the current financial year	Provision for repairs/ restoration in the current year's budget	Provision for restoration in the budget for the preceding year
1	2	3	4	5	6	7	8
		1.					
		2.					
		3.					
		4.					
		5.					
		6.					

ANNEXURE-V**Name of the victim during flood**

Serial No.	Name of the District/ Tehsil	Village	Name of the victim whether			Age
			Deceased	Permanently incapacitated	Or injured with loss of limb/limbs	
1	2	3	4	5	6	7

Annual income of the family	Cause of accident	Date and time of the accident	Name of the authority certifying death/ disability	Amount proposed to be distributed and the rates at which it is to be distributed	Whether residing in Rajasthan for not less than 15 years
8	9	10	11	12	13

ANNEXURE-VI

**Statement of Cost of Emergent Relief Measures for flood
or
(Other than Employment Generating Schemes)**

Name of work	Expenditure incurred	Period of operation	No. of beneficiaries	Sources of funds CRF (margin money/non plan funds/ other funds)	Balance available out of each source
1	2	3	4	5	6
(a) Gratuitous relief					
(b) Free supply of clothings, blankets, utensils etc.					
(c) Supply of fodder					
(d) Cattle camps					
(e) Fodder banks					
(f) Supply of medicines, disinfectants					
(e) Transporting drinking water by trucks/tankers					
(h) Air dropping of relief articles					
(i) Contingent charges					
(j) Relief Camps					
(k) Any other items					

**LAW (LEGISLATIVE DRAFTING) DEPARTMENT
(Group-II)
NOTIFICATION**

Jaipur, October 4, 1997

No. F.2(21) Vidhai/90 - In pursuance of clause (3) of Article 348 of the Constitution of India, the Governor is pleased to authorise the publication in the Rajasthan Gazette of the following translation in the English language of the Rajasthan Badh Maidan Parikshetran Adhiniyam, 1990 (1997 Ka Adhiniyam Sankhya 15):-

(Authorised English Translation)

THE RAJASTHAN FLOOD PLAIN ZONING ACT, 1990

(Act No. 15 of 1997)

(Received the assent of the President on the 22nd day of September, 1997)

An

Act

to provide for the zoning of flood plains of rivers in the State of Rajasthan.

Be it enacted by the Rajasthan State Legislative in the Forty Third Year of the Republic of India as follows :-

**CHAPTER-I
PRELIMINARY**

1. Short title, extent and commencement:-

- (1) This Act may be called the Rajasthan Flood Plain Zoning Act, 1990.
- (2) It extends to the whole of the State of Rajasthan.
- (3) This section shall come into force at once and the remaining provisions of this Act shall come into force on such date as the State Government may, by notification in the official Gazette, appoint:-

Provided that different dates may be appointed for different provisions of this Act, and for different areas different rivers.

2. Definitions - In this Act, unless the context otherwise requires :-

- (a) "Flood Plain" includes water channel, flood channel and that area of nearly low and which is susceptible to flood by inundation;
- (b) "Flood Plain Zoning" means restricting any human activity in the flood plains of a river where the plains are created by over flow of water from the channels of rivers and streams;

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- (c) "Flood Zone" means the area which is required to carry the carry flow of the maximum probable floods;
 - (d) "Flood Zoning Authority" in relation to river, means the authority appointed by the State Government under section 3;
 - (e) "Land" includes interest in lands, benefits arising out of lands and things attached to the earth or permanently fastened to anything attached to the earth;
 - (f) "Occupier" in respect of any land, means any person who has in interest in the land and cultivates the land himself or by his servants or by hired labour and includes a tenant.
 - (g) "Owner" in relation to any land includes any person having interest in such land;
 - (h) "Prescribed" means prescribed by rules made by the State Government under this Act;
 - (i) "River" includes its tributaries; and
 - (j) "Water Channel" means the channel in which the flows of a river are generally confined.

CHAPTER-II

FLOOD ZONING AUTHORITY AND ITS POWERS

3. Declaration of flood plain zoning :-

- (1) Where the State Government considers it necessary or expedient so to do, it may, by notification in the Official Gazettee declare that flood plain zoning shall be made in the manner hereinafter specified.
- (2) The State Government may direct that a survey be made of a river for the purpose of determining the limits within which the provisions of the Act are to be applied and that proper charts and registers be prepared specifying all boundaries and landmarks and any other matter necessary for the purpose of ascertaining such limits.
- (3) The State Government may by notification in the Official Gazettee appoint the Collector of the District or such other authority as the Government considers necessary, as the Flood Zoning Authority for the purpose of making a survey of the area as required under sub-section (2) and may specify in such notification, the duties to be discharged by such authority.

4. Powers and functions of the Flood Zoning Authority:-

The Flood Zoning Authority shall exercise the powers and discharge the duties and accordance with the provisions of this Act and the terms and conditions specified in the notification under sub-section (3) of the section.3.

CHAPTER-III

SURVEYS AND DELINEATION OF FLOOD PLAN AREA

5. **Survey:-**

- (1) The Flood Zoning Authority shall carry out surveys of flood plains of the rivers and determine the nature and the extent of flood plains of the rivers.
- (2) The Flood Zoning Authority shall, on the basis of the survey carried out under sub-section (1) establish flood plain zones and delineate the area which are subject to flooding including classification of land with reference to relative risk of flood plain use intended to safeguard the health, safety and property of the general public.
- (3) The Flood Zoning Authority shall prepare charts and registers indicating the areas delineated under sub-section (2).

6. **Power to take up survey:-** It shall be lawful for the Flood Zoning Authority or any of the officers generally or specially authorised by it in this behalf -

- (a) to enter upon and survey and take levels of any land within its or his jurisdiction.
- (b) to make such levels, boundaries and lines by placing marks or boundary stones.
- (c) to measure the land;
- (d) to do all other acts necessary for the purposes of ascertaining the limits referred to in sub-section (2) of section 3; and
- (e) where otherwise the survey cannot be completed and the levels taken, to cut down and clear away any part of standing crop, fence or jungle;

Provided that no Flood Zoning Authority or any other officer shall enter into any building or open any enclosed court or garden attached to a dwelling house (unless with the consent of the occupier thereof) without previously giving such occupier at least seven days notice in writing of its or his intention to do so.

7. **Payment of damages :-**

- (1) The Flood Zoning Authority or any other officer generally or specially authorised by it in this behalf of who has entered upon any land section 5 shall, before leaving tender compensation to the owner or occupier of such land for any damage which may have been caused and in case of dispute as to the sufficiency of the amount so tendered, the Flood Zoning Authority or such officer shall refer the matter to the State Government for its decision.
- (2) The decision of the officer under sub-section (1) shall be final and no suit shall lie in a civil court to have it set aside or modified.

CHAPTER – IV

NOTIFICATION OF LIMITS OF FLOOD PLAINS

8. Declaration of intention of State Government to demarcate flood plains areas:-

The State Government may on the basis of report from the Flood Zoning Authority or otherwise, by notification in the Official Gazette, declare its intention to demarcate the flood plain areas and either prohibit or restrict the use of land therein.

9. Public Notices :-

- (1) The Flood Zoning Authority shall, on the issue of notification under section 8, cause public notice of the substance of such notification to be given at convenient places in the area.
- (2) The Flood Zoning Authority shall also give notice individually in the owners of the lands situated in the area.
- (3) The Flood Zoning Authority shall exhibit records, charts, maps, registers and such other documents showing the river channel, flood channel and the flood plain area, specifying the nature and extend to which the use of limits of the area is either prohibited or restricted, in the office for inspection by the General public at the timing specified therein.

10. Objections :-

- (1) Any person, who desires to raise any objection to the limits and either the prohibitions or restrictions specified in the public notice referred to in section 9, may within a period of sixty days from the date of publication of the notification in the Official Gazette, forward to the Flood Zoning Authority a statement in the writing setting forth his objections.
- (2) After the expiry of the period aforesaid, the Flood Zoning Authority shall issue a notice in the manner prescribed and consider the objections after giving the party concerned a reasonable opportunity of being heard in the matter.
- (3) The Flood Zoning Authority shall forward to the State Government its or his proposals together with the records referred to in sub-section (3) of section 9.

11. Decision of the State Government :-

- (1) The State Government shall after considering the report of the Flood Zoning Authority, order such alterations in the limits of the area as it considers necessary.
- (2) The decision of the State Government shall be final.
- (3) The State Government shall by notification in the Official Gazette, declare that provisions of this Act shall apply to the said river with the boundaries and limits as specified.
- (4) The areas delineated and approved by the State Government shall be deemed to be

the flood plain and the limits shall, where necessary be marked either by boundary stones or other suitable marks.

- (5) The Flood Zoning Authority shall maintain the charts and registers of such areas so delineated and such charts and registers shall form part of the permanent records of the office.
- (6) The charts and registers maintained under sub-section (5) shall be furnished to the Collection of the District in which any part of the river is situated and shall be opened for inspection by the general public at such times as may be prescribed.

CHAPTER – V

PROHIBITED OR RESTRECTION ON THE USE OF THE FLOOD PLAINS

12. Power to Prohibit obstruction etc. in flood plain:-

- (1) Where the State Government is satisfied that it is necessary in the interest of public health, safety, or property or in the interest of reducing the inconvenience to the general public to prohibit or restrict the activities in the flood plain, the Government may, by notification in the Official Gazette, specify the area where such prohibition or restriction is to be enforced and the nature and extent of such prohibition or restriction:

Provided that no notification under this sub-section shall be issued after the expiry of six months from the date of publication of notification under section 8.

- (2) Upon the publication of a notification under sub-section (1), notwithstanding any thing contained in any law, custom, agreement or instrument, for the time being in force, the prohibition or restriction specified in such notification shall prevail.
- (3) No person shall undertake any activity within the prohibited area or restricted area except with the previous permission of Flood Zoning Authority:

Provided that where a person makes an application to the Flood Zoning Authority for permission under this sub-section to undertake any activity and the Flood Zoning Authority does not within a period of ninety days from the date of receipt of such application, communicate to the person that permission applied for has been refused, it shall be presumed that the Flood Zoning Authority has granted such permission.

13. Penalty:

If the persons commences or carries on or attempts to carry on any activity in the areas specified in the notification under sub-section (1) of section 12 contrary to the terms and conditions specified in such notifications, he shall be punishable-

- (a) With fine which may extend to five hundred rupees and in default of payment of fine, with simple imprisonment for the terms which may extend to two months, and

- (b) With further fine which may extend to one hundred rupees for each day during which the offence continues after the conviction under clause (a).

14. Power of compound :-

- (1) Subject to such conditions as may be prescribed, any officer authorised by the State Government by a general or special order in this behalf may, either before or after the institution of proceedings under this Act, accept from the person who has committed or is reasonably suspected of having committed an offence, a sum of money not exceeding one thousand rupees.
- (2) On the payment of such sum of money, such person shall be discharged and no further proceedings shall be taken against him in respect of such offence.

15. Appeal :-

- (1) Any person aggrieved by any decision of the Flood Zoning Authority may prefer an appeal to an authority prescribed by the State Government in this behalf, within a period of ninety days from the date on which such decision was communicated to him;

Provided that the prescribed authority may entertain the appeal after the expiry of the said period of ninety days if it is satisfied that the appellant was prevented by sufficient cause from filing the appeal in time.

- (2) The prescribed authority may, after giving a reasonable opportunity to the appellant of being heard, pass such orders as it thinks fit and the decision thereof shall be final.

16. Revision :-

- (1) Where on appeal has been preferred under section 15, the State Government may, for the purpose of examining the legality propriety or correctness of any order, inquiry or proceedings of the Flood Zoning Authority, call for the records of any enquiry or proceedings of the Flood Zoning Authority and make such order in the case as it thinks fit:

Provided that no such record shall be called after the expiry of six months from the date of such order.

- (2) No order of the Flood Zoning Authority shall be varied by the State Government so as to prejudicially effect any person without giving such person a reasonable opportunity of being heard in the matter.

CHAPTER -VI COMPENSATION

17. Payment of compensation :-

- (1) Where any permission to undertake any activity in the flood plain has been refused to any person or where as a result of prohibition or restriction imposed on any person

under this Act, such person suffers any damage, he shall be entitled to the payment of compensation not exceeding the difference between the value of the land as determined under section 23 or section 24 of the Land Acquisition Act, 1894 (Central Act, 1 of 1894) and the value which it would have had, had the permission for carrying on any activity had been granted or the prohibition or restriction had not been imposed.

- (2) In determining the amount of compensation under sub-section 91) any restriction which the land is subjected to under any other law for the time being in force in regard to the right of the person claiming compensation to carry on any activity on the land or otherwise to the use of land shall be taken into consideration.

18. Determining the compensation and apportionment by consent:-

- (1) The person to whom the compensation under section 17 is to be paid and the apportionment of such amount among the persons interested therein shall be determined by agreement between the Flood Zoning Authority and the person or persons claiming interest therein.
- (2) In default of any such agreement, the Flood Zoning Authority shall, after holding such enquiry as it considers necessary, make an award determining.
- (a) the amount of compensation to be paid under section 17; and
 - (b) the apportionment, if any, of such compensation among persons known or believed to be interested therein;

Providing that where the amount of compensation exceeds ten thousand rupees, no award shall be made without the previous approval of the State Government or such other officer as the State Government may authorise in this behalf.

19. Compensation not admissible :-

- (1) No compensation shall be awarded-
- (a) if and in so far as the land is subject to substantially similar restriction in force under some other law in force on the date on which the restrictions were imposed by or under this Act; or
 - (b) In compensation in respect of the same restrictions imposed by or under this Act or substantially similar restrictions in force under some other law has already been paid in respect of the land to the claimant or any predecessor in interest of the claim; or
 - (c) for removal of any encroachment.
- (2) If any person has unauthorisedly undertaken any activity, then any increase in the land value from such activity shall not be taken into account in estimating the value of land.

20. Application against award:-

- (1) Any person aggrieved by the Award of the Flood Zoning Authority under section (2) of section 18 may, by an application in writing, apply to the State Government or such other officer as the State Government may authorise in this behalf.
- (2) Any application under sub-section 91) shall be made in such form and in such manner as may be prescribed and shall be made within forty five days from the date of communication of the award.
- (3) The application under this section shall be disposal of in such manner as may be prescribed.

21. Procedure and powers of authorities in deciding applications under sec. 20:-

- (1) An application under section 20 shall be deemed to be proceedings within the meaning of section (4) of the Code of Civil Procedure, 1908 (Central Act 5 of 1908) and in the trial thereof, the authorities empowered to decide a reference may exercise the powers of a civil court.
- (2) The scope of inquiry shall be restricted to the consideration of the matter referred to the State Government of such other officer as the State Government may authorise in this behalf.

2. Decision enforceable as decree of civil court :-

The decision under section 21 shall be enforceable as a decree of a civil court.

23. Payment under award :-

On the determination of the compensation under sub-section (1) of section 18, or on the making of an award under sub-section (2) of section 18 or, if an application is made under section 20 against such award, after decision of the authority, the compensation shall be paid by Flood Zoning Authority and the provisions of section 31 to 35 (both inclusive of the Land Acquisition Act, 1891 (Central Act 1 of 1894), shall apply to such payment.

CHAPTER-VII

POWER TO REMOVE OBSTRUCTIONS AFTER PROHIBITION

24. Power to remove obstructions :-

- (1) The Flood Zoning Authority may, in accordance with the provisions of this Act, direct any owner or occupier of land to do any act or to remove any unauthorised obstructions within such time as may be specified by it and such owner or occupier shall do such act or remove the obstructions.
- (2) If owner or occupier fails to comply with the order of the Flood Zoning Authority within the time specified under sub-section (1), the Flood Zoning Authority may cause the act to be performed or cause the obstructions to be removed.

-
- (3) All expenses incurred by the Flood Zoning Authority under this section shall be recovered from such owner or occupier as arrears of land revenue.

CHAPTER-VII MISCELLANEOUS

25. Preventing Flood Zoning Authority from doing an act to be an offence:-

Any person who prevents the Flood Zoning Authority in discharging any act imposed on such Authority by or under this act, shall be deemed to have committed an offence under section 186 of the Indian Penal Code (Central Act 15 of 1860)

26. Flood Zoning Authority other officer to be public servants :-

The Flood Zoning Authority and the officers and employees authorised under the Act shall be deemed to be public servants within the meaning of section 21 of the Indian Penal Code (Central Act 45 of 1860)

27. Protection of action taken in good faith :-

- (1) No suit, prosecution or other legal proceedings shall lie against the State Government or any authority or person exercising any power or performing any duty under this Act for anything which is in good faith done or included to be done in pursuance of this Act or an order made thereunder.
- (2) No suit or other legal proceeding shall lie against the State Government for any damage caused or likely to be caused for any thing which is in good faith done or included to be done in pursuance of this Act or any rule or order made thereunder.

28. Recovery of time :

All times imposed under this act shall be recovered in the manner provided in the Code of Criminal Procedure, 1973 (Central Act 2 of 1974).

29. Power of Court :-

A Civil Court shall have jurisdiction to settle, decide or deal with any question which is by or under this Act required to be settled, decided or deal with by the Flood Zoning Authority or such other officer as is authorised by the State Government in this behalf.

30. Power to make rules :-

- (1) The State Government may, by notification in the Official Gazette make rules to carry out the purposes of this Act.
- (2) In particular and without prejudice to the generally of the foregoing provisions, such rules may provided for-
 - (a) the manner in which charts and records shall be maintained;

-
-
- (b) the form and manner in which application under section 20 shall be made and the manner in which such application shall be disposed of;
 - (c) any other matter which has to be, or may be, prescribed.
- (3) Every rule made under this Act shall be laid, as soon as may be after it is made, before the House of the State Legislature while it is in session for a total period of fourteen days which may be comprised in one session or two or successive sessions and if before the expiry of the session immediately following the session or the successive session aforesaid the House agrees in making any modification in the rule, or the House agrees that the rule should not be made, the rule shall, thereafter, have effect only in such modified form or be of no effect, as the case may be so however, that any such modification or annulment shall be without prejudice to the validity of anything previously done under that rule.

Secretary to the Government

**Guidelines for Requisitioning of Armed Forces
in Aid of Civil Administration**

Procedure for Provision of Aid

1. The Armed Forces are conscious of not only their constitutional responsibility in-aid to civil authority, but also, more importantly, the aspirations and the hopes of the people. Although such assistance is part of their secondary role, once the Army steps in, personnel in uniform wholeheartedly immerse themselves in the tasks in accordance with the Army's credo - **SERVICE BEFORE SELF**.

2. Assistance during a disaster situation is to be provided by the Defence Services with the approval and on orders of the central government. In case, the request for aid is of an emergency nature, where government sanctions for assistance is not practicable, local military authorities, when approached for assistance should provide the same. This will be reported immediately to respective Services Headquarters (Operations Directorate) and normal channels taken recourse to, as early as possible.

Requisition Procedure

3. Any state unable to cope with a major disaster situation on its own and having deployed all its resources will request Government of India for additional assistance. Ministry of Defence will direct respective service headquarters to take executive action on approved requests. The chief secretary of state may initiate a direct request for emergency assistance, for example, helicopter for aerial reconnaissance, or formation of local headquarter (Command/Area Headquarters) or naval base or air force station.

Coordination

4. The responsibility for coordination of disaster relief operations at various levels is as follows:

- a) Inter-service Coordination at Central Level: Cabinet secretariat (Military Wing). A case for co-opting a Tri Service RRF to cater for emergency situations within India and in the region is under consideration of COSC. This JCC would be responsible for coordination and directing all rescue/relief operations to ensure synergy of efforts of all three services in management of disasters.
- b) Service Headquarters
 - (i) Military Operations Directorate (MI-6) at Army Headquarters
 - (ii) Director of Naval operations at Naval headquarters
 - (iii) Directorate of Operations (Transport and Maritime) at Air Headquarters

- c) Command and Lower Formation Headquarters: Senior General Staff Officers (Operations)
 - d) State Level: Service liaison officer deputed to form a part of Joint Control Centre.
 - e) Local Level: Nominated Commander of troops and senior civil administrator in-charge of relief.
5. The Armed Forces may be called upon to provide the following types of assistance:
- a) Infrastructure for command and control for providing relief. This would entail provision of communications and technical manpower.
 - b) Search rescue and relief operations at disaster sites.
 - c) Provision of medical care at the incident site and evacuation of casualties.
 - d) Logistics support for transportation of relief materials
 - e) Setting up and running of relief camps
 - f) Construction and repair of roads and bridges to enable relief teams/ material to reach affected areas.
 - g) Repair, maintenance and running of essential services especially in the initial stages of disaster relief.
 - h) Assist in evacuation of people to safer places before and after the disaster
 - i) Coordinate provisioning of escorts for men, material and security of installations,
 - j) Stage management and handling of International relief, if requested by the civil administration.

Disaster Relief Operation by Headquarters Rajasthan Sub Area

6. Important aspects of policy for providing disaster relief are as under:
- a) Disaster relief tasks can be undertaken by local commanders. However, HQ Rajasthan Sub Area is to be informed at the first opportunity and then flow of information to be maintained till completion of the task.
 - b) Effective and efficient disaster relief by the army while at task
 - c) Disaster relief tasks will be controlled and coordinated through Commanders of Static Headquarters while field units Commanders may move to disaster site for gaining first hand knowledge and ensuring effective assistance.
 - d) Once situation is under control of the civil administration, army aid should be promptly de-requisitioned.
 - e) Adequate communication, both line and radio, will be ensured from Field Force to Command Headquarters.

Procedure to Requisition Army, Air Force and Naval Assistance.

7. It will be ensured by the local administration that all local resources including Home Guards, Police and others are fully utilised before

assistance is sought from outside. The District Collector will assess the situation and project his requirements to the State Government. District Emergency Control Room will ensure that updated information is regularly communicated to the State Control Room, Defence Service establishments and other concerned agencies.

8. District Collector will apprise the State Government of additional requirements through State Control Room and Relief Commissioner of the State.

9. Additional assistance required for relief operations will be released to the District Collector from the state resources. If it is felt that the situation is beyond the control of state administration, the Relief commissioner will approach the Chief Secretary to get the aid from the Defence Services. Based on the final assessment, the Chief Secretary will project the requirement as under while approaching the Ministry of Defence, Government of India simultaneously for clearance of the aid:

- a) Aid from Army: Head quarters Rajasthan Sub Area Commander, Jaipur and Headquarters of South Western Command
- b) Aid from Air Force: Area Officer Command, Jodhpur and South Western Air Command Headquarters.

Army authorities to be contacted for disaster relief are as under:

10. Headquarters Rajasthan Sub Area (General Staff) will muster the troops and equipment and exercise operational control over them for relief operation. It will also process the case through Army channels to get the clearance of headquarter Western Command (General Staff). A Joint Operational Centre, with adequate communications to be provided by the State Government, will operate on 24 hourly basis at Headquarters Rajasthan Sub Area under the control of Colonel General Staff. State Relief Commissioner will provide a duty officer and requisite staff at the Joint Operational Centre (JOC) in addition to staff of the armed forces and their own communications.

11. Co-Ordination Between Civil and Army: For deployment of the Army along with civil agencies on disaster relief, co-ordination should be carried out by the district civil authorities and not by the departmental heads of the line departments like Police, Health & Family Welfare, PWD and PHED etc.

12. Overall Responsibility When Navy and Air Force are also being Employed: When Navy and Air Force are also involved in disaster relief along with the Army, the Army will remain overall responsible for the tasks unless specified otherwise.

13. Principles of Employment of Armed Forces

- a) **Judicious Use of Armed Forces:** Assistance by Armed Forces should be requisitioned only when it becomes absolutely necessary and when the situation cannot be handled by the civil administration from within its resources. However, this

does not imply that the response must be graduated. If the scale of disaster so dictates, all available resources must be requisitioned simultaneously.

- b) **Immediate Response:** When natural and other calamities occur, the speed for rendering aid is of paramount importance. It is clear that, under such circumstances, prior sanction for assistance may not always be forthcoming. In such cases, when approached for assistance, the Army should provide the same without delay. No separate Government approval for aid rendered in connection with assistance during natural disasters and other calamities is necessary.
- c) **Command of Troops:** Army units while operating under these circumstances continue to be under command of their own commanders, and assistance rendered is based on task basis.
- d) **No Menial Tasks:** While assigning tasks to troops, it must be rendered that they are not employed for menial tasks e.g. troops must not be utilised for disposal of dead bodies.
- e) **Requisition of Aid on Task Basis:** While requisitioning the Army, the assistance should not be asked for in terms of number of columns, engineers and medical teams. Instead, the civil administration should spell out tasks, and leave it to army authorities to decide on the force level, equipment and methodologies to tackle the situation.
- f) **Regular Liaison and Co-ordination:** In order to ensure that optimum benefit is derived out of Armed Forces employment, regular liaison and coordination needs to be done at all levels and contingency plans made and disseminated to the lowest level of civil administration and the Army.
- g) **Advance Planning and Training:** Army formations located in areas prone to disaster must have detailed plans worked out to cater for all possible contingencies. Troops should be well briefed and kept ready to meet any contingency. Use of the Vulnerability Atlas where available must be made.
- h) **Integration of all Available Resources:** All available resources, equipment, accommodation and medical resources with civil administration, civil firms and NGOs needs to be taken into account while evolving disaster relief plans. All the resources should be integrated to achieve optimum results. Assistance from outside agencies can be superimposed on the available resources.
- i) **Early De-requisitioning:** Soon after the situation in a disaster-affected area has been brought under control of the civil administration, Armed Forces should be de-requisitioned.

**REQUISITION FOR ARMY AID BY CIVIL AUTHORITIES
(NATURAL CALAMITIES)**

Reference No. : Calamities

1. From :
2. To :
3. For Information -
4. Date and time origination of demand -
5. Situation as at area _____ an
Heavy flood in area _____ due rising of rigor
_____ civilians marooned. Own evacuation resources
insufficient meet requirement. In view continuous heavy, rains in upper regions, more
areas may be affected marooning another _____ civilians of
_____ region.
6. **Type of extent of aid required for**
 - (i) Equipment and personal, to evacuate marooned civil.
 - (ii) Medical assistance for approximately _____ civilians.
 - (iii) Tentage for _____ families if available.
7. **Likely duration and period of aid required**
for _____ days with effect from _____
(present situation permitting)
8. **Officer in charge Army aid to contact.**
9. **Name of civil Liaison Officer detailed.**
Mr. _____ (Telephone No.) _____
10. **Arrangement made by civil authorities to guide Army aid to place of operations.**
Mr. _____ will meet Army aid part at _____ On receipt of
information from Army authorities)
11. **Special Instructions.**
 - (i) School building at _____ being made available to
house personnel and also for medical arrangements.
 - (ii) Sufficient stocks of required medicines in the present contingency being made
available to treat effected civilians population.
 - (iii) Road Bridge at _____ is unserviceable.
12. Please acknowledge.

Signature

Office Seal

DE-REQUISITION OF ARMY AID (NATUAL CALAMITIES)

1. **Reference No.** **Date :**
2. **From** -
3. **To** -
4. **Information** -
5. Army aid requisitioned vide our reference No. _____ of _____ is hereby de-requisitioned with effect from _____ hrs on _____.
6. Please acknowledge.

Signature

Office Seal

Appointment

Guidelines & check list for monitoring arrangement for Public Health & Medical problems in flood prone areas

Name of diseases and common ailments found after flood

Types of ailments	Due to
i) Respiratory diseases	Adverse condition of living
ii) Injuries (not very common)	Collapse of houses/standing structure
iii) Water-borne diseases Diarrhoeal diseases/(Cholera, gastroenteritis, Dysentery, etc.) Infective Hepatitis, Poliomyelitis.	Non-availability/ inadequate availability of drinking water due to: <ul style="list-style-type: none"> a) Flooding of wells with polluted drinking b) Breakdown of piped water supply c) Inaccessibility of available water sources. Insanitary conditions in villages/ evacuation camps due to: <ul style="list-style-type: none"> a. Accumulation of water b. Lack of excreta disposal c. Blockage/disruption of normal drain d. Slush with increase in breeding space for flies e. Overcrowding f. Dumping of compound dry refuse g. Dumping of animal excreta h. Dumping of carcasses
iv) Malaria/ Filaria	Increase in mosquito breeding space
v) Skin diseases/Eye Diseases/ Respiratory Diseases	Lack of personal hygiene and overcrowding
vi) Snake/Insects bite	Water entering into their shelters

SPECIFIC PUBLIC HEALTH ACTIVITIES FOR FLOOD

A. Preventive measures

As mentioned earlier, water-borne diseases are one of the most common phenomena during flood. Diarrhoeal diseases are one of the earlier manifestations but diseases like typhoid, infective hepatitis and poliomyelitis are usually seen after about a fortnight. Therefore, emphasis, as far as preventive measures are concerned, is given on consumption of safe drinking water, public education, including Dos and DON'Ts and sanitary arrangements.

(i) Safe drinking water: Safety of drinking water can be ensured either at the point of storage or distribution. Various methods practiced are:

1. Boiled water: Water could be boiled for 10 to 15 minutes and then stored in clear and covered containers. This could be used after it has cooled.
2. Use of chlorine tablets: Nascent chlorine makes water safe for drinking:

Wight of tablet	Strength of Chlorine	Quality of water for disinfection
2.5 gm	300 mg	225 litres
0.5 gm	25 mg	20 litres
0.125 gm	1.25 mg	1 litre

3. Bleaching powder: Bleaching powder is used to disinfect usually bigger sources of water. Usual dose (with 35% chlorine) 2 gms for 5 litres of water. If water is in the wells, the quantity of water could be estimated as:

Diameter of well X Depth of water X 5 = gallons of water in well

4. Monitoring: Chlorine content of water is estimated by chlorinometer. At least 0.245 ppm of chlorine should be available in water for safe drinking.
5. Microscopical and bacteriological examination including stool culture should also be done at frequent intervals.

- (ii) Disposal of water and excreta: Existing infrastructure is likely to become ineffective. Therefore, adequate arrangements for disposal of wastes should planned in advance, so that it can be executed immediately.
- (iii) Fly proofing: Areas including houses/shelters should be disinfected regularly by spray of bleaching powder.
- (iv) Health education: Use of mass media like radio, newspaper, pamphlets, leaflets containing small repeated messages on following points should be transmitted to the population:
 - Personal hygiene
 - Water consumption
 - Use of boiled water and chlorine tablets
 - Food consumption - Avoid use of cheap ice creams, candles, food prepared and stored in the open.
 - Non-consumption of stale and overnight food, etc.
- (v) Surveillance: A close watch is required to be kept so that any rise in diseases can be detected at very early stage. This can be done only with a careful watch at the sub-centre level.

1. Early detection of rising pattern of disease
The rising pattern of any disease can be detected easily by keeping a watch at sub-centre and PHC levels by noticing more number of cases with similar symptoms coming from a particular village or locality (say more than 5 persons/locality).

In order to operationalise the above arrangements, the following actions may be necessary:

- a. Meeting of doctors and staff with district health officials for making them aware about the intentions;
- b. Specific instructions with DOs and DON'Ts to health officials upto the sub-centres level;
- c. Weekly collection, compilation and analysis of information at PHC and District levels to identify rising trends. Information sought from sub-centre and PHC should be small in order to save time in filing forms;
- d. Periodical inspections upto the sub-centre level by District officials.

2. Immediate investigation and action on noticing rising patterns

In case of rising trend of diseases, arrangements for immediate investigation should be made. Investigation should include the following points:

- a) Actual assessment of the situation by the district health official
- b) Detection of the source of spread of infection by identification of mohalla, house, person
- c) Investigation of diseases like in case of Diarrhoeal diseases by stool examination, stool culture, etc.
- d) Immediate isolation of the source of its treatment
- e) Requisition of special medical team for investigation from the District or Medical Colleges.

3. Prevention Measures Against Diseases: Details have already been emphasized earlier. Specific points are:

- a) Disinfection of water sources by chlorination at intervals
- b) Distribution of chlorine tablets to local population with necessary instructions for its use
- c) Immunization against diseases for high-risk group population
- d) In case of municipalities and notified areas, arrangements for proper disposal of water about DOs and DON'Ts
- e) Health check up for high risk group like children below 5 years, pregnant and lactating mothers and old persons in Anganwadis, Balwadis, Chaupals, Schools etc.
- f) Close surveillance

4. Immediate action in case of rising disease patterns

- a) Arrangement for extra manpower/doctors, paramedics and other staff
- b) Arrangement for quick mobility
- c) Sufficient drugs, vaccines and other medical stores
- d) Arrangements for establishment of evacuation/ isolation camps

- e) Arrangement for close supervision and periodical evaluation and reporting.

5. Feedback information at various levels

Feedback information is extremely essential to keep close watch at different levels for timely action. Information from the field should be small and specific, so that the officials are not busy in filing forms.

- a) From sub-centre to PHC
- b) From PHC to District
- c) At the District, between public health officials and Medical Colleges authorities and District Collector.
- d) From the District to the State Headquarters.
- e) From the State Headquarters to the Centre.
- f) Establishment of control rooms at PHC, District and State Headquarters.

Administrative Arrangements:

1. Identification of Target Groups

In flood prone areas, villages and PHCs should be identified which are commonly affected by flood. Having done so, attention may be paid to target groups like children, pregnant and nursing mothers, old and infants, as they pose special health problems.

2. Procurement of Medical Stores

There is no need to stock a large quantity of a number of medicines. It is expected that only about 10% of the affected population may require medical treatment. Most common diseases are Diarrhoeal diseases including gastroenteritis, dysenteries and cholera, typhoid, infective hepatitis and later poliomyelitis. Other common diseases are respiratory infections, skin diseases, malaria and snake bites. Medical stores should include disposable syringes also.

3. Disinfection of drinking water sources and frequent monitoring at distribution points like houses, etc.

Necessary administrative measures may be taken to distribute chlorine tablets, spray of bleaching powder and estimate chlorine content of water at distribution points.

4. Immunization

It is better and cost effective to start immunization against certain diseases like Polio and DPT much earlier, specially of children. In case of suspension of rising pattern of diseases, immunization should be initiated only in vulnerable groups in epidemic areas, instead of going in for mass immunization, as there has been a lot of discussion in the scientific community about mass scale cholera immunization.

5. Establishment of Medical and Health Camps

In addition to the existing establishments like dispensaries, PHC, Tehsil, District and Medical Colleges Hospitals, arrangements for mobile and fixed camps may be planned in advance to render medical aid in flood affected areas where existing infrastructure is likely to be ineffective. Arrangements for transport facilities should be made for every medical health camp to transport critically ill persons to higher level referral centers.

6. Setting up of Epidemiological Surveillance

Epidemiological surveillance should be set up through PHC and incidence of epidemic prone disease should be notified to the health authorities regularly.

7. Publicity and Health Education

Adequate publicity should be given to inform the people about the location of various medical and health camps and other medical units. People should be informed from time to time about the public health measures to be practiced by them.

8. Monitoring and Review

- a. A cell should be established under the charge of senior officer in the Directorate of Health Services to exclusively monitor and review the public health measures in the affected areas in the State.
- b. The epidemiological cell of the Directorate of Health Services should be alerted and asked to keep itself ready for any eventuality if any epidemic disease breaks out. The unit should also, be asked to take anticipatory preventive measures in the form of obtaining information in respect of epidemic prone diseases, immunization of preventable diseases etc. The emergency drugs, vaccines etc. should be procured and kept ready.
- c. Similarly one officer should be identified at the District level to coordinate and monitor all public health measures for flood affected areas in the district.
- d. The Chief Medical and Health Officers of the districts should send regularly information to the Directorate of Medical and Health Services where an officer has been earmarked to receive all the information and process the same for onward transmission to the Department of Medical and Health.

Check List of Points for Monitoring Arrangements for Public Health & Medical Problems in Flood-Prone Areas:

1. GENERAL

- a. Have all the villages, which are affected or are likely to be affected by flood been identified?
- b. Has the requirement of medical and paramedical staff for attending to the health needs of flood prone village during the period been assessed?
- c. Have the medical and paramedical personnel who may be required to be deployed been identified?

- d. Have such personnel been given special training to attend to medical and public health problems, which may arise in flood areas?
- e. Have surveillance teams consisting of bacteriologists to conduct on-the-spot random stool examination been constituted?
- f. Has the requirement of drugs, disinfectants like bleaching powder/chlorine tablets and vaccines etc. been worked out?
- g. Has the availability of existing stocks been estimated?
- h. Have arrangements been made for the procurement of additional stocks required?

2. ACTION

- a. Has adequate publicity been given in the flood-prone areas on how to use the disinfectants and take other precautionary measures?
- b. Have the anti-fly and anti-mosquito measures been taken?
- c. Have the treatment centres been identified?
- d. Do the villagers of each village know which treatment centre to go to in case of need?
- e. Has the adequacy of the existing treatment centres been assessed?
- f. If the additional treatment centres are required to be temporarily set up have their locations been identified?
- g. In case additional treatment centres are required have the sources from which additional staff would be obtained been identified?
- h. Has the availability of various drugs, vaccines etc. at such treatment centres been assessed?
- i. Have arrangements been made to supply additional, drugs and vaccines etc. in treatment centres where existing stocks are not adequate?

3. MONITORING

- a. Has a senior officer in the Directorate of Medical and Health Service been identified to look after exclusively the problems of flood prone areas during the flood session?
- b. Have such officers been earmarked at the District and the Block levels?
- c. Have such arrangements been made for feedback information from Health Centres to the Block, District and State Headquarters for periodical assessment of this situation and the availability of staff and stock position?
- d. Do arrangements exist to report from the treatment centres to higher levels about any rise in the incidence of gastroenteritis, dysentery, cholera, jaundice and polio?

NODAL DEPARTMENTS OF DIFFERENT DISASTERS

NAME OF DISASTER	NODAL DEPARTMENT
I Water and Climate Disasters 1. Floods and Drainage Management 2. Cyclones 3. Tomadoes and Hurricanes 4. Hailstorm 5. Cloud Burst 6. Thunder and Lightening 7. Snow Avalanches 8. Heat Wave and Cold Wave 9. Sea Erosion 10. Droughts	Relief Department
II Geologically related Disasters 1. Earthquakes 2. Landslides and Mudflows 3. Dam Bursts 4. Mine Fires	Relief Departments Irrigation Department Mines Department
III Chemical, Industrial & Nuclear Disasters 1. Chemical and Industrial Disasters 2. Nuclear Disasters	Secretary Industries Home Department (Civil Defence
IV Accident related Disasters 1. Urban fires 2. Village Fire 3. Forests Fire 4. Electrical Disasters & Fires 5. Serial Bomb Blasts 6. Oil Spill 7. Festival related Disasters 8. Air, Road, & Rail Accidents 9. Boat Capsizing 10. Mine Flooding 11. Major Building Collapse	UDH Department Revenue Department Forest Department Energy Department Home Department Home Department Home Department Revenue Department Mines Department PWD Department
V Biologically related Disasters 1. Biological Disasters and Epidemics 2. Pest Attacks 3. Cattle Epidemics 4. Food Poising	Medical & Health Deptt. Agriculture Department A.H. Department Medical & Health Deptt.

ANNEXURE-XI

RIVER SUB BASIN IN RAJASTHAN

S.No.	Basin	Area(Sq.Km)
1	2	3
A. CHAMBAL VALLEY (25792 Sq.Kms.)		
1.	Chambal	2079
2.	Eru	358
3.	Alnia	543
4.	Chooti Kalisindh	384
5.	Parwan	2995
6.	Kalisindh	7314
7.	Mej	5606
8.	Chakan	881
9.	Parwati	4941
10.	Kunu	691
B. BANAS VALLEY (48264 Sq Kms.)		
11.	Banas I (Upto Khakunda site)	6019
12.	Berach	8451
13.	Kothari	2294
14.	Banas II	5988
15.	Khari	6658
16.	Dia	2957
17.	Sohadra	1523
18.	Mashi	6920
19.	Dheel	791
20.	Morel	5921
21.	Kalisil	742
C. PARBATI VALLEY (1876 Sq Kms)		
22.	Parbati	1876
D. BANGANGA VALLEY (6669 Sq. Kms.)		
23.	Banganga	6669
E. GHAMBHIR VALLEY (4371 Kms)		
24	Ghambir	4731
F. RUPARAIL VALLEY (3109 Sq. Kms.)		
25	Ruparail	3109
G. SABI VALLEY (4513 Sq. Kms.)		
26	Sabi	4513
H. MAHI VALLEY (16759 Sq. Kms.)		
27	Mahi	16759
28	Jakham	2430
29	Som	6060
30	Maran	1000
31	Anas	1419

I. SABARMATI VALLEY (4246 Sq. Kms.)		
32	Sabarmati	4246
33	Sei	790
34	Wakal	1999
35	Bhadar Vartak	1037
J. WEST BANAS VALLEY (1846 Sq. Kms.)		
36	West Banas	1848
K. LUNI VALLEY (34598 Sq. Kms.)		
37	Joari	4808
38	Luni River I (Origin to Jaswant Sagar)	3866
39	Luni River II (Jaswant Sagar to Nakoda)	4234
40	Luni River III (Nakoda to Chitawana)	1718
41	Guhiya	3796
42	Sukri River	1254
43	Bandi Hemawas	1485
44	Sukri with Other Nalla's	1331
45	Sukri River (Upto Bankli Bund)	1592
46	Mithri	1290
47	Jawai	3210
48	Sukri River	1201
49	Khari River	2478
50	Bandi River	932
51	Sagi River	937
L. SUKLI VALLEY (935 Sq. Kms.)		
52	Sukli	935
M. OTHER NALLAH'S OF JALORE DISTRICT (466 Sq. Kms.)		
53	Other Nallah of Jalore District	466
N. SHEKHAWATI VALLEY (9224 Sq. Kms.)		
54	Dohan	981
55	Nawalgarh	474
56	Krishnawati	319
57	Ranoli	486
58	Mendha	4186
59	Kantli	2778
O. INLAND (2778 Sq. Kms.)		
60	Inland	2778
	TOTAL	342239

**STATEMETN SHOWING MAXIMUM & MINIMUM
RAINFALL DATA PAST 100 YEARS**

S. No.	Name of Station	Normal Rainfall(mm)	Maximum Rainfall(mm)	Minimum Rainfall(mm)	Actual Rainfall(mm)
1.	Jaipur	603.8	1317.2	120.1	807.0
2.	Dausa	561.0	1363.2	134.9	504.0
3.	Alwar	657.3	1444.5	198.6	416.0
4.	Bharatpur	663.9	1383.0	211.8	635.0
5.	Dholpur	744.5	1371.7	292.6	773.0
6.	Karauli	704.9	1326.4	181.7	577.0
7.	Sawai Madhopur	873.4	2410.2	199.9	985.0
8.	Tonk	668.3	1507.5	168.7	699.0
9.	Ajmer	514.1	1226.8	149.3	377.4
10.	Sikar	440.3	1095.8	152.0	272.0
11.	Jhunjhunu	405.1	766.3	92.7	202.0
12.	Bhilwara	683.2	1303.8	317.0	922.0
13.	Chittorgarh	841.5	1533.7	286.7	877.0
14.	Kota	771.7	1593.1	171.7	572.0
15.	Bundi	773.4	1533.1	275.5	848.0
16.	Jhalawar	975.0	1698.3	375.0	956.0
17.	Baran	873.8	1537.4	251.2	715.0
18.	Sirohi	591.2	1577.6	139.9	386.0
19.	Rajsamand	567.8	1001.9	214.0	462.0
20.	Udaipur	645.3	1222.8	206.0	567.0
21.	Dungarpur	728.9	1800.5	269.4	675.0
22.	Banswara	950.3	1997.0	545.7	1383.0
23.	Bikaner	295.4	771.0	32.0	96.0
24.	Churu	354.7	1072.5	77.2	292.0
25.	Sri Ganganagar	226.4	666.0	71.8	130.0
26.	Jodhpur	360.7	1176.0	37.9	182.0
27.	Jalore	370.0	1047.4	27.3	314.2
28.	Barmer	365.7	940.0	28.7	220.0
29.	Nagaur	311.7	1259.0	63.0	273.0
30.	Jaisalmer	185.5	578.4	26.4	47.3
31.	Pali	424.4	1022.4	78.8	229.0
32.	Hanumangarh	273.5	844.0	59.5	241.0