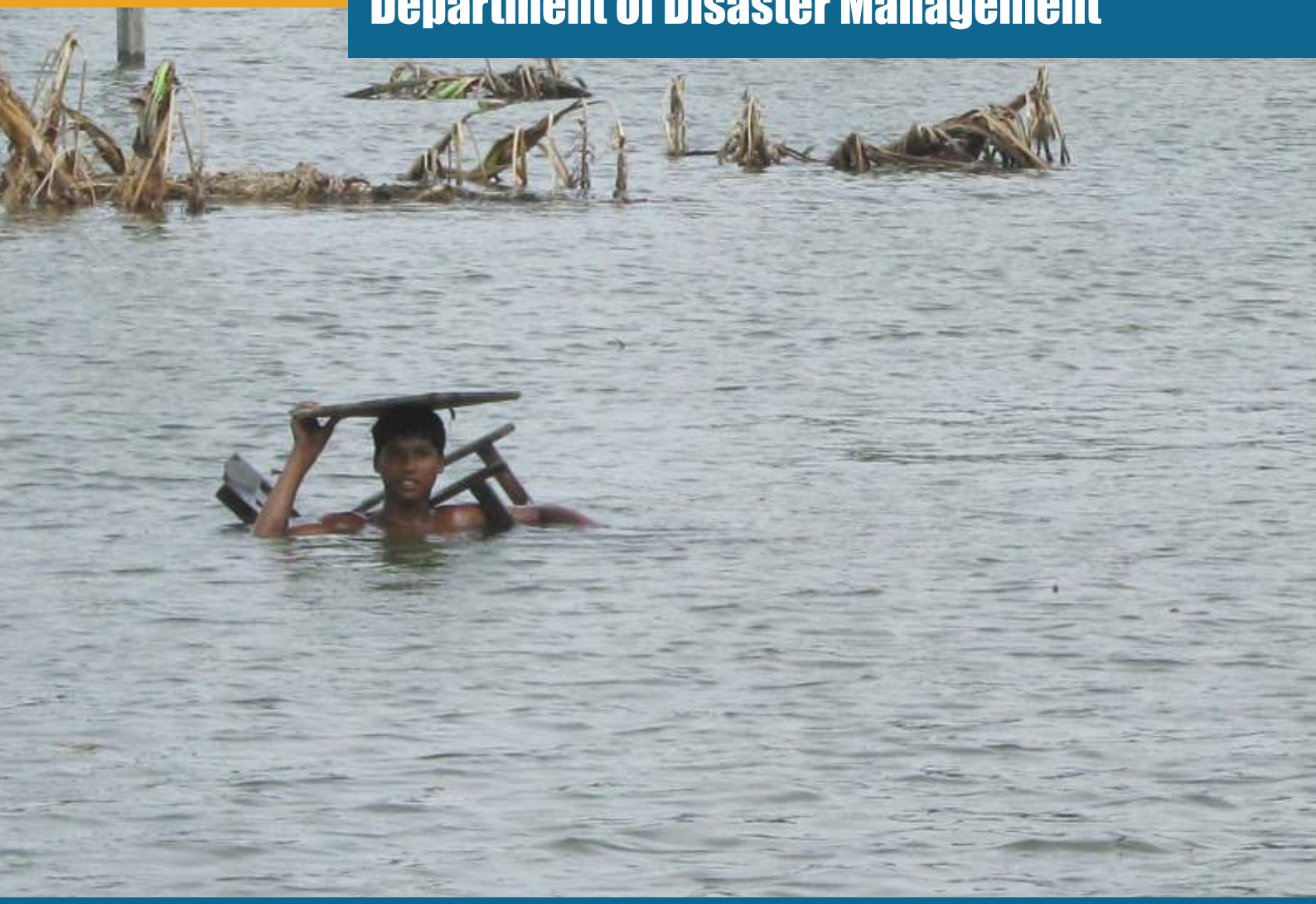
WEST BENGAL

DISASTER MANAGEMENT PLAN 2014

Department of Disaster Management



DRAFT

WEST BENGAL

DISASTER MANAGEMENT PLAN 2014

PART 1

Department of Disaster Management

FOREWORD

Different parts of West Bengal are vulnerable to the natural calamities like Flood, Cyclonic Storms, Earthquake, Landslide, Drought and Embankment Erosion. In fact there are multiple High Risk Multi Hazard Zones.

Apart from these natural hazards there are chances of man-made disasters like major fire, industrial accidents, terrorist attacks etc.

West Bengal has 18 Districts covering 66 Sub-divisions, 341 Blocks and 3,354 Gram Panchayats. The total area of the state is 88,752 sq Km having a dense population of more than 80 million people of which about 72% live in the rural areas and the population density is 1,029 per square kilometer.

This State DM Plan, West Bengal, has been prepared in the context of natural disasters. This Plan should be useful to tackle the multi-hazard vulnerabilities and should be based on the factors like ever-growing population, the vast disparities of income, rapid urbanisation, increasing industrialization, development within high risk zones, environmental degradation, climate change, state and national security, economy and sustainable development.

The objective of the State Disaster Management Plan, West Bengal is to facilitate execution of activities for prevention and preparedness, operations, coordination, and community awareness and involvement.

In preparing the Plan, the existing system has been studied; the prevailing documents and various stakeholders were consulted.

The framework of the plan is based on the paradigm shift in DM from a relief centric approach to a regime that anticipates the importance of preparedness, prevention and mitigation. The team has followed the guidelines for preparing State Disaster Management Plans issued by the National Disaster Management Authority and various State Government's Disaster Management Plans. It may be noted that West Bengal is the only State where there is a separate Department of Disaster Management and Officers are deployed up to Block level. All the activities of WBSDMA have been carried out through the Department Disaster Management up to the Grass root level.

This Plan document consists of two volumes. Book I contains the Introduction and a Chapter on Vulnerability Assessment and Risk Analysis. Book II contains the chapters on actionable items. The softcopy of the document is also provided for reference. Some of the tables have been fragmented because of inadequate paper width. However, the EXCELL Sheets for the tables have been provided with the softcopy.

INDEX

Chapter 1: Introduction	6 -21
Chapter 2 :Hazard, Risk and Vulnerability profile of West Bengal	22- 49
Chapter 3:prevention And Mitigation Measures	50 -93
Chapter 4: Mainstreaming DM Concerns Into Developmental Plans / Programmes / Projects	94 -102
Chapter 5: Preparedness Measures	104 -122
Chapter 6 : Disaster Response	124 -145
Chapter 7:Partnership with Other Stakeholders	146 -151
Chapter 8: Reconstruction, Rehabilitation And Recovery Measures	152 -155
Annexure-1: Abbreviation	156 -158
Annexure-2: List of Codes of Buildings for safety	159 -162
Annexure-3: IRC Code	163 -164
Annexure 4 : Dos and Don'ts	165 -170
Annexure-5: Important Contact No. (DMD)	171 -172
Annexure-6: DMD Field Organisations	173 -176
Annexure-7: Contact no INCOIS	177
Annexure-8: Contact No of National Organisations	177-178
Annexure-9: Contact no. of DMs and Sps	179 -181
Annexure-10: Contact Numbers of ADM(DM)s and DDMOs	181 -182
Annexure-11: Flow Chart of Distribution of Relief Articles	182

CHAPTER I
INTRODUCTION

This plan will be known as "West Bengal State Disaster Management plan" and will be applicable in state of West Bengal.

Different parts of West Bengal are vulnerable to the natural calamities like Flood, Cyclone, hailstorm - kalbaishakhi, Earthquake, Landslide, Drought and Erosion. In fact there are multiple High Risk Multi Hazard Zones.

Apart from these natural hazards there are chances of man-made disasters like major fire, industrial accidents, terrorist attacks etc.

West Bengal has 19 Districts covering 66 Sub-divisions, 341 Blocks, 127 Municipalities, 3,354 Gram Panchayats, 40,782 Mauzas, 37,945 inhabited villages, 375 towns and 463 Police Stations (includes 42 G.R.P. for Sealdah, Howrah and Siliguri). The total area of the state is 88,752 sq km having a dense population of more than 80 million people of which about 72% live in the rural areas covering 85,427.26 sq Km, i.e., 96% of the total geographical area and the population density is 1,209 per square kilometer.

This plan is being formulated in the context of both natural and man-made disasters to tackle the multi-hazard vulnerabilities and is based on the factors like ever-growing population, the vast disparities of income, rapid urbanisation, increasing industrialisation, development within high risk zones, environmental degradation, climate change, state and national security, economy and sustainable development.

1.1 Vision:

The vision is to build a safer and disaster resilient State by developing a holistic, proactive, multi-disaster and technology driven strategy for DM. This will be achieved through a culture of prevention, mitigation and preparedness to reduce the impact of disasters on people.

"To build a safer and disaster resilient West Bengal"

1.2 Policy:

Saving of human lives will be the highest priority; however the plan will also address minimum loss of property and environment.

1.3 Theme:

The central themes of this State DM Plan are as follows:

- To study the vulnerability of different parts of the state to different kinds of disasters
- The measures to be adopted for prevention and mitigation of disasters.
- The manner in which mitigation measures shall be integrated with development plans and projects, i.e., mainstreaming of Disaster Management.
- The capacity building and preparedness measures to be taken.
- The roles and responsibilities of each department of the government of the state in relation to the measures specified above.
- The roles and responsibilities of different departments of the government of the state in responding to any threatening disaster situation or disaster.
- Methodologies for the annual review and updating of the state plan.
- Appropriate provisions for financing the measures to be carried out under the state government.
- Availability to the departments of the government of the state and provision and methodology of such departments to draw up their own plans in accordance with the state plan.

1.4 Objectives and Goal of the Plan:

Section 31 of National DM Act 2005, makes it mandatory to have a disaster management plan for every State. SDMP shall include Hazard Risk and Vulnerability Analysis (HRVA), prevention, mitigation, preparedness measures, response plan and procedures. An indicative list with possible plan objectives is given below:

- To identify the areas vulnerable to major types of the hazards in the State.
- To adopt proactive measures at State level by all the govt. departments to prevent disaster and mitigate its effects.
- To define and assign the different tasks and responsibilities to stakeholders during the pre-disaster and post-disaster phases of the disaster.
- To enhance disaster resilience of the people in the State by way of capacity building.
- Reduce the loss of public and private property, especially critical facilities and infrastructure, through proper planning.
- Manage future development to mitigate the effect of natural hazards in the State.
- To set up an Emergency Operations Centre at the State level to function effectively in search, rescue, response.

- To develop the standardized mechanism to respond to disaster situation to manage the disaster efficiently.
- To set up the early warning system so as to prepare the community to deal with the disaster and responsive communication system based upon fail-proof proven technology.
- To prepare the response plan based upon the guidelines issued in the State Disaster Management Plan so as to provide prompt relief, rescue and search support in the disaster affected areas.
- To adopt disaster resilient construction mechanism in the State by way of using Information, Education and Communication for making the community aware of the need of disaster resilient future development.
- To make the use of media in disaster management.
- Rehabilitation plan of the affected people and reconstruction measures to be taken by different govt. departments at State level and local authority.

The State Disaster Management Plan (SDMP) is the guide for achieving the objective mitigation, preparedness, response and recovery.

1.5 Scope of the Plan:

The State DM Plan provides a consistent, statewide framework to enable state, local, governments, Central government and the private sector to work together to mitigate, prepare for, respond to and recover from the effects of emergencies regardless of cause, size, location, or complexity. In accordance with the NDMA / SDM Act (if any), this plan is in effect at all times and applies to all levels of state government and its political subdivisions/Tehsils/Blocks/Villages. The plan incorporates and complies with the principles and requirements found in National and state laws, regulations and guidelines.

The scope is applicable to the whole Geographical Jurisdiction of West Bengal and it includes Corporation, Municipality, Sub Division, Block including three tier Panchayati Raj System upto Gram Sansad level. The Plan is applicable to all the Departments of West Bengal.

1.6 Authority and Reference:

Under Section 23(1) of the DM Act 2005 - it is mandatory for every state to have a State Disaster Management Plan (SDMP) which shall be prepared by State Executive Committee and approved by the State Authority.

- **West Bengal Disaster Manual, 2011**

The Government of West Bengal had published a Manual for Relief of Distress in the year 1959. That Manual was a significant step forward from the Bengal Famine Code, 1913 and the Bengal Famine Manual, 1941. Distress of the people arising out of scarcity of food was aimed to be reduced by application of new methodologies. It basically centered on crisis management by the State Government along with normal social welfare activities. Time has changed, compelling the Government sector to switch over from crisis management attitude to both risk management and crisis management. The importance of risk management has been highlighted by events like Orissa Super Cyclone, 1999, Bhuj Earthquake, 2001 and Tsunami, 2004. Unless preparedness measures have been mainstreamed in development activities and everyday activities of the Government, natural calamities which have always been increasing in number and intensity, will destabilise the civilisation. The State Government has already finalized State Disaster Management Policy. It is necessary to provide a suitable handbook to the practitioners of disaster management in the public sector as guide within a set parameter.

1.7 Plan Development:

As per the Section 23(2) of the DM Act, the State Plan is to be prepared by the State Executive Committee (SEC) having regard to having regard to the guidelines laid down by the National Authority and after such consultation with local authorities, district authorities and the people's representatives as the State Executive Committee may deem fit.

The State Plan prepared by the State Executive Committee under subsection (2) shall be approved by the State Authority. Steps in a collaborative planning process while developing State Plan included formation of core team, understand hazards, vulnerabilities and risk foot prints of the State, plan development (develop and analyse course of action, identify resources, identify information needs), plan preparation (write, review, approve and disseminate), Plan implementation and maintenance (exercise, review, revise and maintain).

1.8 Institutional Arrangements, Roles and Responsibilities

The Disaster Management Act 2005 provides the legal and institutional framework for disaster management in India at the national, state and district levels. In the National polity of India the primary responsibility of disaster management vests with the State Governments. The Central Government lays down policies and guidelines and provides technical, financial and logistic support while the district administration carries out most of the operations in collaboration with central and state level agencies.

1.8.1 SDMA:

Section 14 of NDM Act 2005 mandates each State to establish State Disaster Management Authority (SDMA). At the State Level the State Disaster Management Authority (SDMA), headed by the Chief Minister, lays down policies and plans for disaster management in the State. It is also responsible to coordinate the implementation of the State Plan, recommend provision of funds for mitigation and preparedness measures and review the developmental plans of the different departments of the State to ensure integration of prevention, preparedness and mitigation measures. The Chairperson of the State Authority shall, in the case of emergency, have power to exercise all or any of the powers of the State Authority but the exercise of such powers shall be subject to ex post facto ratification of the State Authority.

Powers and functions of State Authority

a) lay down the State disaster management policy;
b) approve the State Plan in accordance with the guidelines laid down by the National Authority;
c) approve the disaster management plans prepared by the departments of the Government of the State;
d) lay down guidelines to be followed by the departments of the Government of the State for the purposes of integration of measures for prevention of disasters and mitigation in their development plans and projects and provide necessary technical assistance therefor;
e) coordinate the implementation of the State Plan;
f) recommend provision of funds for mitigation and preparedness measures;
g) review the development plans of the different departments of the State and ensure that prevention and mitigation measures are integrated therein;
h) Review the measures being taken for mitigation, capacity building and preparedness by the departments of the Government of the State and issue such guidelines as may be necessary.

West Bengal State Disaster Management Authority

- Honorable Chief Minister, West Bengal-Chairperson
- Minister-in-Charge, Department of Disaster Management, WB- Vice Chairperson
- Minister-in-Charge, Finance Department
- Minister-in-Charge, Department of Health and Family Welfare
- Minister-in-Charge, Department of Irrigation & Waterways
- Minister-in-Charge, Department of Public Works Department
- Minister-in-Charge, Department of Agriculture
- Minister-in-Charge, Food & Supplies Department
- Minister-in-Charge Department of Power
- Chief Secretary to the Government of West Bengal &Chief Executive Officer Ex-Officio

1.8.2 State Executive Committee:

The State Executive Committee under with State CS as Chairperson (ex officio) and four Secretaries to the Government of the State of such departments as the State Government may think fit, ex officio members.

Formation/ Composition of West Bengal SEC :

- The Chief Secretary to the Government of West Bengal.- Ex-officio Chairperson
- The Secretary Home Department.- Member.
- The Secretary Finance Department.- Member.
- The Secretary Irrigation & Waterways Department.- Member.
- The Secretary Disaster Management Department.- Member.

Functions of the State Executive Committee:

(1) The State Executive Committee shall have the responsibility for implementing the National Plan and State Plan and act as the coordinating and monitoring body for management of disaster in the State.

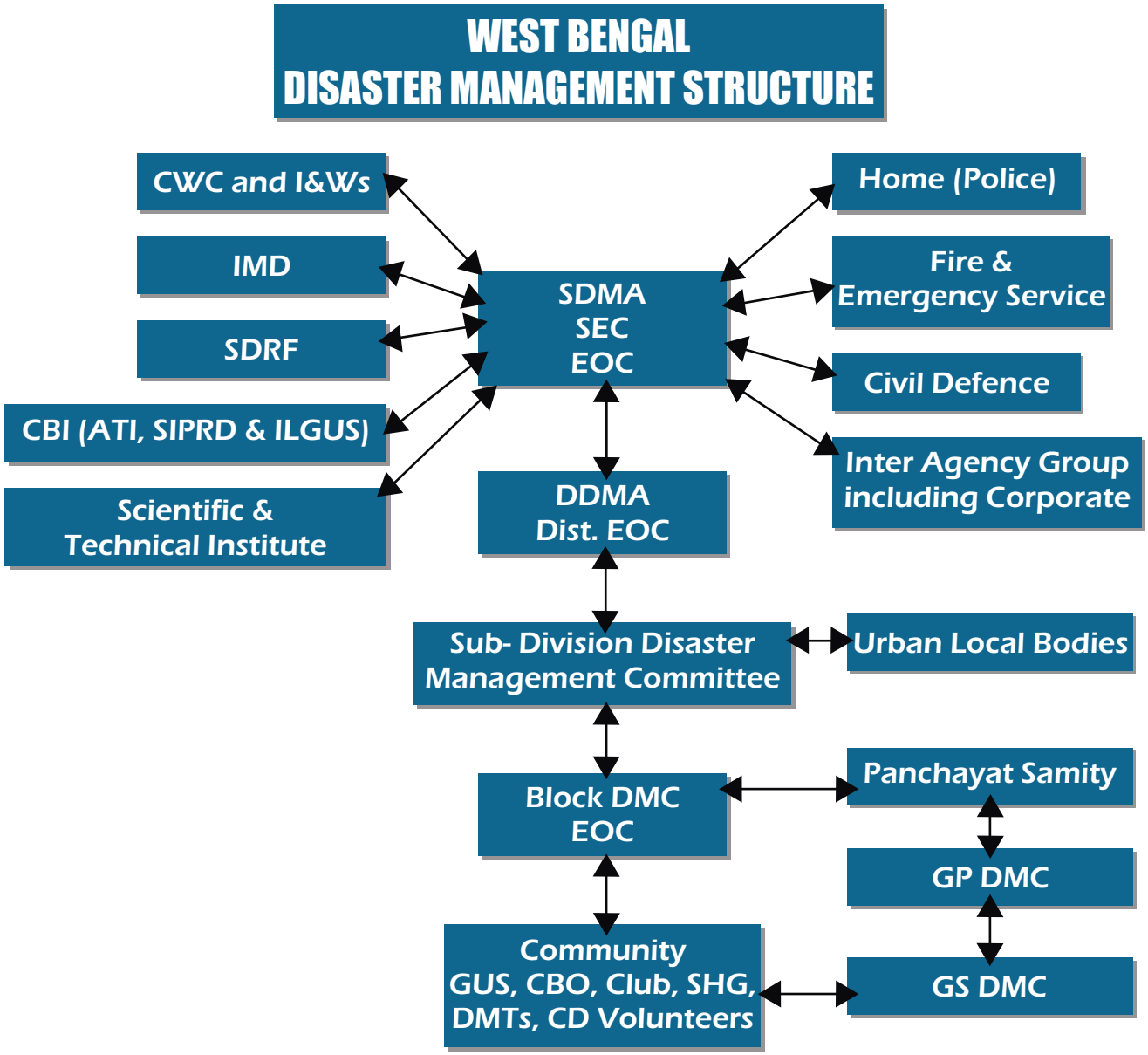
(2) Without prejudice to the generality of the provisions of subsection (1), the State Executive Committee may-

(a) coordinate and monitor the implementation of the National Policy, the National Plan and the State Plan;

(b) examine the vulnerability of different parts of the State to different forms of disasters and specify measures to be taken for their prevention or mitigation;

(c) lay down guidelines for preparation of disaster management plans by the departments of the Government of the State and the District Authorities;

(d) monitor the implementation of disaster management plans prepared by the departments of the Government of the State and District Authorities;
(e) monitor the implementation of the guidelines laid down by the State Authority for integrating of measures for prevention of disasters and mitigation by the departments in their development plans and projects;
(f) evaluate preparedness at all governmental or non-governmental levels to respond to any threatening disaster situation or disaster and give directions, where necessary, for enhancing such preparedness;
(g) coordinate response in the event of any threatening disaster situation or disaster; (h) give directions to any Department of the Government of the State or any other authority or body in the State regarding actions to be taken in response to any threatening disaster situation or disaster;
(h) promote general education, awareness and community training in regard to the forms of disasters to which different parts of the State are vulnerable and the measures that may be taken by such community to prevent the disaster, mitigate and respond to such disaster;
(j) Advice, assist and coordinate the activities of the Departments of the Government of the State, District Authorities, statutory bodies and other governmental and non-governmental organisations engaged in disaster management;
(k) Provide necessary technical assistance or give advice to District Authorities and local authorities for carrying out their functions effectively;
(l) Advise the State Government regarding all financial matters in relation to disaster management;
(m) Examine the construction, in any local area in the State and, if it is of the opinion that the standards laid for such construction for the prevention of disaster is not being or has not been followed, may direct the District Authority or the local authority, as the case may be, to take such action as may be necessary to secure compliance of such standards;
(n) Provide information to the National Authority relating to different aspects of disaster management; National Authority relating to different aspects of disaster management;
(o) lay down, review and update State level response plans and guidelines and ensure that the district level plans are prepared, reviewed and updated;
(p) Ensure that communication systems are in order and the disaster management drills are carried out periodically;
(q) Perform such other functions as may be assigned to it by the State Authority or as it may consider necessary.


WEST BENGAL
DISASTER MANAGEMENT STRUCTURE
CWC and I&Ws
IMD
SDRF
CBI (ATI, SIPRD & ILGUS)
Scientific & Technical Institute
SDMA
SEC
EOC
DDMA
Dist. EOC
Home (Police)
Fire & Emergency Service
Civil Defence
Inter Agency Group including Corporate
Sub- Division Disaster Management Committee
Urban Local Bodies
Block DMC
EOC
Panchayat Samity
GP DMC
GS DMC
Community
GUS, CBO, Club, SHG,
DMTs, CD Volunteers

1.8.3 State Disaster Response Force (SDRF):

States are encouraged to create response capabilities from within their existing resources. To start with, each State may aim at equipping and training a few companies in smaller states or one battalion equivalent force in the case of bigger states. They will also include women members for looking after the needs of women and children. NDRF battalions and their training institutions will assist the States/UTs in this effort. The States/UTs will also be encouraged to include DM training in the basic and in-service courses of their respective Police Training Colleges for gazetted and non-gazetted police officers.

- **Status of Constitution of State Disaster Response Force:** Seven Companies from West Bengal SAP Battalion and three from Kolkata Police have been working as State Disaster Response Force (SDRF). These companies of SAP Bns. are currently located at Raiganj, Barrackpore, Krishnagar, Siliguri and Barjora. Three Company strength of Disaster Management Group (DMG) of Kolkata Police has been operating in Kolkata with full equipments. Both State and Kolkata Police Search and Rescue teams have been equipped. Further fund is being provided for strengthening the teams and equipping more teams. The following table depicts the features of SDRF and DMG, Kolkata.

Date of Constitution	Number of Companies	Number of personnel	Location
SDRF from West Bengal State Armed Police (SAP)			
Police Order No. 16/2009 & 01/2013 dated 18.01.2013	07	Each company comprises 81 police personnel i.e. Total: 567	1. SAP 4th Bn. Kasba, Raiganj 2. SAP 6th Bns. Barrrackpore 3. SAP 8th Bn. Barrackpore 4. SAP 7th Bn. Asansol 5. SAP 9th Bn. Sandhya, Krishnagar 6. SAP 10th & 12th Bns. Siliguri 7. SAP 13th Bn. Barjora, Bankura
Disaster Management Group under Kolkata Police			
14.05.2002	1. Water Wing 2. CSSSR & MFR Wing 3. Tree Cutting Team	Inspector 01, Subedar 02, ASI 03, Sepoy 78, HG 65, GP 27 Total - 176	Police Training School (PTS) 247 AJC Bose Road, Kolkata - 7000278

1.8.4 State Emergency Operation Centre (EOC):

EOC is an off-site facility functioning from State / District HQ. The EOC will take stock of the emerging situation and assist the incident managers in mobilising the respective line department's resources, manpower and expertise along with appropriate delegated authorities for the on-scene actions / response. State EOC will keep the DEOC and field EOC informed of the changing situation and support extended. Emergency communication, SMS alert and warning system, decision support system, and resources management system are few of critical components inbuilt into State EOC infrastructures. The basic functions of EOC, derived on the basis of functional framework of disaster management would be to:

- Receive, monitor, and assess disaster information.
- Keep track of available resources.
- Monitor, assess, and track response units and resource requests.
- Manage resource deployment for optimal usage.
- Make policy decisions and proclaim local emergencies as needed.
- Provide direction and management for EOC operations through Standard Operations Guide (SOG), set priorities and establish strategies.
- Coordinate operations of all responding units, including law enforcement, fire, medical, logistics etc.
- Augment comprehensive emergency communication from EOC to any field operation when needed or appropriate.
- Maintain EOC security and access control.
- Provide recovery assistance in response to the situations and available resources
- Keep senior, subordinate and tenant officials informed.
- Keep local area (Village/town/City, district and State) informed.
- Operate a message centre to log and post all key disaster information.
- Develop and disseminate public information warnings and instructions.
- Provide information to the news media.
- Manage donation / aids.

State EOC is seamlessly connected with National EOC on up-stream and with all District EOC on downstream.

1.9 Metropolitan Cities and Towns

Towns and cities in India are managed by a variety of elected urban local bodies. Therefore, the response structure for disaster management, too, varies from city to city. Thus, in the:

1) Towns managed by a municipality, disaster response is primarily handled by the district administration – as head of the DDMA, the District Magistrate is responsible for response and relief in the aftermath of a disaster.
2) cities managed by municipal corporation, the Municipal Commissioner is responsible for managing disasters in the whole municipal area – the District Magistrate/Deputy Commissioner as head of the DDMA coordinates response and relief within the jurisdictional limits of the district. In such situations, the Divisional Commissioner coordinates among the affected districts and works closely with the Municipal Commissioner.
3) Some metropolitan cities, the elected Mayor of the city is responsible for coordinating response and relief – the Municipal Commissioner and Police Commissioner render support, while the District Magistrate/Deputy Commissioner is responsible for response and relief within his jurisdiction.

Most of the town and cities of West Bengal have prepared City Disaster management Plan in consultation with SDMA & respective DDMA and review such plans annually. DDMP have town/ city DMPs annexed to it.

1.10 District Disaster Management Authority (DDMA):

Each DDMA will be headed by the respective District Magistrate, District Collector (DC), Dy. Commissioner as the case may be, with the elected representative of the Local Authority as the Co-Chairperson. DDMA will act as the planning, coordinating and implementing body for DM at District level and take all necessary measures for the purposes of DM in accordance with the Guidelines laid down by the NDMA and SDMA. It will, inter alia, prepare the District DM plan for the District and monitor the implementation of the National Policy, the State Policy, the National Plan, and the State Plan concerning its own District and prepare the District Plan. The DDMA will also ensure that the Guidelines for prevention, mitigation, preparedness and response measures lay down by NDMA and SDMA are followed by all Departments of the State Government, at the District level and the Local Authorities in the District.

1.11 Local Authorities:

Local Authorities would include Panchayati Raj Institutions (PRIs), Municipal Corporations, Municipalities, District and Cantonment Boards and Town Planning Authorities which control and manage civic services. These bodies will prepare DM Plans in consonance with the Guidelines of NDMA, SDMAs and DDMAs and will ensure capacity building of their officers and employees for managing disasters, carry out relief, rehabilitation and reconstruction activities in the affected areas.

1.12 Trust / Organisations managing Places of Worships & Congregation:

Each establishment / organisation identified as "critical infrastructure and key resource", including places of congregation in the state of West Bengal prepare and implement "on-site" and "off-site" Disaster Management Plan in consultation with respective DDMA. Carry out mitigation, response, relief, rehabilitation and Reconstruction activities.

1.13 Private Sector:

- The private sector is being encouraged to ensure their active participation in the pre-disaster activities in alignment with the overall plan developed by the SDMA
- They adhere to the relevant rules regarding prevention of disasters, as may be stipulated by relevant authorities in the State.
- As a part of CSR undertakes DRR projects in consultation with State / District Authority for enhancing State's resilience.

1.14 Community Groups and Volunteer Agencies:

- Local community groups and voluntary agencies including NGOs normally have active role in prevention and mitigation activities under the overall direction and supervision of the SDMA or DDMA.
- They should be encouraged to participate in all training activities as may be organized and should familiarise themselves with their role in State disaster management.

1.15 Citizens:

It is the duty of every citizen to assist the State agency engaged in disaster management whenever demanded generally for the purpose of disaster management.

1.16 Concept of Operation:

- Section 31 of DM Act 2005 makes it mandatory for every State to prepare a disaster management plan, for the protection of life and property from the effects of hazardous events within the State.
- In significant emergencies or disasters, District Magistrate or the chairperson of DDMA will have the powers of overall supervision and direction control as may be specified under State Government Rules / State Disaster Management Plan guidelines.
- The State EOC will be staffed and operated as the situation dictates. When activated, operations will be supported by senior officers from line departments and central government agencies; private sector and volunteer organizations may be used to provide information, data and resources to cope with the situation.
- The Chairman of SDMA may recommend for action under Sec 24 of DM Act.
- Facilities that have been identified as vital to operation of the State government functions have been identified.
- The District Magistrate or his representative will coordinate and control resources of the State.
- Emergency public information will be disseminated by all available media outlets through the designated media and information officer.
- Prior planning and training of personnel are prerequisites to effective emergency operations and must be considered as integral parts of disaster preparations.
- Coordination with surrounding States is essential when an event occurred have impacts beyond State boundaries. Procedure should be established and exercised for inter State collaboration.
- Departments, agencies and organisations assigned either primary or supporting responsibilities in this document must develop implementation documents in order to support this plan.
- When local resources prove to be inadequate during emergency operations, request for assistance will be made to the State or higher levels of government and other agencies in accordance with set rules and procedures.
- State authority will use normal channel for requesting assistance and/or resources, i.e., through the State Emergency Operations Center (DEOC) to the State EOC. If state resources have been exhausted, the state will arrange to provide the needed resources through central assistance.
- The State EOC will coordinate with the other State's EOC, National EOC, Agencies of the Govt. of India like IMD / CWC to maintain upto-date information concerning potential flooding, cyclones etc. As appropriate, such information will be provided to the citizens

of the affected areas in the State.

- Upon receipt of potential problems in these areas, DEOC / designated official will appropriately issue alert and notify action to be taken by the residents.
- Disaster occurrence could result in disruption of government functions and, therefore, all levels of local government and their departments should develop and maintain procedures to ensure continuity of Government action.

It is necessary that for activation of the agencies involved in the disaster management, the institutional trigger mechanism should be there so that every agency takes its assigned role at the time of such disaster. There will be three types of the Trigger mechanism set up depending upon the warning signals availability as mentioned below:

1.17 Plan Implementation and Maintenance:

Training- After developing a plan, it must be disseminated and managers must be required to train their personnel so that they have the knowledge, skills and abilities needed to perform the tasks identified in the plan. Personnel should also be trained on the organization-specific procedures necessary to support those plan tasks.

Exercise the Plan - Evaluating the effectiveness of plan involves a combination of training events, exercises and real-world incidents to determine whether the goals, objectives, decisions, actions and timing outlined in the plan led to a successful response. The purpose of an exercise is to promote preparedness by testing polices plans and training personnel.

Revise and Maintain - Planning teams should establish a process for reviewing and revising the plan. Reviews should be a recurring activity. Review on an annual basis is considered minimum. This should be mandatory to consider reviewing and updating the plan after the following events:

- A major incident.
- A change in operational resources (e.g., policy, personnel, organizational structures, Management processes, facilities, equipment).
- A formal update of planning guidance or standards.
- Each activation.
- Major exercises.
- A change in the State's demographics or hazard or threat profile.
- The enactment of new or amended laws or ordinances.

The responsibility for the coordination of the development and revision of the basic plan, annexes, appendices and implementing instructions must be assigned to the appropriate person(s).

It is recommended that a SDMP be **internally reviewed on a yearly basis** and either be updated or reaffirmed. The updates or reaffirmed document may also be used to summarize the accomplishments of the past year and help the administration to prioritize mitigation goals for the next year.

1.18 Financial Arrangements:

To ensure the long-term sustenance and permanency of the organisation funds would be generated and deployed on an ongoing basis. There are different ways to raise the fund in the State as described below;

1.18.1 State Budget:

The Department/Authority, submit to the State Government for approval a budget in the prescribed form for the next financial year, showing the estimated receipts and expenditure, and the sums which would be required from the State Government during that financial year. As per the provisions of The West Bengal State Disaster Management Act, 2007 the Department/Authority may accept grants, subventions, donations and gifts from the Central or State Government or a local authority or any individual or body, whether incorporated or not.

1.18.2 State Disaster Response Fund:

To carry out Emergency Response & Relief activities after any disaster the State Disaster Response Fund is made available to the Relief Commissioner, Department of Disaster Management under which the Central Government will share 75% and the Govt. of West Bengal has to share 25% as per the recommendation of 13th Finance Commission.

The available SDRF for West Bengal for year 2010 2015 **is Rs. 2,774.54 crore out of which Central share will be Rs. 2,080.90 crore and State share will be Rs. 693.64 crore.**

1.18.3 Grant in Aid :

Further State may receive a grant in aid from Central Govt., World Bank and/or other departments/agencies to carry out specific projects/schemes related to disaster management/ mitigation/ capacity building.

1.18.4 Partnerships:

There are projects/schemes in which funding can be done by a public sector authority and a private party in partnership (also called on PPP mode funding). In this State Govt. along with Private organizations and with Central Govt. share their part.

In addition, West Bengal Inter Agency Group (WB-IAG), a forum of GO-UN-NGO organasations exists in the state. In collaboration with IAG the State Government Carry forward various capacity building and awareness activities across the state.

1.18.5 Loan:

The Disaster Management Department/Authority may borrow money from the open market with the previous approval of State government to carry out disaster management functions as described in DM Act 2005.

CHAPTER 2

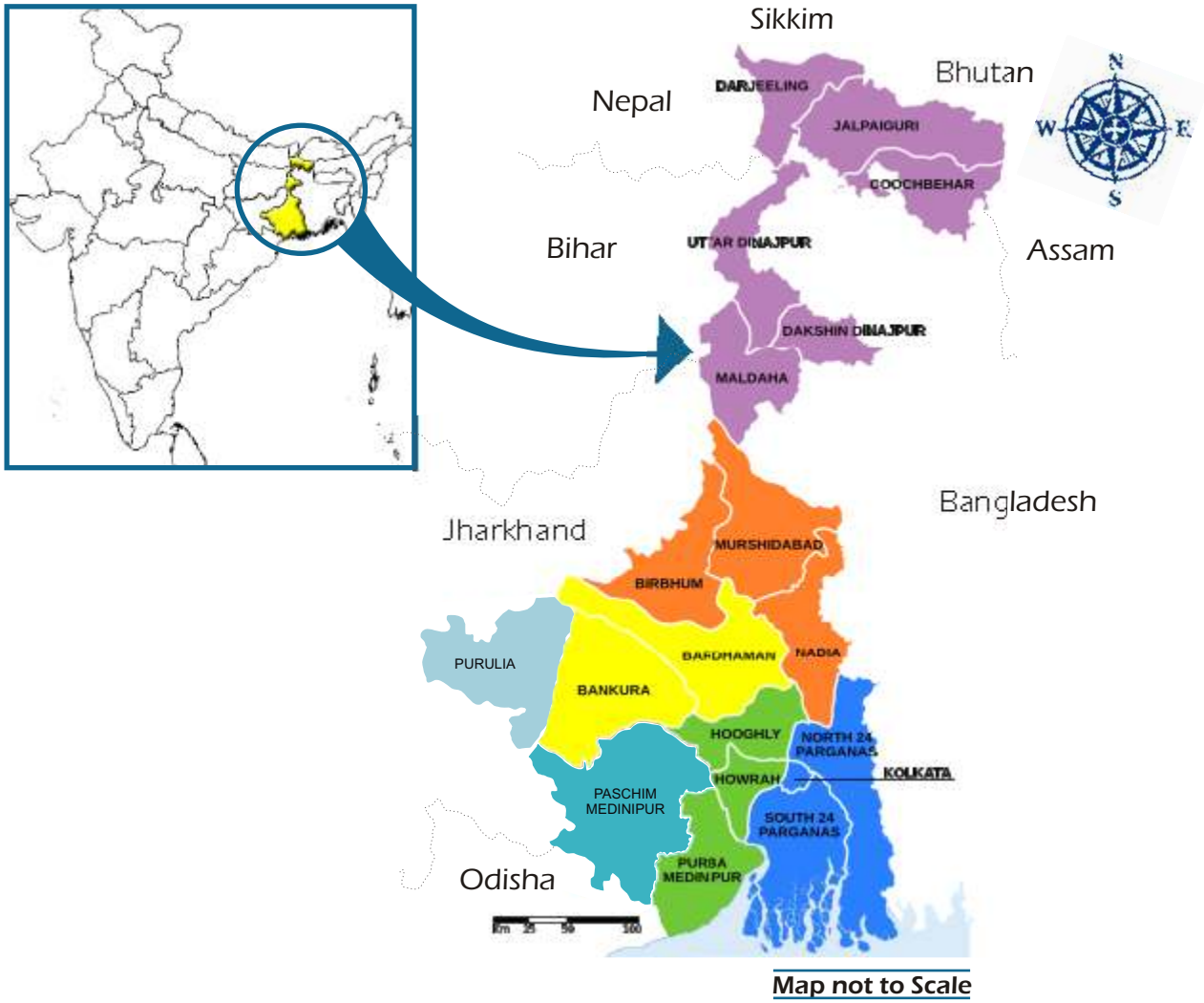
HAZARD, RISK AND VULNERABILITY PROFILE OF WEST BENGAL

2.1 State Profile:

Date of formation of West Bengal -15th August 1947

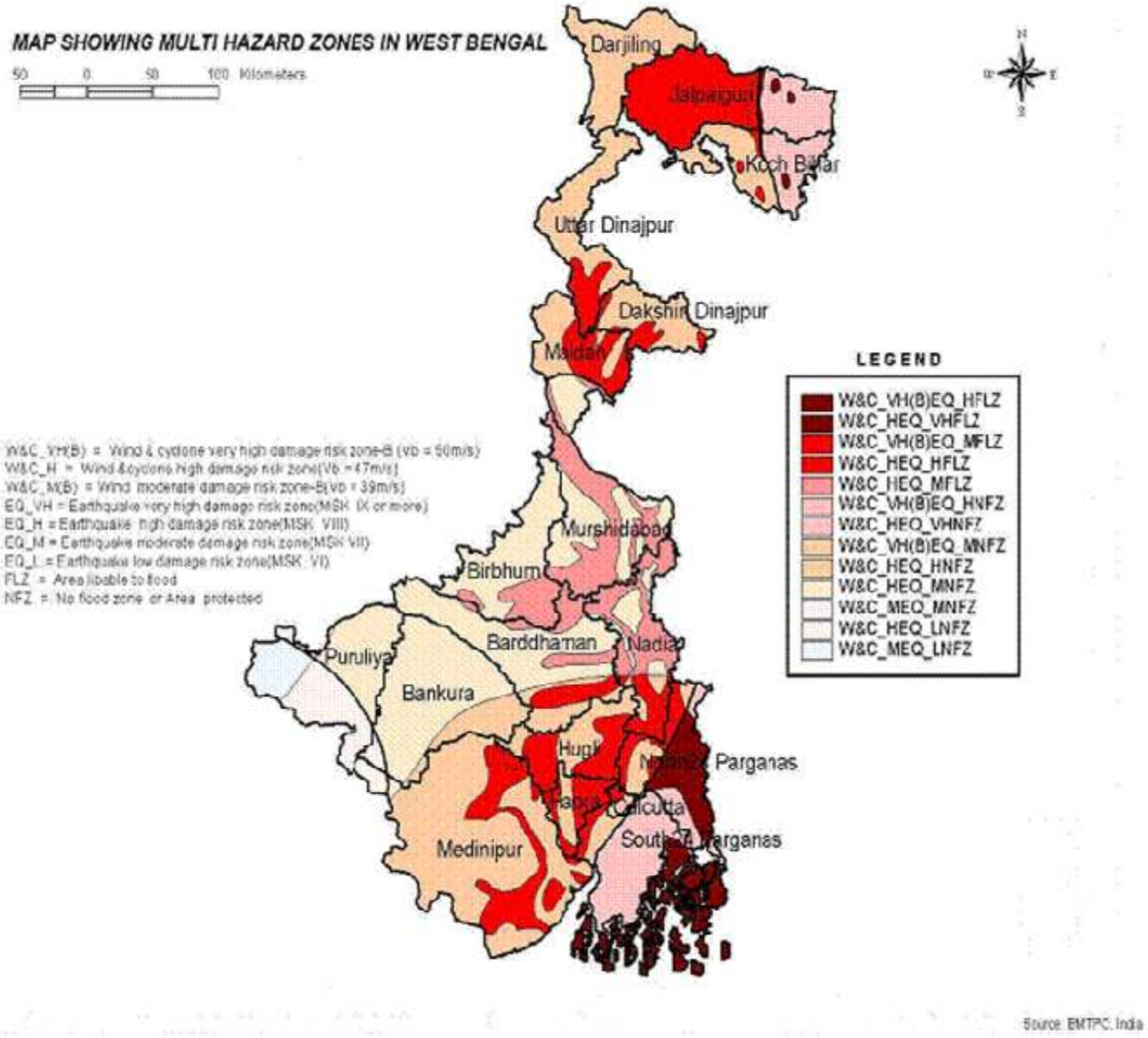
2.1.1 Geography:

The state is located on the eastern part of India



Map not to Scale

MAP SHOWING MULTI HAZARD ZONES IN WEST BENGAL



Area	88,752 sq Km
Latitude	21°30' N & 27° 30' N
Longitude	85° 30' E & 89°45'E
Geographical Regions	• The hill region in the north • The Terai and Teesta alluvial region of North Bengal • The lateretic, red and gravely undulating region in the west • The coastal alluvial region in the south •
Connected States/ Uts	• Jharkhand, Bihar, Orissa, in the west • Assam in the east • Sikkim in the north
Major Rivers	• Torsa, Mahananda, Teesta, Fulahar, Mechi-Balasan, Tangon, Jaldhaka, Raidak, (North Bengal) • Churni, Jalangi, Ichhamati, Bhagirathi, Pagla-basloi, Bhrammani-Dwarka, Mayurakshi, Punarbhaba, Attrayee, Damodor, Subarnarekha (South Bengal)
Mountains	North-Western side of the state of West Bengal is covered the Himalayan mountain range.
Forest	• Recorded forest area in the state is 11,879 km2 which is 13.38% of the state's geographical area, • Reserves, protected and unclassed forests constitute 59.4%, 31.8% and 8.9%, respectively, of the forest area. • Part of the world's largest mangrove forest, the Sundarbans, is located in southern West Bengal. • West Bengal has 3.26% of its geographical area under protected areas comprising 15 wildlife sanctuaries and 5 national parks[51] Sundarban National Park, Buxa Tiger Reserve, Gorumara National Park, Neora Valley
Coastlines	350 km

2.1.2 Demography

Population	91,276,115
Male population	46,809,027
Female population	44,467,088
Sex Ratio	950 females per 1000 males
Population Density	1,029/KM2
Rural Population	62,183,113
Urban Population	29,093,002
Decadal Growth Rate	13.84%
Crude Birth Rate	16.3 per 1,000 population
Crude Death Rate	6.2 per 1,000 population
Death Rate (Rural)	6.1 per 1,000 population
Death Rate (Urban)	6.4 per 1,000 population
Infant Mortality Rate(IMR)	32 per 1,000 population
Natural Growth Rate	10.1 per 1,000 population
Effective Literacy Rate	76.26%

Source : Census 2011 & National Health Mission, Ministry of Health and Family Welfare, GoI.

2.1.3 Administrative Profile

No. of Districts	19
No. of Zilla Parisads	18
No. of Sub Divisions	66
No. of Blocks	341
No. of Panchayat Samity	333
No. of Municipalities	126
No. of Corporations	06
No. of Gram Panchayats	3,239
No. of Mouzas	40,782
No. of Villages	4,782
No. of Towns	375
No. of Police Stations	502 (including 42 G.R.P.s)

2.1.4 Language

Official Primary Language	Bengali
Other languages spoken	English, Hindi, Nepali, Urdu, Santhali.

2.1.5 Agriculture:

Agriculture is the leading occupation in West Bengal. Rice is the state's principal food crop. Rice, jute, sugarcane and wheat are the top crops of the state. Tea of Darjeeling and Duars is also an important crop.

Area under principal Crops in West Bengal (In thousand hectares)

Sl. No.	Type of Crops	Area
1	Cereals	5,365
2	Pulses	197
3	Fibres	576
4	Spices	75
5	Vegetables & Misc. Crops	14

Source : Directorate of Agriculture (Estimation Wing) GoWB -2010-2011

2.1.6 Animal Husbandry & Livestock

Sl. No.	Particulars	No. in thousand
1	Cattle	20,607
2	Buffalo	666
3	Others	21,820
4	Poultry	97,463

Source : Directorate of Live Stock, GoWB, 2010-2011

A) Milk production: 4,660 (000 tonnes)
B) Fish production: 13,746 lakh tonnes
C) Egg production :4,001 Million
D) Fishing boats: 29,733 (13,622 Mechanised)

2.1.7: A) Water resources:
B) Irrigation potential:

Major Industries in West Bengal:

Sl. No.	Type	Number
1	Rice Mills	822
2	Tea factories	364
3	Cotton Textiles	400
4	Jute Mills	109
5	Leather & leather products	529
6	Paper & paper products	293
7	Printing & allied industries	459
8	Rubber & rubber products	376
9	Chemical & chemical products	885
10	Glass & glass products	99
11	Engineering	6,005
12	Ship Building & Repairs	42
13	Electricity	91
14	Coal Mines	105

Source : Directorate General of Mines Safety, MOL, GOI : 2010

2.1.8 : Electricity:

2.1.9: Railways:

2.1.10: Roads:

The total length of surface road in West Bengal is over 92,023 km
National highways - 2,704 km
State highways - 1,122 km

2.1.11: Motor Vehicles: 3,260,624

2.1.12: Medical Facilities: (as on 31st March 2011) **:**

a) Hospitals: 2,311+
b) Health Centres (including Rural Hospital, BPHC,PHC) : 1,257
c) Sub-Centres: 10,356

2.1.13 : Educational Institutions:

a)	Pr., Jr. Basic :	50,717
b)	U. Primary:	10,235
c)	SSK & SSP :	16,100
d)	Jr. High :	2,019
e)	Secondary:	8,729
f)	MSK :	1,921
g)	High & Higher Secondary Schools :	9,225

2.1.13: Ports:

One major port of Kolkata is under Kolkata Port Trust
One minor port at Haldia also controlled by Kolkata Port Trust

2.1.14: Post and Telecommunication:

A) Post Office/Branches: 8,752
B) Telephone Exchange: Kolkata Telephone: 526; WB Telecom: 1,379
C) Banking: Total nos. of bank Branches: 5,673

2.1.15: Culture and Spirit :

- West Bengal is a melting pot of varied cultures, traditions and religions.
- It has retained its traditional culture in various ways. The love towards its tradition finds expression through the various occasions in the Bengal calendar. Bengali people celebrate all regional and national fairs and festivals with equal fervour.
- Bengal's long coastline had attracted sea-farers through the ages, lured by the rich prospects of trade.

2.2. History of Vulnerability

Followings are the records of large FLOODS in West Bengal:

Period	Description
1978	Major flood affected 13 districts, 1,370 human lives were lost, about 14 lakh houses were damaged.
1986	Flooding due to heavy rains in some areas of Kolkata, Hooghly, Howrah, 24-Parganas and Midnapore
1988	Monsoonal rains caused flooding in areas of Balurghat and Dinajpur lying under the purview of the Ganges and Churani rivers
1991	Flash floods caused damage 35,000 houses
1995	Flooding triggered by heavy rains caused erosion, severe agricultural damage and outbreak of diseases
1998	Monsoon rains caused flooding of the Ganges river
1999	Tropical cyclones caused destruction of an estimated number of 1,500 villages. Floods due to brief torrential rains affected areas of Kolkata, Burdwan and Birbhum
2000	Besides flash floods triggered by incessant torrential rains, disaster is also accredited to the opening of sluice gates of dams. The fatalities counted to the tune of 1262, besides affecting millions of people.
2002	Flooding in Jalpaiguri, Cooch Behar and Jalpaiguri in north Bengal due to monsoonal rains. Flash floods swamped ten villages, causing four deaths and 11,000 displacements
2003	Monsoonal rains caused floods affecting the regions of Darjeeling, Jalpaiguri, Malda and Murshidabad

Period	Description
2005	Heavy rains caused floods in many areas. About 3,000 coastal villages were inundated and 60,000 huts and many roads washed away.
2005	Heavy monsoon rains triggered flash floods and landslides
2006	The regions of Birbhum, Burdwan and Murshidabad were affected mainly from continuous monsoonal downpour
2006	Monsoonal rains and tropical cyclone-driven storms in the Bay of Bengal hit India and Bangladesh. West Bengal recorded 50 deaths, 300 were injured and 30,000 mud houses destroyed. Heavy rains left large parts of Kolkata city under water; subsequently 2000 people were evacuated from the city.
2007	The hazard affected Kolkata and several other districts. Eighty-three deaths were reported, and millions of people were marooned in 3000 villages in coastal areas of the state.
2007	Heavy rain from tropical depression in the Bay of Bengal caused flooding leading to 51 deaths, and affecting 3.2 million people
2013	Moderate flood occurred in 4 districts, affected 21 lakh population, 84,720 houses were damaged.

Following Table provides the information for damaging cyclones in West Bengal from 1900 A.D.

Period	Description
18-29/09/1916	Extensive damage reported; however, no estimation of deaths
14-16/10/1942	About 5 m high surge reported at Midnapur (64 km upstream in Hooghly River). Overall 15,000 deaths reported.
29/05/195601/06/1956	Caused flooding in Midnapur District, and also damage to agriculture due to saline water intrusion

Period	Description
13-20/08/1974	Cyclonic storm over land with maximum wind speed of 139 kmph caused floods in several districts. Seven deaths reported.
12-11/09/1976	About 2.5 m high surge along with 1.4 m tide caused 40 deaths.
27/09/197101/10/1971	Sixty people died and thousands of houses collapsed.
24-28/09/1981	Caused loss of five launches in the Bay and damage to many houses in Midnapur District.
09-14/10/1984	Caused damage in Midnapur district.
23-27/05/1989	Sixty-one persons died and thousands of cattle perished.
12/11/2002	Caused 78 deaths along with the destruction of agricultural crops and property.
25/05/2009	Cyclone AILA , caused huge damage to the North 24 Parganas, South 24-Parganas, Purba Midnapur and Kolkata . Death tolled to 146
12/10/2013	Cyclone caused by Phailin. Death of 17 persons in the Districts of Purba Midnapur, Paschim Midnapur and Burdwan.

History of fatal Fire Accidents in West Bengal :	
12.10.10	Stephen Court Fire, Death-43
12.10.11	AMRI fire, Death-92

Vulnerability Assessment and Risk Analysis

In Disaster Management, risk is measured in terms of loss of human lives, loss of capital, property like agricultural land, roads, infrastructures, livestock etc.

Hazard is potentially a damaging physical event, phenomenon or human activity that may cause the loss of life or injury, property damage, social and economic disruption or environmental degradation.

Hazards can include latent conditions that may represent future threats and can have different origins: natural (geological, hydrometeorological and biological) or induced by human processes (environmental degradation and technological hazards). Hazards can be single, sequential or combined in their origin and effects. Each hazard is characterized by its location, intensity, frequency and probability.

Risk is the probability of harmful consequences, or expected losses (deaths, injuries, property, livelihoods, economic activity disrupted or environment damaged) resulting from interactions between natural or human-induced hazards and vulnerable conditions.

Vulnerability is the internal weakness of a system from external threats and in disaster perspective it is the conditions determined by physical, social, economic, and environmental factors or processes, which increase the susceptibility of a community to the impact of hazards. It is the degree of loss (from 0 to 100 per cent) resulting from a potentially damaging phenomenon. It is the degree to which a person, system or unit is likely to experience harm due to exposure to perturbations or stresses

A hazard becomes a disaster only when it affects human settlements and causes loss of life and damage to property. In order to reduce the impact of such events through mitigation efforts, it is necessary to understand how such hazards become disasters. The extent of vulnerability of the area, people and property to a hazard or the probability of its occurrence defines the extent of risk. Vulnerability analysis and risk assessment therefore are essential forerunners for evolving appropriate preventive measures and mitigation strategies.

The process of conducting a risk analysis is based on a review of both the technical features of hazards such as their location, intensity, frequency and probability; and also the analysis of the physical, social, economic and environmental dimensions of vulnerability and exposure, while taking particular account of the coping capabilities pertinent to the risk scenarios.

Interaction of hazards & people's vulnerability

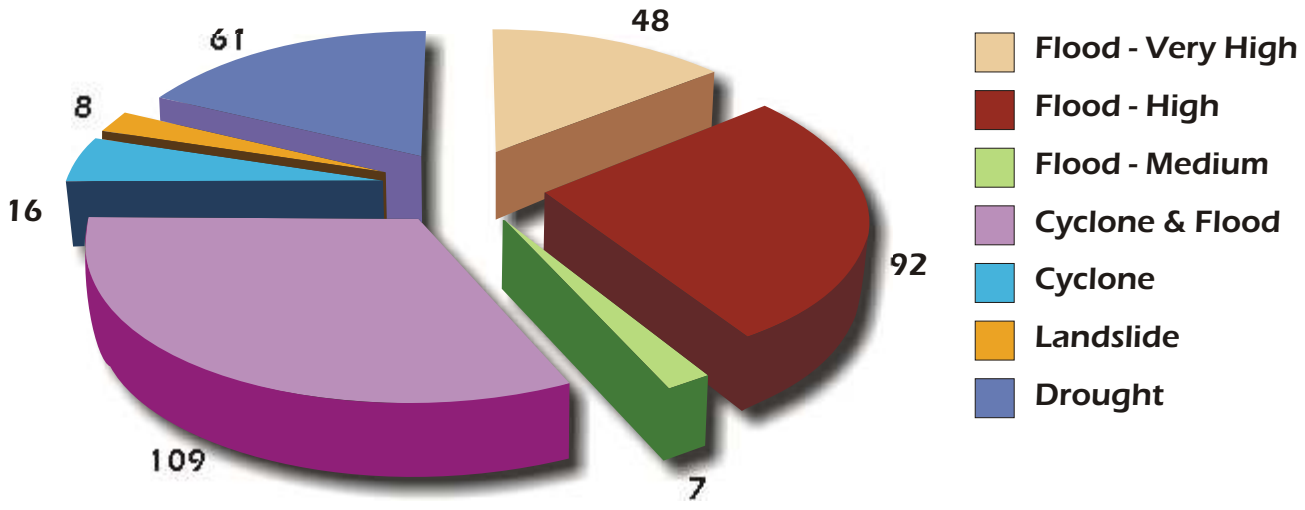
Even vulnerability is only partially related to particular types of hazards. Vulnerability is balanced by peoples' capabilities and resilience and cannot be perceived as the term "victim" only. It is not politically neutral and devoid of contention and conflict.

So it is important to specify and operationalise what is meant by vulnerability. We need to disaggregate it, make it apparent that it is derived largely from a political, economic and social context and is not only about people who are "victims" in some aggregated and apolitical manner. The key issue is that people's own characteristics their capacities, resilience and vulnerabilities are recognised as a significant part of the equation. Moreover, vulnerability needs to be appraised in terms of different types of hazard impacts and operationalized so that the factors that constitute vulnerability can be measured and taken into account prior to a hazard striking.

Vulnerability analysis is developed from a range of socio-economic approaches to hazards. Vulnerability analysis begins with the acceptance that it is often part of normal, becoming apparent and obvious to some only with the impact of hazard. It is vital to recognise that vulnerability should be treated as a condition of people that derives from their political-economic position.

The initial development of vulnerability analysis is rooted in social science and has constituted a political economy of disasters. The focus of vulnerability analysis should be on its political determinants and their effects in differentiating people into groups that are differentially exposed to risk and not simply structures that happen to be in places where a particular hazard (or various hazards) is likely to strike. This means that vulnerability analysis is complex and dependent on large data sets, and on qualitative analysis that requires the involvement of people connected in the evaluation of their vulnerability.

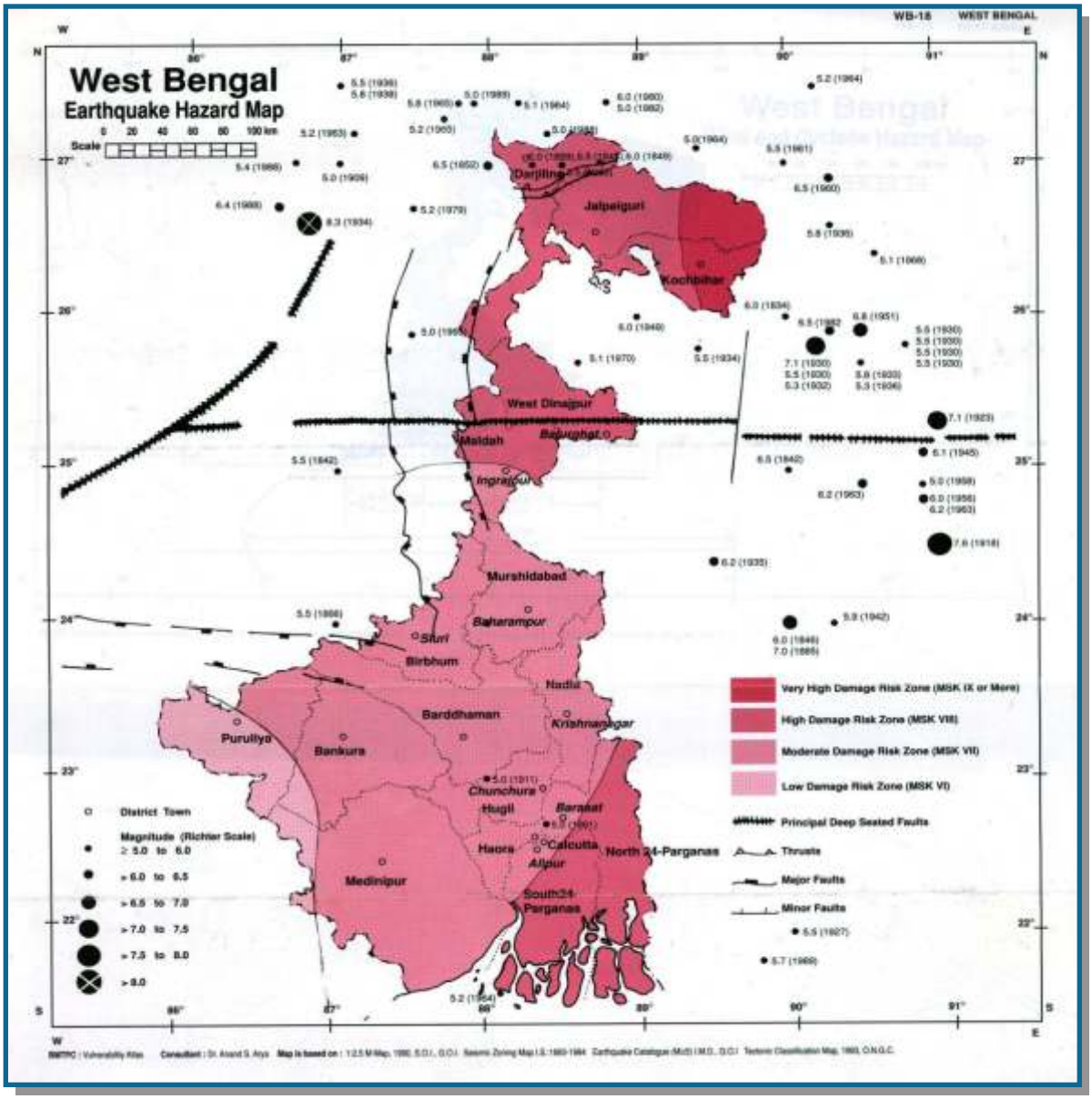
NO. OF BLOCKS UNDER DIFFERENT TYPES OF HAZARDS:



2.3. Assessment of Vulnerability and Risk Analysis due to Natural Hazards in West Bengal

2.3.1 : GEOLOGICAL VULNERABILITY

2.3.1.1 : EARTHQUAKE



Seismic Profile of West Bengal:

The seismic zonation map (2002) as prepared by Bureau of Indian Standard shows:

- Eastern section of northern districts of Jalpaiguri and Coochbehar lie in Zone V
- The remaining part of these two districts, along with the districts of Darjeeling, Uttar Dinajpur, Dakshin Dinajpur, Malda, 24 Paraganas (south & north) lie in Zone IV
- The rest of the state along with Kolkata lies in Zone III expect some portions of Purulia, Bankura and Paschim Medinipur.
- Small part of Purulia, Bankura and Medinipur lies in Zone II.

  It is also found from seismic map that two fault lines run through the state.

Element At Risk:

Several key factors that contribute to vulnerability of human populations to earthquakes:

- Location of settlements in an earthquake prone area, especially on soft ground, on area prone to landslides or along fault lines.
- Dense collection of weak buildings with high occupancy.
- Non-engineered building constructed by earth, rubble, buildings with heavy roofs (more vulnerable than light weight structures), poor quality and maintenance of buildings.
- Weak or flexible storey intending for parking purposes.

Temblor measured 6.3 on the Richter scale, occurred 10 km depth and settled in **India 2:23 (0853 GMT)**, the U.S. Geological Survey on 27-04-2009.

20 June 2002 - Jayachari-Rajshahi, Bangladesh, Mw 5.1
25.868 N, 88.874 E, D=037.8 kms, OT=05:40:43 UTC
A moderate earthquake struck northern Bangladesh, on 25 June 2002 at 11:40 AM local time, causing several injuries in the Rajshahi division, Bangladesh. It had a magnitude of Mw=5.1 and was felt for close to 45-seconds.

28 November 2005 - Ganga Canyon, South of the Sunderbans, Mb 4.7
21.015 N, 89.158 E, D=010.0 kms, OT=16:57:13 UTC
A light earthquake occurred in the Ganga Canyon in the northern Bay of Bengal, off the Sunderbans on 28 November 2005 at 22:27 PM local time in India. The earthquake had a magnitude of Mb=4.7 and was felt in southern parts of West Bengal.

18 September 2011- Earthquake originating at Sikkim, affected the whole of Bengal. Richter Scale 6.9

2.3.1.2: LANDSLIDES AND EROSION

Landslides -These are slippery masses of rock, earth or debris which move by force of their own weight down mountain slopes or river banks.Landslides are a common disaster phenomena in Darjeeling district.

Landslide is primarily nature's way of adjustment to slope stability. Here the process has been intensified by human interference mainly through rapid deforestation, incorrect construction procedure and unplanned tapping of natural resources. The nature of landslides varies in proportion in various localities in Darjeeling depending on the intensity of rainfall coupled with extent of deforestation and the vulnerable geological structures.

The most common occurrence in different parts of Darjeeling is :

a) Along the springs which invariably cut across the roads,
b) At coal mining sites,
c) In tea gardens and
d At urban agglomeration.

Soil Erosion - The removal of soil by the action of water or wind, compounded by poor agricultural practices, deforestation, overgrazing, and desertification. Mainly three types of erosion make this State vulnerable:

i. Erosion in hill areas of North Bengal;
ii. Erosion in banks of Ganga at Malda;
iii. Erosion in coastal region.

Elements At Risk

The most common elements at risk are the settlements built on the steep slopes, built at the toe and those built at the mouth of the streams emerging from the mountain valley. All those buildings

constructed without appropriate foundation for a given soil and in sloppy areas are also at risk. Roads, communication line and buried utilities and vulnerable.

Subsidence

Subsidence hazard has been exhibited in underground coal mining areas of the state, such as Raniganj and Asansol. During 19th century, the Raniganj coalfield was the most important producer of coal in India. Coal seams nearer to the surface were worked by Bord and Pillar method only. Entries were made through either small shallow shafts or inclines. Small areas round the entries were worked manually and pillars were reduced indiscriminately that caved-in in some places.

In the past when the surface was not densely populated the operators had extracted as much coal as possible without sowing or supporting. The surface rights were generally acquired. In course of time when these holdings were abandoned habitation started growing over the old abandoned workings first slowly and subsequently at a rapid pace. Growth of population took place for various reasons, such as general growth of population, migration of population from distant villages to the areas adjoining coal mines in search of livelihood and growth of business and industry in coal belt. This was further accelerated after nationalization of coal mines in 1973.

Large numbers of pot holes have occurred indicating ground movement. Aging of pillars and subsequent weathering effects are continuous. These old workings are now waterlogged. Equilibrium is being maintained in the old waterlogged workings due to hydrostatic pressure. Collapses cannot be ruled out once water level is lowered. Stability of strata is distributed when mining is done. Subsidence of surface is an inherent phenomenon associated with mining and that is why mining is taken as accepted from change of land use all over the world.

Unplanned and unsystematic coal mining activity, spread over decades past in shallow deposits up to about 60m depth poses serious problem of subsidence. In and around Raniganj Coalfield, about 8.0 sq.km. of the inhabited area is under the threat of subsidence. Thus hydrostatic pressure is holding these areas and occurrence of subsidence cannot be ruled out once the water level is disturbed. The old abandoned mines underlying the inhabited areas are mostly water logged and unapproachable. Working of lower seems may induce tracks which eventually will drain out the water. Once the old workings are de-watered, subsidence is likely to take place immediately. After the subsidence breathing of air will cause spontaneous combustion. Once the workings are on fire, the environmental problems will become more acute.

2.3.1.3: DROUGHT

General : Drought is an insidious natural hazard that results from a departure of precipitation from expected or normal that, when extended over a season or longer period of time, is insufficient to meet the demands of human, plant and animal activities.

Agricultural statistics play a vital part in combating distress arisen out of drought. For the last few decades this state becomes a food surplus one. So famine does as immediate consequence not follow drought.

But statistics collected on a scientific basis and at regular intervals are all the more vital. They will serve as a safe guide to the District Magistrate in formulating his policies for tackling the problems of relief in his district. They give timely warning of climatic danger, prevent surprise and provide information for plan, draw attention, in ordinary times, to weak points in the conditions of a district, thereby preparing the way for timely improvements, which will fortify the people against times of pressure.

Elements at Risk:
Drought impacts mostly rainfed crops to start with and subsequently the irrigated crops. Areas with minimum of alternative water sources to rainfall (ground and canal water supplies), areas subjected to drastic environmental degradation such as denuded forest lands and altered ecosystems, and areas where livelihoods alternative to agriculture are least developed are most vulnerable to drought. The herdsman, landless laborers, subsistence farmers, the women, children, and farm animals are the most vulnerable groups affected by the drought conditions.

Typical Effects: Drought, different from other natural disasters, do not cause any structural damages. The typical effects include loss of crop, dairy, timber (forest fires), and fishery production; increase in energy demand for pumping water; reduced energy production; increased unemployment, loss of biodiversity, reduced water, air and landscape quality; groundwater depletion, food shortage, health reduction and loss of life, increased poverty, reduced quality of life, and social unrest leading to migration.

CLIMATIC VULNERABILITY
The climate of the state comes under two distinct types. The major parts of sub-Himalayan West Bengal belongs to the type: sub-tropical monsoon, mild winter; dry winter, hot summer and Gangetic West Bengal and adjoining southern parts of Sub-Himalayan West Bengal belongs to the type: Tropical Savanna Hot; seasonally dry (usually winter) (Aw). However, northern most part viz., Darjeeling district has a climatic type: Tropical upland, mild winter; dry winter; short warm summer.
The year may be divided into four seasons. The winter season from December to February is followed by the pre-monsoon season (hot weather season) from March to May. The period from June to the middle of September constitutes the southwest monsoon and the period from the latter half of September to November is the post monsoon period. The period from December to February is generally very pleasant due to low temperatures over the sea except in the coastal belt. In the hot weather season from March to May, weather is dry and uncomfortable in the interior. Due to lower temperatures, the hilly regions are however, comparatively less uncomfortable. Weather tends to be oppressive during June due to high humidity and temperature. The rest period of the monsoon is fairly comfortable due to reduced day temperatures, although humidity continues to be high.

Rainfall in West Bengal:

The main rainfall season in the state is from June to September, i.e., the monsoon rain. 75% of the total rainfall in a year takes place due to the impact of south-western monsoonal wind-flow.

According to State Agro-meteorological department of West Bengal, averages of monthly rainfall data for the districts are as follows. This average (in mm) has been calculated over the period 1991-2000.

Districts	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Darjeeling	22.0	18.0	32.5	104.3	212.0	615.5	749.8	684.9	467.8	139.0	32.0	14.4
Jalpaiguri	16.8	18.7	30.2	124.6	386.5	744.6	966.8	687.2	468.8	167.4	19.4	9.1
Coochbehar	15.4	12.1	27.6	125.1	302.7	581.5	770.5	553.5	413.0	134.6	8.5	7.1
Dinajpur (Uttor & Dakkhin	13.8	12.2	7.8	57.1	188.2	319.7	425.7	385.5	452.2	84.2	13.0	9.2
Maldah	11.6	13.5	16.0	46.2	115.0	276.3	357.7	339.1	406.9	88.6	16.8	10.6
Murshidabad	10.1	24.1	19.8	48.0	120.9	233.1	315.1	269.8	307.2	95.7	17.0	11.0
Nadia	17.2	33.3	31.5	37.5	122.2	230.6	301.3	268.2	255.1	89.1	23.9	11.2
24 Parganas												
Bardhaman	16.7	31.5	27.2	48.1	108.1	207.1	306.9	298.1	291.7	86.6	23.3	15.6
Birbhum	12.5	22.7	18.7	42.8	87.8	213.1	332.1	332.5	352.4	89.5	23.3	9.8
Bankura	19.3	27.4	21.6	45.8	93.9	225.7	314.6	293.4	243.1	88.9	30.4	14.9
Purulia	22.8	25.3	21.4	21.4	75.0	246.8	312.7	276.7	283.1	72.1	24.7	15.9
Total	**250.1**	**357.3**	**404.0**	**908.3**	**2,305.1**	**4,846.9**	**6,524.9**	**5,630.8**	**5,079.6**	**1,579.3**	**381.4**	**150.7**

Total rainfall in a year is 28,418.2 mm.

Total rainfall from June to September is 22,082.2 mm, i.e., 78% of the total rainfall. So, 78% of the total rainfall takes place within June to September and that also varies in different places throughout the state resulting variation in surface discharge.

Excessive Rainfall

Rainfall sufficiently in excess of the normal is a predominant factor for occurrence of floods, particulary in high rainfall regions. Even with a coefficient of variation of rainfall of 20% or less, regions are prone to frequent floods. Since the coefficient of variation of annual rainfall is less than 25% in the state, the state is prone to floods. For the purpose of the present description annual rainfall of 125% or more of the normal is considered as excessive rain.

2.3.1.4: Floods:

General : It is a temporary inundation of large regions as a result of an increase in reservoir, or of rivers flooding their banks because of heavy rains, high winds, cyclones storm surge along coast, tsunami, melting snow or dam bursts.

Types of Flood:

Flash floods: It is defined as floods which occurs within six hours of the beginning of heavy rainfall, and are usually associated with cloud bursts, storms and cyclones requiring rapid localized warning and immediate response if damage is to be mitigated. In case of flash floods, warning for timely evacuation may not always be possible.

River floods: Such floods are caused by precipitation over large catchment's areas. These floods normally build up slowly or seasonally and may continue for days or weeks as compared to flash floods.

Coastal floods: Some floods are associated with the cyclonic activities like Hurricanes, tropical cyclone etc. Catastrophic flooding is often aggravated by wind-induced strom surges along the coast.

River Systems of West Bengal at a Glance

Rivers	Origin	Outfall	Travels through
Torsa	Chumbivalley (Tibet)	Brahmaputra (B)	Bhutan, Jalpaiguri, Coochbehar
Mahananda	Mahaldirang near Kurseong	Padma (B)	Darjeeling, Bihar, S. Dinajpur, Malda
Teesta	Kangse Glaciers	Brahmaputra (B)	Dargeeling, Jalpaiguri, Coochbehar
Fulahar	Bagdob	Ganga	Malda
Mechi-Balasan	Singhalia Range of Himalayas	Mahananda	Darjeeling, Jalpaiguri
Mechi-Balasan	Singhalia Range of Himalayas	Mahananda	Darjeeling, Jalpaiguri
Tangon	Panchagar (B)	Mahananda	N. & S. Dinajpur, Malda
Jaldhaka	Bitana lake, Sikkim	Brahmaputra (B)	Sikkim, Bhutan, Darjeeling, Jalpaiguri, Coochbehar

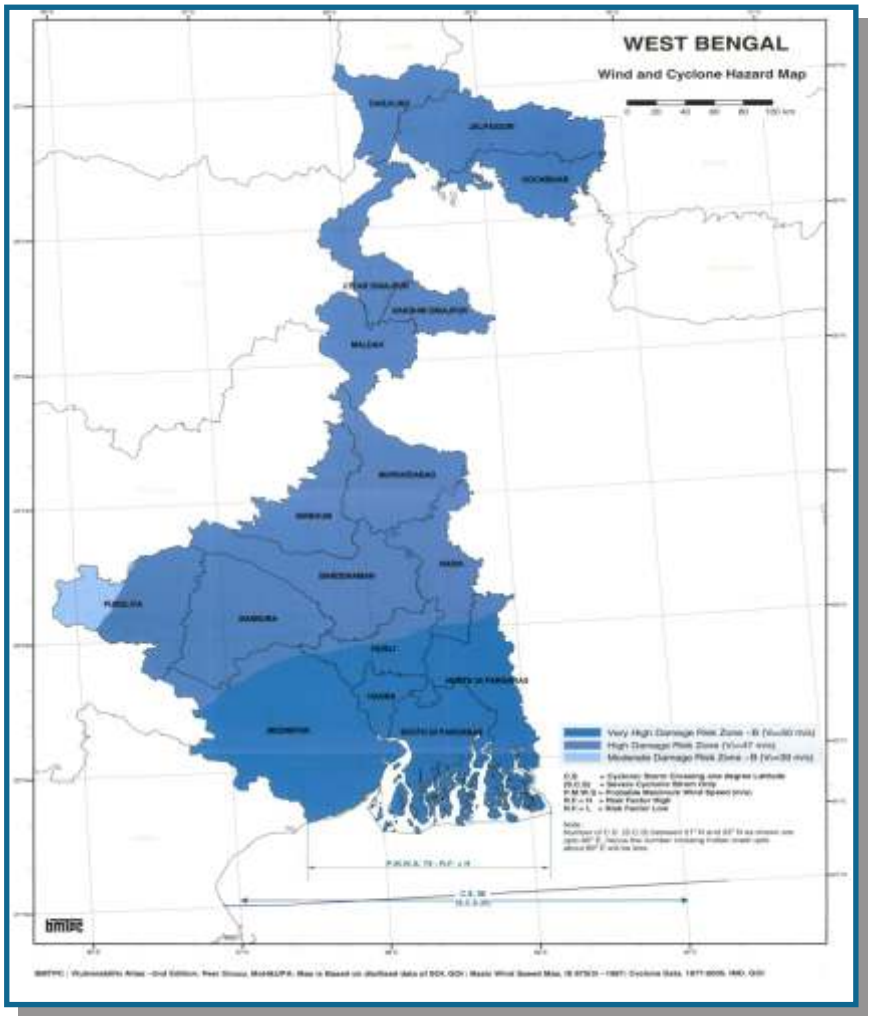
Rivers	Origin	Outfall	Travels through
Raidak	Mt. Chamolhari (Tibet)	Torsa	Bhutan, Jalpaiguri, Coochbehar
Churni	Mathabhanga in Nadia	Bhagirathi	Nadia
Jalangi	Padma in Murshidabad	Bhagirathi	Murshidabad, Nadia
Ichhamati	Mathabhanga in Nadia district	Bay of Bengal	Nadia, N. 24 Parganas, S. 24 Parganas
Bhagirathi	Ganga in Murshidabad	Bay of Bengal	Murshidabad, Nadia, Hooghly, Bardhaman, Howrah, S. 24 Parganas, N. 24 Parganas
Pagla-basloi	Chotonagpur Plateau in Bihar	Bhagirathi	Birbhum, Murshidabad
Bhrammani-Dwarka	Chotonagpur Plateau in Jharkhand	Bhagirathi	Birbhum, Murshidabad
Mayurakshi	Do in Jharkhand	Bhagirathi	Birbhum, Murshidabad
Punarbhaba	East Dinajpur at Bangladesh	Mahananda	South Dinajpur & Malda at West Bengal; East Dinajpur, Bangladesh
Attrayee	East Dinajpur at Bangladesh	Boral River (B)	Barind tract at Bangladesh
Damodor	Chotonagpur Plateau in Jharkhand	Hooghly	Bankura, Bardhaman, Hooghly, Howrah, Ps. & Pb. Medinipur
Subarnarekha	Piskanear Ranchi	Bay of Bengal	Pb. Medinipur

Flood Scenario

According to the Irrigation Department, 37.6 lakhs Ha of West Bengal (42.4% of the total geographical area and 69% of its net cropped area) has been identified as flood prone area; of this 29.8 lakh Ha (i.e., 58% of the flood prone area) is Protected Area. Strong monsoon, rivers and floods are an integral part of Bengal's characteristic ecology that shaped its civilization and culture and at the same time, cause of flood hazard and disasters for the society as a whole.

Pattern of rainfall and discharge of water through the drainage basins are the two main parameters generally studied for assessing the flood vulnerability in the state. Cyclonic flood and storm surge generated flood are given separately in Cyclone Hazard sub-heading.

2.3.1.5: Cyclone:



The coastal stretch of West Bengal is necessarily highly vulnerable to cyclone. The phenomenal storm surge in coastal West Bengal is due to its peculiar bathymetry and nature of coastal belt. The northern part of the Bay of Bengal is very shallow. The coast is also landlocked on three sides. As a result when a very severe cyclonic storm or a hurricane approaches the coast, the enormous storm surge generated by the wind pressure submerges the coastal belt at the time of the storm crossing the belt. The frequency of storms crossing this belt is also high. Another peculiar characteristic of this coast is that it is crisscrossed by innumerable rivers and rivulets, with the elevation of the islands about 4 to 5 meters. The seadykes and embankment are not strong enough to resist strong wind-driven waves and naturally cave in during depression / cyclonic storm situation.

In peninsular India, cyclone occurs frequently on both the coasts i.e. The West Coast (Arabian Sea) and East Coast (Bay of Bengal) but the east coast is considered to be one of the most cyclone prone areas of the world.
About 80 tropical cyclones (with wind speeds equal to or greater than 35 knots) form in the world's waters every year. Of these about 6.5% develop in the Bay of Bengal and Arabian Sea. Since the frequency of cyclones in the Bay of Bengal is about 5 to 6 times the frequency of those in the Arabian Sea, the Bay of Bengal's share comes out to be about 5.5%.
The regions of West Bengal that may suffer the possible impact of tropical cyclones come belong to the following districts:

1. Purba Medinipur (blocks Ramnagar I, Ramnagar II, Contai I, Contai II, Khejuri II, Nanadigram I, Sutahata)
2. 24 Parganas-South (blocks Kultali, Canning I, Canning II, Gosaba, Basanti, Kakdwip, Namkhana, Sagar, Patharpratima)
3. 24 Parganas-North (blocks Hingalganj, Sandeshkhali I, Sandeshkhali II, Hasnabad, Gaighata, Bongaon, Bagdah).
4. Howrah (blocks Uluberia I, Shyampur II)
5. Paschim Medinipore (Danton)

The State capital Kolkata also falls in the cyclone prone region, as stated before.

2.4: Technological Vulnerability:

2.4.1: Technological Hazards:

Technological hazards include hazardous materials incidents and nuclear power plant failures. Usually, little or no warning precedes incidents involving technological hazards. In many cases, victims may not know they have been affected until many years later.

The number of technological incidents is escalating, mainly as a result of the increased number of new substances and the opportunities for human error inherent in the use of these materials.

Chemicals are found everywhere. They purify drinking water, increase crop production, and simplify household chores. But chemicals also can be hazardous to humans or the environment if used or released improperly. Hazards can occur during production, storage, transportation, use, or disposal. Our community are at risk if a chemical is used unsafely or released in harmful amounts into the environment where you live, work, or play. Chemical manufacturers are one source of hazardous materials, but there are many others, including service stations, hospitals, and hazardous materials waste sites.

2.5 : Biological Disasters

Biological disasters of natural origin are largely the result of the entry of a virulent organism into a congregation of susceptible people living in a manner suited to spread the infection. In crowded areas anthrax spreads by spore dispersal in the air, small pox spread by aerosols, typhus and plague through lice, fleece, rodents, etc. Disasters occur when environmental factors are conducive.

2.6: Epidemics:

The introduction of a pathogen capable of establishing a transmission chain into a susceptible population will result in an epidemic. Experience with the highly pathogenic avian influenza virus (H5N1) in West Bengal in January 2008 is a good example of the economic and health issues, and actions needed to control epidemics and epizootics.

2.6.1: Institutional Mechanism : There are various national health programmes run by the Director General Health Services, Ministry of Health & Family Welfare, either as a central sector scheme or in partnership with the state government. Some of these programmes, such as the National TB Programme, National Vector Borne Disease Control Programme, National Programme for Control of Iodine Deficiency Disorders and National AIDS Control Programme which have their networks throughout the country, run as vertical programmes, merging horizontally with service delivery at the grass-root level and have

focused strategic approach with inbuilt components for surveillance and monitoring. Many of these programmes were successful in achieving their objective to control/prevent major biological disastersmalaria, smallpox and AIDS are prime examples.

National Institute of Cholera and Enteric Diseases (NICED), Kolkata: It is an ICMR institution specialising in diarrhoeal diseases and provides expertise in tackling national emergencies caused by epidemics of cholera and other diarrhoeal diseases.

All India Institute of Hygiene and Public Health, Kolkata: It is among the oldest public health institutions in India involved in public health teaching, training and research. It runs regular postgraduate training programmes in public health, environmental health, public health engineering, etc.

2.7: Problems of Urbanisation

At present the state has 375 towns and the area and population is increasing. Census data for 1991 revealed that eastern India was the least urbanized. West Bengal was the third most urbanized state with 27.48% (27.97% in 2001 census) of urban population.
During 1961-91, urban population increased more rapidly than rural population in West Bengal. Fast growing districts included Midnapur, Howrah, Murshidabad, and Maldah. Burdwan and West-Dinajpur districts after 1971 had the highest rates of urbanisation. During 1981-91, Maldah had a very high rate of urbanization. The proportions of male and female migrants were the same for all districts, with the exception of Midnapur where male migrants outnumbered female migrants. Rural-to-urban migrants settled primarily in the districts of Calcutta, 24-Parganas, Burdwan, Howrah, and Jalpaiguri. The proportions of female urban-to-rural migrants were higher than their male counterparts for most districts. Females tended to migrate toward districts of 24-Parganas, Burdwan, and Hadia. A large migrant population shifted from Maldah to West Dinajpur. Problems include proper place and area for waste disposal systems, sewage systems, infrastructural facilities etc., all of which are heading towards man-made disasters right from health related diseases to loss of natural drainage basin areas, which further increase the flood vulnerability in the urban areas.

2.7.1: Population Explosion:

On account of the Partition of the Indian subcontinent in 1947, refugees moved from Pakistan, without much interruption, to various parts of India, especially to West Bengal, till 1971, when political boundaries in South Asia were redrawn. Even after the emergence of Bangladesh as an independent country in 1971, however, the march of refugees to West Bengal appeared to be ceaseless.

Table 1.1: Population in West Bengal 1941-2011

Year	Population (100,000)	Increase of population in the previous decade (100,000)	Percentage rate of growth in the current decade
(1)	(2)	(3)	(4)
1941	232	43	22.9
1951	263	31	13.2
1961	349	86	32.8
1971	443	94	26.9
1981	546	103	23.2
1991	680	134	24.6
2001	801	121	17.77
2011	913	112	13.93

2.2.8: Global Warming

Global warming is the increase in the average temperature of the Earth's near-surface air and oceans since the mid-20th century and its projected continuation.

An increase in global temperature will cause sea levels rise and will change the amount and pattern of precipitation, probably including expansion of subtropical deserts. Other likely effects include increases in the intensity of extreme weather events, species extinctions, and changes in agricultural yields.

Global warming and climate change could affect India's growth story unless a range of steps are taken to address the effects of increased surface temperature and its effect on monsoon pattern and river flows.

CHAPTER 3
PREVENTION AND MITIGATION MEASURES

3.1 Prevention and Mitigation:

Prevention consists of actions that reduce risk from natural or human made disaster incidents. List and elaborate all types of measures (like - building codes, floodplain management, storm water management, coastal area zoning and management plan etc.) planned and implemented by the States as a part of prevention measures.

It is good to have long term mitigation goals in place and connect these goals with measures that State has planned and implemented. These goals may include (but not limited to):

- Provide better early warning methods for flood, storms, cyclone
- Reduce the destruction and loss of life within buildings
- Provide for safer environments for transportation systems
- Eliminate flooding in populated areas
- Ensure redundant water supply systems
- Reduce effects of the natural environment on the infrastructure
- Ensure redundant power systems on critical facilities
- Ensure adequate materials available for road maintenance

3.1.1 Protection reduces or eliminates a threat to people, property and the environment. Primarily focused on adversarial incidents, the protection of Critical Infrastructure and Key Resources (CIKR) is vital to local States, national security, public health & safety and economic vitality. Protection includes actions or measures taken to cover or shield assets from exposure, injury or destruction. Protective actions may occur before, during or after an incident and prevent, minimise or contain the impact of an incident.

3.1.2 Mitigation, with its focus on the impact of a hazard, encompasses the structural and non-structural approaches taken to eliminate or limit a hazard's exposure; impact on people, property and the environment.

Common structural measures for disaster risk reduction include dams, flood wall / levies, ocean wave barriers, earthquake-resistant construction, and evacuation shelters.

Common non-structural measures include building codes, land use planning laws and their enforcement, research and assessment, information resources, and public awareness programmes. Note that in civil and structural engineering, the term "structural" is used in a more restricted sense to mean just the loadbearing structure, with other parts such as wall cladding and interior fittings being termed nonstructural.

Examples of mitigation activities include:

- **Town Planning Act:** Planning, adopting and enforcing stringent building codes, flood-proofing requirements, seismic design standards and cyclone wind-bracing requirements for new construction or repairing existing buildings.
- **Zoning Regulations:** Planning and adopting zoning ordinances that steer development away from areas subject to flooding, storm surge or coastal erosion.
- **Development Control Regulations:** Incorporate the disaster management concerns into development. This should include all Government Sponsored Developmental Programs and Schemes.
- **Undertaking retrofitting** work on public buildings to withstand ground shaking or cyclone-strength winds.
- **Land use regulation:** Planning and building **community shelters** and tornado safe rooms to help protect people in their homes, public buildings and schools in hurricane and tornado-prone areas.
- **Safety norms for economic and social infrastructures including places of worships and crowd management:** Steps taken for developing and implementing public safety norms for critical infrastructures and places of worships.
- **Capacity Building for Mitigation:** Steps taken for human resource development and capacity building for effective disaster mitigation at State Level.
- **Awareness generation** on disaster mitigation.
- **Mainstreaming DRR in all developmental projects.**

3.2 Human Made Disasters:

Manmade disasters are unpredictable and can spread across geographical boundaries. Some disasters in this class are entirely manmade while other may occur because of natural disasters, equipment failures, or workers having inadequate training or fatigue and make errors.

Technological disasters include a broad range of incidents. Routes of exposure through water and food, airborne releases, fires and explosions, and hazardous materials or waste (e.g., chemical, biological, or radioactive) released into the environment from a fixed facility or during transport.

Fires, explosions, building or bridge collapses, transportation crashes, dam or levee failures, nuclear reactor accidents, and breaks in water, gas, or sewer lines are other examples of technological disasters. The structural and non-structural prevention/mitigation measures for the industrial (chemical) disaster are mentioned below;

Table: Structural & non-structural measures (Industrial hazard)

Structural Measures		
Task	**Activity**	**Responsibility**
Land use planning	Planning permission of any factory/industry should consider the land use planning in view of hazard, risk and vulnerability of the State	• Labour & Employment Deptt. • WBIDC • WBPCB • Local authority
Adaption of advance technology	Application of Science and technology and engineering inputs to improve industrial infrastructures	• Labour & Employment Deptt. • Department of Science & Technology • DM Deptt.
Tech-legal Regime	1. Review and revision of Acts and Rules 2. Strict implementation of Acts and Rules	• Labour & Employment Deptt. • PWD (Electrical)
Capacity Building	1. Establish infrastructure for onsite and offsite warning dissemination 2. Construction/Strengthening of EOC/ERC at all level 3. Procurement of all necessary equipments including PPE	• Department of Indusry & Commerce • District Magistrate. • Municipal Commissioner • DM Deptt. • R. Commissioner. • WBSDMA
Safety Audit	Carry out structural safety inspection/audit	Concerned Inspectors

Non-Structural Measures		
Task	**Activity**	**Responsibility**
Planning	1. Prepare an onsite and offsite emergency plan 2. Conduct mock drills as per the regulations 3. Update the plan as per the requirement 4. Monitor similar activities in all the factories/ industries	• Department of Industry & Commerce • District Magistrate. • Municipal Commissioner • DM Deptt. • R. Commissioner • WBSDMA
Capacity Building	1. Develop IEC material for Publication & Distribution 2. Awareness generation to general public and the people residing near MAH factories 3. Organize training programmes, seminars and workshops 4. Ensure the student community is imparted proper education on the relevant topics by schools/ colleges. 5. Encourage disaster insurance	• Department of Indusry & Commerce • District Magistrate. • Municipal Commissioner • DM Deptt. • Labour Deptt. • R. Commissioner • WBSDMA • Education Deptt. • Finance Deptt. • IAG/NGOs

3.3 Natural Disasters:

The State follows all-hazard approach for disaster prevention and mitigation is multi-hazard approach due to it's vulnerable to all-major natural hazards such as Drought, Flood, Cyclone, Earthquake, Tsunami, landslides etc.

There are several prevention/mitigation activities which will be common for natural. The same are describe below. Hazard specific measures are mentioned thereafter in the previous chapter.

Table: All Hazard structural & non-structural measures

Structural Measures		
Task	**Activity**	**Responsibility**
Land use planning	1. Land use planning of the State in view of hazard, risk and vulnerability of the State	• Land & Land Reforms Deptt.. • State Planning Board. • Disaster Management Deptt. • Line Deptt.
	2. To ensure development schemes of the State are undertaken in view of hazard, risk, vulnerability and microzonation	• Planning & Development Deptt. • HoD & District Authorities of the line Deptts. Authorised /sanctioning plan/projects. • Line Deptts.
Mainstreaming Disaster Management in development programmes	1. Ensure that each development programme /scheme in the State should be sanctioned / undertaken only if it meets the requirement of disaster management	• Planning & Development Deptt. • HoD & District Authorities of the line Deptts. Authorised /sanctioning plan/projects. • Line Deptts.
	2. Ensure the programme/ scheme/ project is facilitated with the provision for adequate funds of disaster management	
Adaption of advance technology	Application of Science and technology and engineering inputs to improve infrastructures including dams and reservoirs, building design, construction , etc.	• PWD Deptt. • Municipality & Urban Development Deptt. • Deptt. Of Sceience & Technology. • GSI Eastern Region • WBSDMA/Disaster Management Deptt. • Regional Remote Sensing Centre.

Structural Measures		
Task	**Activity**	**Responsibility**
Tech-legal Regime	1. Review and revision of building by laws 2. Review and revision of GDCR (general development Control regulation)/CRZ (coastal regulation zone) etc. 3. Review and revision of town planning Act & Rules 4. Ensure strict implementation of Code and Rules 5. Monitoring of quality construction	• Municipality & Urban Development Deptt. • Municipal Corporations • WBHIDCO • P&RD Deptt. • Housing Board • ULB & PRI
Safety Audit	Carrying out structural safety audit of all critical Infrastructures and Key Resources (CIKR)	• Municipality & Urban Development Deptt. • PWD • Disaster Management Deptt. • WBHIDCO • P&RD Deptt.
Capacity Building	Construction/Strengthening of EOC and emergency resource management at all level	• Deptt. Of Disaster Management. • PWD • Municipality & Urban Development Deptt. • Concerned Line Deptt.

Non-structural Measures		
Task	Activity	Responsibility
Planning	1. Prepare all-hazard disaster management plan a. Prepare hazard wise contingency planning b. Ensure hazard wise departmental action plan and SOP c. Conduct mock drills at regular intervals d. Update the plan as per the requirement e. Monitor similar activities at district & levels below.	• Deptt. Of Disaster Management. • Relief Commissioner. • Deptt. Of Fire & Emergency Services. • Deptt. of Civil Defence • District Magistrates • Municipal Commissioner • BDOs
Capacity Building	1. Develop multi-hazard IEC (Information, education and communication) material for Publication & Distribution 2. Media campaign for awareness generation in general public 3. Organise training programmes, seminars and workshops 4. Include disaster related topics in curriculum 5. Encourage disaster insurance 6. Encourage favorable taxation / incentive	• Deptt. of Disaster Management. • Relief Commissioner. • Deptt. of Fire & Emergency Services. • Deptt. of Civil Defence • Deptt. Information & Cultural Affairs. • Deptt. of Education • Deptt. of Finance. • Municipality & Urban Development Deptt. • P&RD

3.1: Earthquake

In most earthquakes, the collapse of structures like houses, schools, hospitals and public buildings results in the widespread loss of lives and damage. Past earthquakes show that over 95 per cent of the lives lost were due to the collapse of buildings that were not earthquake-resistant. In such situation, the losses can be reduced if all structures in earthquake-prone areas built in accordance with earthquake-resistant construction techniques. The earthquake specific mitigation activities are described below:

Structural & Non-structural Measures		
Task	**Activity**	**Responsibility**
Structural Measures		
Microzonation	1. To undertake micro zonation study according to priority area 2. To provide or make available seismic microzonation	• Deptt. of Disaster Management./WBSDMA • Science & Technology Department. • IIT Kharagpur.
	3. Provide vulnerability and risk assessment map	• Deptt. of Disaster Management./WBSDMA
Earthquake Resistance Design for different earthquake zones	1. To develop earthquake resistant design features for the construction of public utility structures	• Deptt. of Disaster Management. • Relief Commissioner. • Deptt. of Development & Planning Deptt. Municipality & Urban development.
	2. To develop earthquake resistant design features for the construction of public utility structures	
	3.To provide earthquake resistant design for incorporating in different types of structures to the line departments	

Structural & Non-structural Measures		
Task	Activity	Responsibility
Contd.	Structural Measures	
Strengthening of infrastructure	1. Construction of missing roads and bridges in cyclone prone areas 2. Strengthening/repair of existing roads and bridges in cyclone prone areas. 3. Strengthening of dams and canals 4. Saline Embankment-new/repairs repairs of existing	• Dept. of Disaster Management. • Relief Commissioner. • Dept. of Forest • P & RD Dept. • Dept. of Environment. • Irrigation Dept.
Forecasting and Warning	1. Strengthening and Upgradation of existing Cyclone and tsunami forecasting system 2. Establish infrastructure for Cyclone/tsunami warning and dissemination to the on shore/off shore coastal areas 3. Develop specific warning dissemination system for ports, beach, salt workers and fishermen.	• IMD • Dept. of Disaster Management • Relief Commissioner • Dept. of Fishery • Coast Guard
	Non Structural Measures	
Capacity building	1. Departmental cyclone/tsunami contingency plan 2. Cyclone/tsunami related departmental action plan and SOP 3. Imparting training to the stakeholders involved in Cyclone mitigation and management	• Disaster Management Dept./WBSDMA • Education Dept. • Line Dept. • ATI/SIPRD/ILGUS • Dept. of Information & Cultural Dept.

Structural & Non-structural Measures		
Task	Activity	Responsibility
Contd.	Non Structural Measures	
Awareness	1. Disseminate cyclone/tsunami risk to general public residing in coastal areas 2. Campaign for Cyclone/tsunami safety tips	• Disaster Management Dept./WBSDMA • Education Dept. • Line Deptt. • ATI/SIPRD/ILGUS • Dept. of Information & Cultural Deptt

3.2.3: Flood:

Floods being the most common natural disaster, people have, out of experience, devised many ways of coping with them. However, encroachments into the flood plains over the years have aggravated the flood problem and a need to take effective and sustained mitigation measures. Various measures, structural and non-structural, have been described below:

Structural & Non-structural Measures		
Task	Activity	Responsibility
	Structural Measures	
Construction	1. Improvement of design for irrigation and flood protective structures 2. Construction of dams, flood protection wall, flood diverting channels etc. 3. Strengthening/repair of existing roads and bridges and other critical infrastructure in flood plains. 4. Strengthening of dams and canals.	• Disaster Management Deptt./WBSDMA • Relief Commissioner • Irrigation Deptt. • P&RD • Line Deptt
Development of catchment area	1. Development of catchment area of the flood plain o Forestation o Land sloping	• Deptt. of Disaster Management. • Relief Commissioner. • Deptt. of Forest

Structural & Non-structural Measures		
Task	**Activity**	**Responsibility**
Structural Measures		
Retrofitting of existing structure	1. Create a database of existing structure in the State A. Public B. Private 2. Identify the available resources 3. Identify structures that require retrofitting 4. Prepare a scheme /programme for retrofitting 5. Identification and removal of unsafe buildings /structure	• Municipality & Urban Development Deptt. • Municipal Corporations • WBHIDCO • P&RD Deptt. • Housing Board • ULB & PRI
Monitoring of seismic activities	1. Establish seismological network and round the clock monitoring 2. Dissemination of information and reporting 3. Conduct seismological research	• Deptt. of Disaster Management./WBSDMA • Science & Technology Department • IMD, Eastern Zone
Non-structural Measures		
Capacity Building	1. Departmental earthquake contingency plan 2. Ensure earthquake related departmental action plan and SOP 3. Include earthquake engineering topics in curriculum	• Disaster Management Deptt./WBSDMA • Education Deptt. • Line Deptt. • ATI/SIPRD/ILGUS • Deptt. of Information & Cultural Deptt.

Task	Activity	Responsibility
Contd.	Non-structural Measures (Contd.)	
Capacity Building	4. Provide professional training about earthquake resistance construction to engineers and architects 5. Provide training to masons. 6. Encourage soil and material testing in laboratories	
Awareness	1. To disseminate earthquake risk to general public residing in earthquake prone zones 2. Campaign for Earthquake safety tips	• Disaster Management Deptt./WBSDMA • Education Deptt. • Line Deptt. • ATI/SIPRD/ILGUS • Deptt. of Information & Cultural Deptt.

3.2. Cyclone, Storm Surge and Tsunami :

Tropical cyclones are characterised by destructive winds, storm surges and very heavy rainfall, each one having its own impact on human and livestock, and their activities. Of these, storm surge and sea waves are responsible for 90% of the loss of lives associated with cyclone and tsunami disaster. The mitigation measures are described as below:

Structural & Non-structural Measures		
Task	Activity	Responsibility
	Structural Measures	
Shelterbelt	1. Shelterbelt plantation and mangrove regeneration	• Deptt. of Disaster Management. • Relief Commissioner. • Deptt. of Forest • P & RD Deptt.
Providing Cyclone Shelters	1. Construction of Cyclone shelters in Cyclone prone areas.	• Dept. of Disaster Management. • Relief Commissioner. • Dept. of Forest • P & RD Dept. Dept. of Environment.

Structural & Non-structural Measures		
Task	Activity	Responsibility
Contd.	Structural Measures	
	o Small reservoirs/Check dams /ponds etc.	• P & RD Deptt. Deptt. of Environment. • Irrigation Dept.
Flood proofing	1. Specific building bye laws for flood plains	• Dept. of Disaster Management. • Relief Commissioner. Deptt. of municipality & Urban Development • P & RD Dept. • Irrigation Dept. • Local Bodies
Techno-Legal Regime	1. Enactment and enforcement of laws regulating developmental activities in flood plain	• Disaster Management Dept. • RC • Irrigation Dept. • M& UDD, P & R D • Local Bodies
Forecasting & Warning	1. Strengthening and Upgradation of existing Flood forecasting system 2. Establish infrastructure for flood warning and dissemination.	• DM Dept. • RC • Irrigation Dept • CWC • IMD
	Non Structural Measures	
Capacity building	1. Departmental flood contingency plan 2. Flood related departmental action plan and SOP 3. Imparting training to the stakeholders involved in flood mitigation and management.	• Disaster Management Dept./WBSDMA • Education Dept. • Line Dept. • ATI/SIPRD/ILGUS • Irrigation Dept. Dept. of Information & Cultural Dept.

Structural & Non-structural Measures		
Task	Activity	Responsibility
Contd.	Non Structural Measures	
Awareness	1. Disseminate flood risk to general public residing in flood prone zones 2. Campaign for Flood safety tips	• Disaster Management Dept./WBSDMA • Education Dept. • Line Dept. • ATI/SIPRD/ILGUS • Irrigation Dept. • Dept. of Information & Cultural Deptt.
Review of rules	Review of operational rules for reservoirs	• DM Dept. /WBSDMA • RC • Irrigation Dept

3.2.4: Drought:

Drought is an insidious natural hazard that results from a departure of precipitation from expected or normal that, when extended over a season or longer period of time, is insufficient to meet the demands of human, plant and animal activities.

Agricultural statistics play a vital part in combating distress arisen out of drought. For the last few decades this state becomes a food surplus one. So famine does as immediate consequence not follow drought. But statistics collected on a scientific basis and at regular intervals are all the more vital. They will serve as a safe guide to the District Magistrate in formulating his policies for tackling the problems of relief in his district. They give timely warning of climatic danger, prevent surprise and provide information for plan, draw attention, in ordinary times, to weak points in the conditions of a district, thereby preparing the way for timely improvements, which will fortify the people against times of pressure. The drought mitigation measures are given in the following page:

Structural & Non-structural Measures		
Task	**Activity**	**Responsibility**
	Structural Measures	
Construction	1. Construction of dams, reservoirs, lift irrigation, tube wells and canals for surface irrigation 2. Construction of percolation tanks, check dams, farm ponds, etc. 3. Construction of warehouses and cold storages for preservation/storage of food grains.	• DM Dept. • RC • Irrigation Dept • Agriculture Dept. • P&RD Dept. • PHE Dept.
Repairs, upgradation and strengthening	1. Repairs, upgrading and strengthening of dams, reservoirs, lift irrigation and canals for surface irrigation 2. Repairs, upgrading and strengthening of percolation tanks, check dams, farm ponds, etc.	• DM Dept. • RC • Irrigation Dept • Agriculture Dept. • P&RD Dept. • PHE Dept
Techno-legal regime	1. Enactment and enforcement of laws regulating ground water level and exploitation of natural resources	• DM Dept. • RC • Irrigation Dept • Agriculture Dept. • P&RD Dept. • PHE Dept • Local Bodies
Adaption of new technology	2. Application of advanced Agro-Science technology and agro-engineering inputs to improve agriculture production	• DM Dept. • RC • Irrigation Dept • Agriculture Dept. • P&RD Dept. • PHE Dept

Structural & Non-structural Measures		
Task	Activity	Responsibility
Contd.	Structural Measures	
Forecasting and Warning	1. Strengthening and Upgradation of existing Drought forecasting system 2. Establish infrastructure for drought warning and dissemination	• IMD • DM Dept. • State EOC • I & W Dept.
	Non Structural Measures	
Capacity building	1. Departmental drought contingency plan 2. drought related departmental action plan and SOP 3. Imparting training to the stakeholders involved in drought mitigation and management. 4. Encourage people to use advance technology of drip and sprinkler irrigation 5. Encourage water harvesting 6. Encourage farmers to understand crop pattern to be adopted in their area 7. Rational use of fertilizers and pesticides 8. Encourage the adaptation of technique for preservation of green fodder	• DM Dept. • RC • Irrigation Dept • Agriculture Dept. • P&RD Dept. • PHE Dept • Forest & Environment Dept. • All Line Dept. • NIDM state Wing • State-IAG

Structural & Non-structural Measures		
Task	Activity	Responsibility
Contd.	Non Structural Measures	
Awareness	1. Disseminate drought risk to general public residing in drought prone zones 2. Campaign for drought tips for agriculture, general public and industries	• DM Dept. • RC • Irrigation Dept • Agriculture Dept. • Information Dept. • All line Dept.

3.2.5: Land Slide:

Structural & Non-structural Measures		
Task	Activity	Responsibility
	Structural Measures	
Hazard Mapping	1. To locate areas prone to slope failures to 2.Identify avoidance of areas for building settlements.	• DM Dept. • Dept. of Forest & Environment. • Dept. of Home • I&W Dept. • Dept. of Science & Technology • Dept. of Tourism • PWD Dept. • GSI • Dept. Transport. • Dept. of PHE • Local Bodies
Land use practices	1. Aforestation of areas covered by degraded natural vegetation in upper slopes with suitable species. Preservation of existing patches of natural vegetation (forest and natural grass land) in good condition. 2. Any developmental activity initiated in the area should be taken up only after a detailed study of the region and slope protection should be carried out if necessary	

Structural & Non-structural Measures		
Task	Activity	Responsibility
Contd.	Structural Measures	
	3. Construction of roads, irrigation canals etc.& avoid blockage of natural drainage. 4. Total avoidance of settlement in the risk zone. 5. Relocate settlements and infrastructure that fall in the possible path of the landslide. 6. No construction of buildings in areas beyond a certain degree of slope.	
Retaining Walls	1. Construction of Retaining Walls to stop land from slipping (these walls are commonly seen along roads in hill stations).	• Dept. of Tourism • PWD Dept. • Dept. Transport. • Dept. of PHE • Local Bodies
Surface Drainage Control Works:	1. Implementation of surface drainage control works control the movement of landslides accompanied by infiltration of rain water and spring flows.	• PWD Dept.. • Dept. of PHE • Local Bodies
Engineered structures	1. Engineered structures with strong foundations. Underground installations (pipes, cables, etc) should be made flexible to move in order to withstand forces caused by the landslide.	• PWD Dept.. • Dept. of PHE • Local Bodies

Structural & Non-structural Measures		
Task	**Activity**	**Responsibility**
Contd.	**Structural Measures**	
Increasing vegetation cover	1. Increasing vegetation cover for arresting landslides. Prevention of excessive run-off and soil erosion. Afoerestation of revetment wall and its surroundings with local varieties of grass, bamboo or wild fern, which can protect the better from the splashing of rain.	• Deptt. of Forest & Environment • Deptt. of Tourism • Local Bodies
Techno-Legal Regime	1. Review and revision of town planning Act & Rules	• PWD Deptt. • DM Deptt. • Local Bodies
	2. Ensure strict implementation of Code and Rules	
	3. Monitoring of quality construction	
	Non Structural Measures	
Capacity building	1. Departmental Land Slide contingency plan 2. Land Slide related departmental action plan and SOP 3. Imparting training to the stakeholders involved in Land Slide mitigation and management. 4. Encourage people to use advance technology . 5. Encourage aforestation 6. Encourage the adaptation of technique for preservation of vegetation	• DM Deptt. • PWD Deptt. • Local Bodies • NGOs

Structural & Non-structural Measures		
Task	Activity	Responsibility
Contd.	Non Structural Measures	
Awareness	1. Disseminate drought risk to general public residing in drought prone zones 2. Campaign for drought tips for agriculture, general public and industries	• DM Deptt. • PWD Deptt. • Local Bodies • NGOs

3.3: Hazard Specific Mitigation Measures:

The United Nations has declared the 1990s to be the International Decade for Natural Disaster Reduction (IDNDR). Specifically, it focuses primary attention on planning and preparedness for hazards rather than waiting passively for them to strike. The belief is that post-disaster relief, while humanitarian in its motivation and certainly necessary, is relatively ineffective as compared with various actions that could be taken before disaster strikes. In any case, preparedness is the key to effective action after the event. The roles of training, education, and information dissemination is therefore been given a high priority.

Man made possible disasters specific for West Bengal may be listed as follows: Industrial accidents, Mining accidents, Road accidents, Rail accidents, Aviation disorders, Fire, Communal riots, Terrorist attacks.

Natural disasters specific to West Bengal are: Cyclone, Storm surge, Flood, Landslide, Drought, Earthquake.

Preventive measures mean activities to provide outright avoidance of the adverse impact of hazards and means to minimize related environmental, technological and biological disasters.

Depending on social and technical feasibility and cost/benefit considerations, investing in preventive measures is justified in areas frequently affected by disasters. In the context of public awareness and education, related to disaster risk reduction changing attitudes and behaviour contribute to promoting a "culture of prevention".Early Warning, Structural measures like development of river dam, embankment, shelters, reconstruction and improvement of existing canals-reservoirs, roads etc.

3.4: Early Warning and Dissemination System

In most disaster situations, the experience has shown that loss of life and property could be significantly reduced because of preparedness measures and appropriate warning systems. The importance of warning systems therefore hardly needs any emphasis. Indiscriminate warnings may result in non-responsiveness of the people. It is therefore necessary that with respect to every disaster a responsible officer is designated to issue the warnings. Alert/Warning indicates the onset of a disaster for which a warning system is essential. This system may range from alarms (e.g., for fires), sirens (e.g., for industrial accidents) to public announcements through radio, television etc. (e.g., for cyclones, floods). Other traditional modes of communication (e.g. beating of drums, ringing of bells, hoisting of flags) are also used in inaccessible areas.

Disaster	Agencies
Earthquakes	IMD, MERI, BARC
Floods	Meteorological Department, Irrigation Department
Cyclones	IMD
Epidemics	Public Health Department
Road Accidents	Police
Industrial and Chemical Accidents	Industry, MARG, Police, DISH, BARC, AERB
Fires	Fire Brigade, Police

The district administration is the prime agency responsible for issuing the disaster warning. Additionally the technical agencies authorized to issue warning will also communicate the same to the District Control Room and in case are mentioned below.

3.4.1: Dissemination of Warning

- Communities in disaster prone areas are made aware of the warning systems.
- All warning systems and technologies are maintained in working condition and checked regularly.
- Alternate warning systems must be kept in readiness in case of technical failure (e.g., power failure).
- Only the designated agencies/officers will issue the warning.
- All available warning systems should be used.

- The warning should to the extent possible be clear about the severity, the time frame, area that may be affected.
- Warning statements should be conveyed in a simple, direct and non-technical language, and incorporate day-to-day usage patterns.
- The do's and don'ts should be clearly communicated to the community to ensure an appropriate responses.
- Warning statements should not evoke curiosity or panic behaviour. This should be in a professional language devoid of emotions.
- Rumor control mechanisms should be activated.
- All relevant agencies and organisations should be alerted.
- Wherever possible, assistance of community leaders and organised groups should be sought in explaining the threat.
- Once a warning is issued, it should be followed-up by subsequent warnings in order to keep the people informed of the latest situations.
- When the disaster threat tiding away, an all clear signal must be given.

3.4.2: Communication and Warning

3.4.3: Current communication System

At present, there is no separate and independent communication network for Disaster Management in the state. After renaming and reorganization of the Department of Relief to that of Disaster Management, the prevailing and conventional communication network is being used along with other State Government Departments.

Existing communication network systems are PSTN, CELLULAR NETWORK & Broad- Band network from State level to Gram Panchayat level.

VSAT network system is available from State Government level to Central Government. At present the existing system of receiving and conveying the cyclone warning system and other natural hazard reports are originated from the Indian Meteorological Department (IMD) and then it is conveyed simultaneously to State Disaster Management department, concerning District and Zilla Parishad authorities and to the AIR & electronic (TV channels) and non-electronic media(newspaper). Existing communication network systems are being used for this whole activity. The Government administration and media depend on the existing telecommunication network.

The population of the affected areas is dependent only on radio & TV broadcast.

3.5 Mitigation

Mitigation distinguishes actions that have a long-term impact from those that are more closely associated with preparedness for, immediate response to, and short-term recovery from a specific disaster, recognizing that the boundaries are not absolute. Mitigation efforts must not only be a priority for the repair, reconstruction, and rehabilitation of developed areas, but must become a prerequisite for growth in areas that have not been developed.

A complicating factor is that there will always be residual losses from extreme events above and beyond those for which mitigation is cost-effective. It may not be economical to protect buildings and infrastructure other than critical facilities from these more extreme events since the increased cost of construction can far exceed the damage prevented.

3.5.1: Earthquake Mitigation Strategy:

1. Engineered Structure: The West Bengal Municipal (Building) Rules 1996 was adequately modified. A special change was made in cases of urbanized municipal areas of hill region.

The strategy should consider

- Structure of the building
- Empanelment of structural engineers
- Listing of insecure building
- Incorporation of BIS code
- Guideline for height restriction
- Demolition policy
- Setting up a technical cell in the government
- Setting up of seismological stations etc.

2. Capacity Building: Earth is a natural event which may cause tremendous loss of life and property damages. One of the major challenges is to reduce the vulnerability to this uncontrollable and unpredictable hazard by having a greater understanding about its causes and effects. Strengthening capacities of the engineers/architects, communities, urban local bodies and the administration in mitigation, preparedness and response through training in earthquake risk management, preparing a suitable model for mainstreaming of earthquake risk management initiative at all levels would help reduce seismic risk of earthquake-prone areas.

3. Seismic Hazard Assessment: Under this study attempts are made to forecast the size and effects of earthquakes in years to come. In seismically active regions any decision making for urban and regional planning should be based on probable characteristics of of earthquakes expected in future. The primary objective of SHA is to construct seismic zoning maps. The main outcome of seismic zoning is that it displays a quantity related to assessed frequency and severity of shaking due to expected future earthquake.

4. Community Based Mitigation: Community preparedness along with public education is vital for mitigating the earthquake impact. Community based Earthquake Risk Management Project should be developed. Retrofitting of schools and important building, purchase of emergency response equipment and facilities, establishing proper insurance can be the programmes under Earthquake Risk Management Project. A large number of local masons and engineers will be trained in disaster resistant construction techniques. A large number of masons, engineers and architects can get trained in this process.

Measures To Be Adopted :

- Preparation of plan
- Training of personnel
- Establishment of alternative means of tele-communication
- Mobilization of Fire Services including auxiliary fireman
- Plans of rescue of casualties trapped under debris
- Provision of hospital, medical and nursing stuff
- Medical plans for improvised first aid posts and emergency hospitals
- Removal of debris
- Emergency sanitation, alternative supply of water, salvage and custody of valuables, care of animals etc.
- Provision for care of homeless, establishment of camps, distribution of essential commodities including food, clothing and shelter
- Disposal of dead and their identification
- Mobilisation of transport
- Requisition of vehicles and issue of petrol, oil, lubricant, spare parts and repair facilities
- Special measures for the protection/repair/restoration of essential service communications, industrial and vital plants
- Protection of property including objects of art and things of cultural importance
- Publicity
- Prevention of panic and upkeep of moral
- Restoration of communications
- Liaison, particularly with the Armed Forces
- Rehearsal without causing alarm or despondency.

3.5.2: Landslide Mitigation Strategies

Hazard mapping will locate areas prone to slope failures. This will permit to identify avoidance of areas for building settlements. These maps will serve as a tool for mitigation planning.

Land use practices such as :

- Areas covered by degraded natural vegetation in upper slopes are to be afforested with suitable species. Existing patches of natural vegetation (forest and natural grass land) in good condition, should be preserved.
- Any developmental activity initiated in the area should be taken up only after a detailed study of the region and slope protection should be carried out if necessary
- In construction of roads, irrigation canals etc. proper care is to be taken to avoid blockage of natural drainage.
- Total avoidance of settlement in the risk zone should be made mandatory.
- Relocate settlements and infrastructure that fall in the possible path of the landslide.
- No construction of buildings in areas beyond a certain degree of slope.

Retaining Walls can be built to stop land from slipping (these walls are commonly seen along roads in hill stations). It's constructed to prevent smaller sized and secondary landslides that often occur along the toe portion of the larger landslides.

Surface Drainage Control Works : The surface drainage control works are implemented to control the movement of landslides accompanied by infiltration of rain water and spring flows.

Engineered structures with strong foundations can withstand or take the ground movement forces. Underground installations (pipes, cables, etc) should be made flexible to move in order to withstand forces caused by the landslide.

Increasing vegetation cover is the cheapest and most effective way of arresting landslides. This helps to bind the top layer of the soil with layers below, while preventing excessive run-off and soil erosion. Moreover, the revetment wall and its surroundings should carefully be afforested preferably with local varieties of grass, bamboo or wild fern, which can protect the better from the splashing of rain.

Insurance will assist individuals whose homes are likely to be damaged by landslides or by any other natural hazards. For new construction it should include standards for selection of the site as well as construction technique.

Community Based Mitigation

The most damaging landslides are often related to human intervention such as construction of roads, housing and other infrastructure in vulnerable slopes and regions. Other community based activities that can mitigate landslides are education and awareness generation among the communities, establishing community based monitoring, timely warning and evacuation system.

Communities can play a vital role in identifying the areas where there is land instability. Compacting ground locally, slope stabilization (procedures such as terracing and tree planting may reduce damages to some extent), and avoiding construction of houses in hazardous locations are something that the community has to agree and adhere to avoid damage from the possible landslides. This would also reduce the burden of shifting of settlements from hazardous slopes and rebuild in safe site as it is less practical to do in large scale.

3.5.3: Subsidence - Mitigation Measures: To mitigate the impacts of mining on land, two basic strategies are required to be followed; these are "Land Reclamation" & "Land Use Plan". It is a fact that any mining degraded land should be reclaimed at the earliest possible opportunity, while reclamation means putting the land to a beneficial use.

Planning for rehabilitation, reclamation & closure of mines involves the following:

1. Assessment of prevailing, i.e. pre-mining land use of the area and the surroundings.
2. Assessment of pre-mining surface drainage pattern
3. Study of structure of the mineral deposit/ body and the geology of the area concerned.
4. Design of the method of the working keeping in view the prevailing land use so as to have minimum possible impacts of mining on the land use.
5. Assessment of the life of the mine and the quality of the overburden to be kept outside the mine including the period for which the overburden will be kept outside.

3.5.3.1: Action Plan For Prevention Of Subsidence

A) **Regarding Land Acquisition for the proposed rehabilitation site:** For the purpose of setting up of two townships cabinet has accorded approval for the acquisition of land at Bonjemari and Gourangdih on 18-08-2010.

B) **Regarding Demographic Survey:** Asansol Durgapur Development Authority had engaged an agency for the purpose of conducting demographic survey and valuation in all the identified unstable locations.

3.5.4: Drought-Main Mitigation Strategies:

Drought monitoring is continuous observation of rainfall situation, water availability in reservoirs, lakes, rivers and comparing with the existing water needs of various sectors of the society.

Water supply augmentation and conservation through rainwater harvesting in houses and farmers' fields increases the content of water available. Water harvesting by either allowing the runoff water from all the fields to a common point (e.g. Farm ponds) or allowing it to infiltrate into the soil where it has fallen (e.g. contour bunds, contour cultivation, raised bed planting etc.) helps increase water availability for sustained agricultural production.

- Expansion of **irrigation** facilities reduces the drought vulnerability.
- **Land use** based on its capability helps in optimum use of land and water and can avoid the undue demand created due to their misuse.
- **Livelihood planning** identifies those livelihoods which are least affected by the drought. Some of such livelihoods include increased off farm employment opportunities, collection of non-timber forest produce from the community forests, raising goats and carpentry etc.
- **Drought planning:** The basic goal of drought planning is to improve the effectiveness of preparedness and response efforts by enhancing monitoring, mitigation and response measures. Planning would help in effective coordination among state and national agencies in dealing with the drought. Components of drought plan include establishing drought taskforce which is a team of specialists who can advise the government in taking decision to deal with drought situation, establishing coordination mechanism among various agencies which deal with the droughts, providing crop insurance schemes to the farmers to cope with the drought related crop losses, and public awareness generation.

Study of Agricultural Operation: the District Magistrate should know what is the amount of rain that is necessary and the periods within which the rainfall should occur in order that the main crops of his district may be secured. He should also know how much the main crops depend on rainfall and how much on irrigation. He must keep in touch with the progress of agricultural operations, and the condition of standing crops. This will help in regulating the distribution of water in his district. Statistical graphs for the whole district would be useful.

Study of the normal economic condition of the people: The District Magistrate should make a special study of the normal condition of the people of his district, panchayat by panchayat. He should study the histories of previous crop failures and distress, if any, with the object of ascertaining the extent of the loss of crops, and the amount of help that had to be given on these occasions. He should investigate the changes in the general conditions of his district, whether for better or worse, which have taken place in recent years. He should also note (1) how far the people derive Support from Sources which are not purely agricultural, (2) whether there are any special industries or specially productive crops (whether food or other crops), and (3) whether ordinarily, large number of people leave the district for a portion of the year in order to obtain service in other districts. In short' every consideration bearing on the economic conditions of his district should receive his most careful attention.

Measured To be adopted: BDO should prepare a consolidated action plan in the apprehension of any drought condition. Following measures should be adopted by line departments and incorporated in the action plan at block level.

- Early Warning System
- Contingency Planning For Agriculture
    i. Crop life saving measures.
    ii. The alternative cropping strategy.
    iii. Compensatory Cropping Programme.
    iv. Supply of Inputs.
    v. Provision for Irrigation.
    vi. Supply of Power

- Drinking Water
    i. A detailed contingency plan for supply of drinking water in rural areas to be formulated
    ii. Made adequate plans to supply drinking water in urban areas

- Water Resources
    i. Prepare a water budget for each irrigation reservoir covering drinking water, kharif and rabi requirements and evaporation losses, after working out a trade off between kharif and rabi benefits from the available water
    ii. Plan for undertaking repairs of tubewells to make all tubewells operational and install additional tubewells taking care at the same time to prevent over exploitation of and damage to ground water regime.
    iii. Plan for regulating supply to water-intensive industries , if necessary

- Employment Generation
- Plan for adequate Employment Generation Works by deviating funds available under schemes like MNREGA.
    i. Shelf of project should be kept ready to be taken up for Employment Generation during drought
    ii. Drought proofing schemes to be identified and to be given high priority.

- Public Health
    i. Plan for disinfecting drinking water sources
    ii. Draw up plans to cope with likely epidemics
    iii. Plan for constant surveillance of public health measures including immunisation

- Women And Children
    i. Plan for the nutritional requirements of all the children, expectant mothers and nursing mothers

- Fodder
    i. Plan for assessing fodder requirement and arranging supply from outside
    ii. Plan for monitoring the prices of fodder
    iii. Plan for procurement of fodder

3.6: FLOOD - Main Mitigation Strategies:

Mapping of flood prone areas is a primary step involved in reducing the risk of the region. Historical records give the indication of flood inundation areas and the period of occurrence and the extent of the coverage. The basic map is combined with other maps and data to form a complete image of the flood-plain. Warning can be issued looking into the earlier marked heights of the water levels in case of potential threat. In the coastal areas, the tide levels and land characteristics will determine areas liable to inundation. Flood hazard mapping will give the proper indication of water flow during floods.

3.6.1: Approach to Flood Management

(i) Structural measures:

Attempts to Modify Flood.

(a) Dams and Reservoirs
(b) Embankment
(c) Drainage Improvements
(d) Channel Improvements
(e) Diversion of Flood Waters
(f) Using Natural Detention Basin.

North Bengal districts are more flood prone for having an average rainfall of 3000 + mm. annually. In last few decades, floods have actually become a routine in many southern districts as well. As it stands now, 42% of the land area of this state is known to be flood prone. Historically, reducing the impact of floods depends on structural measures. In West Bengal it started with Zamindary embankment, followed by retired embankment, dams and barrages. More than 16000 km. of river embankments and eight dam systems exist in the state apparently to reduce flood impact and improve irrigation.

Over the years, limitations of structural measures have surfaced and the emphasis began to shift to strengthening non-structural measures. In particular, the emphasis is now on disaster preparedness, and linking preparedness to long-term development.

(ii) Non- Structural Measures:

(a) Attempts to modify susceptibility of Flood.

- **Flood plain zoning:** It aims to regulate the developments in the flood plains, so that it is compatible with 'Flood Risk'. It recognises the basic fact that the flood plains are essentially the domain of the river, and as such all developmental activities must be compatible with the flood risk involved.

  Steps:

  1) Demarcate area liable to floods of different frequency.
  2) Prepare detailed maps.
  3) Detail out the use to which the flood zones can be put.

- **Flood forecasting:** Involves observing and collecting hydrological and meteorological data, transmission and then processing the data with a view to work out the likely level to be achieved at a particular site, i.e. to give advance warning.

- **Flood proofing(including disaster preparedness):**

  The objectives and scope:

  (i) flood proofing of civic amenities
  (ii) relieve drainage congestion.

It is essentially a combination of structural change and emergency action without evacuation. A programme of the flood proofing provides the raised platforms for flood shelter for men and cattle and raising the public utility installations above flood levels.

(b) Attempts to modify loss burden

- Disaster relief
- Flood fighting
- Flood insurance

(c) Living with flood

- Encourage ancient wisdom

3.6.2: Measures to be adopted at Block Level: Following measures should be taken at Block level by the BDO on whom the implementation of BLDMP rests. Action plan of relevant line departments should be put into order.

- Convening a meeting of Block Level Disaster Management Committee before the onset of monsoon in the month of March/early April.
- Arrangement for functioning of control room. Specific charge should be given at Block level to listen to weather bulletins from radio and television to monitor the warning relevant to the Block.
- A joint inspection team at block level will inspect river embankments in the month of March and April. A summary report will be sent to the Sub-Division and District accordingly.
- When monsoon breaks, BDO will send the daily/ weekly report regularly from the report received from village and gram panchayat levels in Form...to the Sub-Divisional Officer and District Magistrate.
- Dissemination of weather report and flood bulletins to lower level.
- Installation of temporary police wireless stations and temporary telephones in flood-prone areas.
- Identification of the owners of country mechanised boats with address and contact numbers.
- Storage of food in interior, vulnerable, strategic and key areas.
- Arrangement of dry foodstuff and other necessities of life.
- Arrangement for keeping the drainage system desilted and properly maintained.
- Health measures.
- Veterinary measures.
- Selection and maintenance of flood shelters.
- Alternative drinking water supplies arrangements and
- Other precautionary measures.

3.7. : Cyclone-Mitigation Strategy:

a) Measures for more efficient storm tracking,

b) Measures for rapid dissemination of warnings issued by the Area Cyclone Warning Center, Kolkata,

c) Emergency measures like evacuation from threatened areas during cyclone situation,
d) Post disaster measures,
e) Long term measures for preparedness to combat cyclone in general and
f) Community preparedness programme.

Warning System: Cyclones have the best predictability among all disaster phenomena. Low pressure and the development can be detected hours or days before its damage effects start. Satellite tracking can track the movement since the build up and the likely path is projected. Warning and evacuation is done along the projected path. The magnitude of the accompanying hazard of storm surge is also predictable through techniques which take into account the parameters of the approaching cyclone as well as the physical and oceanographic characteristics of the coast in the area of anticipated landfall i.e., the place where the cyclone is expected to hit the coast.

It is difficult to predict the accuracy. Accurate landfall predictions can give only a few hours' notice to threatened populations. In addition, people generally opt to wait until the very last minute before abandoning their home and possessions. Deaths from drowning in the high tides and sudden flooding and material losses are therefore often very high. Forecasting is the next step in disaster reduction. But forecasting should be based on sound scientific principles and operationally proven techniques. Forecasting should be done by an authorized agency that, besides being competent, experienced, responsible and accountable, is conscious of the end use of the forecast, its implications, and the dependence of the success of disaster reduction on the forecast.

Once a forecast is available regarding an anticipated disaster event, it should be converted quickly into an area-specific and time-specific warning. Furthermore, the warning should be user-specific because the capacity of different user to withstand the onslaught of disaster is different.

Cyclone forecasting and warning services are the responsibility of the India Meteorological Department (IMD). The IMD issues warning against severe weather phenomena like tropical cyclones, heavy rains and snow, cold and heat waves, etc., which cause destruction of life and property.

Cyclone warning is disseminated by several means such as satellite based disaster warning systems, radio, television, telephone, fax, high priority telegram, public announcements and bulletins in press. Advancement in Information Technology in the form of Internet, Geographical Information System (GIS), Remote Sensing, Satellite communication, etc. can help a great deal in planning and implementation of hazards reduction schemes.

Once the current status of a cyclone and its forecast behaviour are available, the next is to formulate the area-specific cyclone warnings which are addressed to the State Relief Commissioner and other relevant departments. Immediately on receipt of the first information regarding a cyclone, the State Level Disaster Management Committee, the State Disaster Management Group and EOC should be informed and activated through SRC. The State has SMS based Early Warning System for alerting all the mobile users in the state of the advent of natural calamities.

Two stages warning system: IMD issues cyclone warning in two stages-

1. Cyclone Alert : It is issued by Area Cyclone Warning Center (ACWC), Kolkata to State Relief Commissioner and the District Magistrates of coastal districts by high priority telegrams or over phone or by Fax messages as far as possible 48 hrs. before the commencement of apprehended cyclone. These are also sent over police wireless.
2. Cyclone Warning: These are issued 24 hrs. before commencement of adverse weather. However, on the occasions of sudden development, the first stage is skipped.

These bulletins and all other subsequent bulletins are also broadcasted through AIR. These are continued till the storm crosses coast and weakens or the districts are no longer likely to experience adverse weather.

In addition to the above available channels, the India Meteorological Department has introduced a satellite communication link with the lowest level. The system is known as "Cyclone Warning Dissemination System (CWDS)". The dish antenna, battery packed receiver and siren is placed in a local police station or local B.D.O. Office. The receiver is energized by a signal issued from Cyclone Warning Center via INSAT. This communication system is not disturbed by cyclonic winds or heavy rains and the warning and de-warning messages are disseminated without the threat of any disruption. The siren is heard for three minutes. The duty officer disseminates the warning immediately to concerned B.D.O., Savapati, Officer-in-Charge of Police Station, Pradhan and G.P. Members.

3.7.1: Vulnerability Assessment: Meteorological records of the wind speed and the directions give the probability of the winds in the region. Past records and paths can give the pattern of occurrence for particular wind speeds. A hazard map will illustrate the areas vulnerable to the cyclone in any given year. It will be useful to estimate the severity of the cyclone and various damage intensities in the region. The map is prepared with data inputs of past climatological records, history of wind sped, frequency of flooding etc. List of most vulnerable villages based on past disasters and rainfall position should be prepared and should be lying with BDO.

Land use control: It is designed so that least critical activities are placed in vulnerable areas. Location of settlements in the flood plains is utmost risk. Siting of key facilities must be marked in the land use.

Engineered Structures: Structures need to be built to withstand wind forces. Good site selection is also important. Majority of buildings in coastal areas are built with locally available materials and have no engineering inputs. Good constructions practice should be adopted.

Community Based Mitigation: Construction of cyclone resistant houses and strengthening of existing houses should be done through community participation. Local engineers and masons can take part in the construction of the buildings in their area and demonstrate to the people about disaster resistant construction methods. Multipurpose cyclone shelters should be used as schools or community centers in normal times. In case of cyclone or floods, community should take shelter in these designed buildings. The local communities will be responsible for the maintenance and management of these community shelters. Protection measures should be taken for the livestocks, the boats, fishing nets, household items and other possessions.

Measured to be adopted at Block level: Similar remarks apply to cyclone as in floods. In addition to that, the BDO should ensure that action is taken for opening of cyclone stores for providing following materials:

1. Hooks of the type available with the Fire Service Department for cleaning debris,
2. Rubber tires and tubes for using as floats in water,
3. Tents,
4. Kerosene Lanterns,
5. Large cooking vessels for use in relief camps, Copies of Maps etc.,
6. Ropes, wires, chains, lights with wire fittings, torches etc.,
7. Double handle saws (for cutting trees), shovels, candles, land hailers, hose pipes, first aid kits, empty drums, gunny bags and sand bags, polythene bags (for dropping supplies), buckets,
8. Fodders, pumps etc.

3.7.2: Mitigation Strategy

- Risk reduction measures ensure long-term economic success for the community as a whole rather than short-term benefits for special interests.
- Mitigation supports the building (or rebuilding) of communities as models of sustainable development, so that they are likely to recover more quickly from the economic impacts of disasters and the people are disaster survivors, not disaster victims.

- Risk reduction measures for one disaster must be compatible with risk reduction measures for other disasters.
- Risk reduction measures must be evaluated to achieve the best mix for a given location.
- All mitigation is local.
- Disaster costs and the impacts of hazards can be reduced by emphasizing pro- active mitigation before emergency response, that is both pre-disaster and post- disaster mitigation.
- Hazard identification and risk assessment are the cornerstones of mitigation.
- Building new Centre-State-local partnerships and public-private partnerships are the most effective means of implementing measures to reduce the impacts of hazards.
- Those who knowingly choose to assume greater risk must accept responsibility for that choice.
- Risk reduction measures for hazards must be compatible with the protection of natural and cultural resources.
- Significant technical know-how is finding its way into practical application.
  Mitigation is being recognized as an integral component of sustainable development.
- There is growing acceptance of the need to develop a multi-disaster approach to mitigation.
- There is an ongoing UNDP sponsored programme to define the roles of Central government and State governments for reducing the impacts of disasters.

Goals of Mitigation Strategy

To substantially increase public awareness of disaster risk so that the public demands safer communities in which to live and work.

To significantly reduce the risks of loss of life, injuries, economic costs, and destruction of natural and cultural resources that result from disasters.

Cost-Benefit Analysis

The underlying assumption of mitigation is that in the long-term analysis, the expenditure on mitigation measures will prove to be cost-effective in terms of the savings generated via reduced losses and reduced deaths. The hazard assessment and the vulnerability analysis can, to an extent, project the probable future losses. While the specific time and location of future losses cannot be specified, general trends, and areas of elevated risk can be identified. Specific mitigative actions can be taken to prevent losses in these areas. However, such actions do have a cost built into them, in terms of relocation or structural enhancements or protection. This cost, however, will be offset by the expected reduction in loss during a disaster. The difference between the cost of mitigation and the cost of expected loss, is a tangible financial benefit.

While it is difficult to quantify many intangible assets like loss of life or disruption in social structure, studies done in many countries have clearly demonstrated the benefits of mitigation as compared to the expenditure incurred on mitigation. These then, are the various non-financial benefits of mitigation. A cost benefit analysis of any proposed mitigation measure is therefore, essential to analyze the extent of loss-reduction. The effectiveness and efficiency of mitigation investments is directly influenced by scientific development in hazard identification and loss reduction measures. For this reason, scientific and engineering research provides the foundation for improved mitigation investment returns.

Co-Ordination between various agencies involved in rescue and relief work is extremely important for success in avoiding gaps and duplication. Pre-disaster preparedness needs to be based on preparing likely damage scenario in probable earthquake occurrences and the estimate of extent of efforts required the following preparedness actions will be useful.

- Community should be trained in search, rescue and relief at the time of disaster in high-risk areas.
- An extensive programme of mass drills may be very helpful in high-risk areas for earthquake damage reduction.
- Local NGOs should be trained and their capacity and capabilities should be strengthened.
- Introducing earthquake disaster safety do's and don'ts and drills in schools.
- To organise training of field personnel of the states in the science and art of carrying out post disaster damage surveys, (a) for urgent relief purposes, (b) for repair, reconstruction and retrofitting purposes.

Consolidation & Reconstruction

An effort needs to be made in the emergency phase, to involve the affected people to the maximum extent so as to create a feeling of self-reliance. They need to be started as quickly as possible so that the period of relief is minimised.

- Detailed survey of building for assessment of damage and decision regarding repair, reconstruction and strengthening or demolition.
- Repair, reconstruction and seismic strengthening or demolition.
- Selection of sites for new settlements, if required.
- Execution of the reconstruction programme.

- Review of the existing seismic zoning maps and risk maps.
- Review of seismic codes and norms of construction.
- Training of personnel, engineers, architects, builders and masons.
- Statistical studies regarding and earthquake.

3.8: DROUGHT

Essential preparatory measure in respect of drought is to keep a close watch on the behavior of monsoon. Advance action is to be taken to remove or minimize the unfavorable impact of the weather condition. Since the damage of agricultural products is found due to drought, proper arrangement to procure adequate seeds to different. Agricultural products are to be taken well in advance. The availability and requirements of fertilizers would also be of importance. Attention is to be given to the related problems of providing institutional credit, intensifying extension efforts through field staff to guide the farmers towards the best alternative under condition of delayed monsoon.

With the help of different organizations who are closely associated with agricultural matters and also Meteorological Department. of Government of India a committee is to be set up to give advice to tackle the situation arising out of drought. Advance planning in arrangements, supply of irrigation water, fertilizers etc. can also be suggested by the said committee.

The persons engaged with cultivation directly or indirectly do not get work regularly due to drought. To maintain their livelihood, it is necessary to form employment generation schemes with the help of other departments viz. Rural Development, I&W, PWD, PHE etc. involvement of Zilla Parishad is also necessary for the purpose. A Co-ordination Committee in the district is to be set up with the representatives of different departments under the chairmanship of the concerned District Magistrate to chalk out plans and programmes for the schemes and also for implementation of the same. The Relief Department, being the nodal department of relief work will review the schemes and other matters relating to relief work on account of drought at regular intervals with the help of concerned departments.

3.8.1 : Recommendations on Drought Disaster Management

- Food for Work' approach should become an integral part of drought mitigation strategy.
- Impact of drought on agricultural economy should be assessed in terms of indicators like area sown, input use, livestock, crop yield, farm and overall income, employment and migration of families.

- Impact of drought on the poor in urban areas should also be assessed.
- Great stress be laid on preventing deterioration in quality of life during drought.
- Inter state allocation of central relief should be made more rational and equitable.
- Bank credit to farmers in drought prone areas should be provided with considerable flexibility to diversity their activities. Credit should also be sanctioned with flexible repayment periods with inbuilt replacement rehabilitation at the time of original sanction.
- Key issues requiring immediate attention by credit institutions are:
    - Organising delivery system for disbursing large number of small loans needed and quickly during and after drought.
    - Devising viable policy for developing different repayment schedules in different ecological regions and for various classes of farmers for the same enterprise.
    - Developing different viability norms for Regional Rural Banks [RRB] and its branches in dry regions and devising control policies for subsidizing cost of RRB and other co-operating credit institutions in dry regions.
- The problem of overdose has to be dealt with care. Scarcity-induced-genuine overdose deserves to be dealt with differently from the other more deliberate type of overdose.
- There should be much greater involvement of community based organizations like Panchayats in relief administration.
- Relief provided at the household level should bear a reasonable semblance to the extent of the drought loss.
- Drought mitigation measures should be strengthened with the help of the on- going communication revolution. Remote sensing techniques should be used extensively for drought assessment and mitigation. Satellite data may be used to target potential ground water sites for taking up well digging programmes.
- There should be adequate accountability of drought management authorities at all concerned levels of administration. There should be proper monitoring, assessment and evaluation of actors taken by the authorities.
- Agricultural extension agencies should be effectively involved in drought mitigation efforts; these agencies should remain very alert during the period of drought and should be strengthened in drought prone areas.
- Crop production activities should be reoriented suitably with better understanding of the rainfall pattern in terms of quantum, spread and period of dependable rainfall for each segment of a particular area. Regional agricultural research institutes should be assigned the responsibility to prepare area specific contingency crop plans.

- Timely and adequate supply of inputs like drought resistant seeds by the concerned authorities should receive emphasis.
- There should be Water Availability and Outlook Committee and Impact Assessment Committee at local levels.
- Attention should shift from relief works to prevention of drought through long term curative programmes. This would require a holistic approach with a suitable mix of policy options involving both technology and institutions.
- Area under irrigation should be extended through a judicious combination of several technologies like rain water harvesting, watershed development, reuse and recycling of water, major irrigation projects etc. depending on location specific situations. Water storage capacities should be increased adequately to ward off the difficulties in the event of monsoon failure as well as to meet the demand during dry season.
- In view of the limited scope for extending irrigation, an equal emphasis needs to be given to improving utilisation of existing irrigation potential, promoting water conservation and efficient water management including use of sprinkler and drip irrigation systems.
- Watershed development should have a strong element of public participation.
  Annual desalting and proper maintenance of water harvesting structures is absolutely necessary to prevent their quick silting needing replacement. Empowerment of people is necessary for this. Water harvesting should be integrated with village development and other natural resource management programmers.
- The earlier practice of regular desalting of ponds, tanks, lakes etc. by local public should be restored.
- Agriculture in drought prone areas should be diversified by adopting cropping pattern needing less water. Moreover, cultivation of short duration crops and mixed cropping should be encouraged.
- Activities like forestry, livestock and industries should be developed on priority basis in drought prone areas.
- The various central and state government agencies should be utilized for promotion of rural industries in drought prone areas.
- The approach to any preferred set of activities to be adopted for the drought prone areas should be decentralised or area specific rather than uniform for the country as a whole.

3.9 : Training Need Analysis:

One of the most critical components of preparedness is the training to be imparted to the officials and staff of the various departments involved at the state and the district level. Through the training inputs it is visualized that both information and methodology will be shared with the concerned actors. The training activity will be undertaken both at state level and at the district level through NGOs, government training institutions and institutions affiliated to universities and research centers.

3.9.1 : The entity shall develop and implement a training/educational curriculum to support the programme

The need for action and intervention in a disaster situation is at multiple levels and cuts across various sectors. The quality of intervention depends a lot on the inter-sectoral, inter-departmental coordination and efficient teamwork. Thus, it is pertinent to assess the specific training requirements of the key personnel to be involved in the intervention.

Training Needs Assessment (TNA) exercises for different categories and levels of functionaries will enable identification of the gaps that need to be attended to through training activities. These will be done by assessment of the level of knowledge, attitudes and skills, with respect to the task to be undertaken and the expected levels of knowledge, attitudes and skills. Preparation of training modules and materials based on such TNA exercises will be undertaken by the training institutions.

3.9.2 : The objective of the training shall be to create awareness and enhance the skills required to develop, implement, maintain, and execute the programme.

Communities and individuals can reduce their risk from hazards, they need to know the nature of the threat and its potential impact on them and the community. Achieving widespread public awareness of hazards, the options for reducing risk or impact and how to carry out specific mitigation measures, will facilitate informed decisions on where to live, purchase property, or locate a business. Local decision makers will know where to locate and appropriately construct critical facilities, to reduce potential damage from hazards. Communities must be fully aware of its vulnerability to natural hazards as also means to reduce their impacts, before it can insist upon and support actions to mitigate the impacts and take the individual steps necessary to protect lives and property. Generating this level of awareness is perhaps the most challenging task. The public must view hazard mitigation as a basic component of civic responsibility.

Much is already known about the potential for and impacts of natural hazards and the preventive actions that can be taken to mitigate those impacts. The community awareness and training activities will basically be carried out in the form of training programmes through NGOs, Private Sector, and Government training Institutions.

3.9.3 : Frequency and scope of training shall be identified

The scope of training shall include:

- A strategic all-hazards awareness, training, education plan and an evaluation of the most effective methods and messages, involving hazard-resistant planning, designing safety programs and community risk - reduction activities. Additionally, this would include communicating the achievements, progress and success of the mitigation strategy and evaluating and updating tools (documents, plans, training courses, and other mitigation guidance materials) to reflect state- of-the-art technology and engineering practices.
- A programme targeted at State and local elected officials, to encourage the development of legislation and administrative policies that support hazard mitigation.
- A programme to encourage public-private partnerships, to educate employees and customers about mitigation.
- Providing a training programme for teachers to ensure that they understand disasters, likely effects and the precautions that should be taken.
- Include in the academic curriculum information about disasters and the precautionary measures to be taken.
- Organise disaster simulations within schools to review, with staff and students emergency procedures to be followed in the event of a disaster.
- Promote publicity and educational sessions through use of mass media including television.

3.9.4: The training and education curriculum shall comply with all applicable regulatory requirements

A programme targeted at State and local elected officials, to encourage the development of legislation and administrative policies to meet the regulatory requirement that support hazard mitigation.

3.10: Exercises, Evaluations, and Corrective Actions

3.10.1: The entity shall evaluate program plans, procedures, and capabilities through periodic reviews, testing, and exercises

Evaluation would help in reassessing and examining the available options. The objectives of mitigation strategy will keep evolving from one level of safety to another. The proposed mitigation strategy is not static and is subject to alteration and redefinition over time, based on systematic assessments of its utility and the contribution to achieving the mitigation goals.

Such assessments will assist policy makers and the public to learn whether mitigation activities or policies are reducing future damages, and hardship in a reasonable time, and whether such benefits match or exceed the costs.

The purpose of evaluation of the state DM Plan is to determine

- The adequacy of resources
- Coordination between various agencies
- Community participation
- Partnership with NGOs.
- The ease of understanding and using the plan will also be important considerations.

The objectives of full scale drill include evaluation of the following:

- practicality of the plan (structure and organization)
- adequacy of communications and interactions among agencies and the public
- emergency equipment effectiveness
- adequacy of first aid and rescue procedures
- adequacy of emergency personnel response and training
- public relations skills
- evacuation and count procedures

Evaluation mechanisms will include:

- Periodic surveys of the end-beneficiaries of mitigation programmes, through structured instruments and through review sessions (workshops, seminars, conferences etc.)
- Periodic structured reporting of progress in implementing the mitigation strategy
- Convening Annual Disaster Mitigation Conference at state level to focus public attention on the mitigation activities and to evolve consensus for the action agenda.

3.10.2 : Additional reviews shall be based on post-incident analyses and reports, lessons learned, and performance evaluations

A post-incident evaluation should be done after the completion of relief and rehabilitation activities in order to assess

- the nature of state intervention and support
- adequacy of the organisational structure
- institutional arrangements
- adequacy of operating procedures
- monitoring mechanisms
- information tools
- equipment
- communication system, etc.

3.10.3 : Exercises shall be designed to test individual essential elements, interrelated elements, or the entire plan(s)

At the community level, evaluation exercises may be undertaken to assess the reactions of the community members at various stages in the disaster management cycle, and to understand their perceptions about disaster response in terms of

- adequacy of training
- alert and warning systems
- control room functions
- communication plans
- security
- containment
- recovery procedures
- monitoring.

3.10.4: Procedures shall be established to take corrective action on any deficiency identified:

Procedures to take corrective actions include:

- Organisational structures
- Technological changes render information obsolete
- Response mechanisms during drills or exercises
- Assignments of state agencies.

Adaptation, improvisation and optimization are corner stones of any planning pertaining to disasters. It must be emphasized that the documents or manuals prepared as disaster management plans have limited purpose. These can at best serve as reminder of tasks and activities.

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

CHAPTER 4

MAINSTREAMING DM CONCERNS INTO DEVELOPMENTAL PLANS / PROGRAMMES / PROJECTS

4.1 Overview:

The **process of development** and the **kind of development choices** made sometimes creates disaster risks. A close analysis of the development process with its six aspects namely **(1) policy, (2) strategy, (3) programming, (4) project/program cycle management, (5) external relations and (6) institutional capacity;** clearly argues for the need of systematic and more conscious ways of integrating disaster risk reduction (DRR) into development process.

Mainstreaming of DRR into developmental process has been prioritized in the Hyogo Framework for Action (HFA) adopted by 168 countries at the World Conference on Disaster Reduction (WCDR) in January 2005. Governments at all level need along with development agencies need to adjust / change their policies and institutional practices keeping DRR objectives into consideration. Mainstreaming disaster risk reduction into development planning should be a priority concern for the State Government

Mainstreaming risk reduction should result in appropriate measures being taken to reduce disaster risk and ensure that development plans and programmes do not create new forms of vulnerability.

In continuation with the efforts to integrate disaster management into development planning especially for new projects that are under preparation stage, the Central Government has revised the formats for pre-approval from **EFC** (Expenditure Finance Committee) and for preparing the **DPR** (Detailed Project Report) to address disaster management concerns.

4.2: Risk Knowledge and Risk Governance:

DRR is the concept and practice of reducing disaster risks through systematic efforts to analyse and manage the causal factors of disasters, including through reduced exposure to hazards, lessened vulnerability of people and property, wise management of land and the environment, and improved preparedness for adverse events. "Risk knowledge" forms the basis for DRR.

Risk Knowledge will include - Collection and compilation of - economic data, demographic data, land use planning, social data etc.; hazard and vulnerability assessments; Preparation of hazard and vulnerability maps; Assess and review the accuracy of risk data and information; Updating risk data each year, and include information on any new or emerging vulnerabilities and hazards in jurisdiction. All these activities/ functions have been addressed under the Mitigation plan. Relevant outputs from the Mitigation plan can be readily used for mainstreaming DRR in development process.

4.3 : Risk Governance:

DRR Secured as a Long Term State and Local Priority	Area Sub-Heads	Remark
	Economic benefits of DRR highlighted to senior government and political leaders using practical methods such as a cost-benefit analysis of previous disasters.	Orientation and awareness of policy makers for achievement of MDG (Millennium Development Goal)
	DRR integrated into national / State economic planning	For long term economic sustainable development.
Legal and Policy Frameworks to Support DRR Established	Area Sub-Heads	Remark
	Legislation or policies developed to provide an institutional and legal basis for implementing DRR.	Under active consideration by the state legislative assembly & policy makers
	Clear roles and responsibilities defined for all organizations (government and non-government) involved in DRR	Under active consideration by the state legislative assembly & policy makers. However, huge works related to DRR are going on throughout the calendar year are already been done by the Govt. stake holders & NGOs.
	Monitoring and enforcement regime in place to support policies and legislation	After forming Legal and Policy Frameworks to Support DRR monitoring & enforcement regime in place to support policies and legislation will be followed up.

Institutional Capacities Assessed and Enhanced	**Area Sub-Heads**	**Remark**
	Capacities of all organisations and institutions involved assessed and capacity building plans and training programmes developed and resourced.	All such tasks are done through institutions (ATI, ILGUS, SIPRD, RTC etc) at all levels through out the calendar year as routine work.
	Non-governmental sector engaged and encouraged to contribute to capacity building.	All such tasks are done through institutions (ATI, ILGUS, SIPRD, RTC etc) at all levels
Institutionali-sation	**Indicators**	**Remark**
	Policy level- policy statements with a mandate given to managers and planners within organisations.	Govt. of West Bengal has already published Administrative work calendar where such mandate is reflected clearly.
	Strategic Level- Priorities set and targets for addressing the challenge over a specified period	High officials of DM dept./WBSDMA formulate and circulate to all concerned.
	Operational Guidelines- defining Risk analysis, treatment and monitoring	Under active consideration by the state legislative assembly & policy makers
	Structures and systems will be a subset of SDMA/DDMA	System is smoothly running even up to Panchayat level.
	External relations Pre-defined Linkages between key player	DM Dept./ WBSDMA maintains close liason to NDMA and other neighbouring SDMAs
Financial Resources Secured	**Area Sub-Heads**	**Remark**
	Government funding mechanism for DRR developed and institutionalised	GoWB is funding all over the state through DM Dept./ WBSDMA for this purpose.

Contd.	Area Sub-Heads	Remark
	Access to funding at the State / District / Local level explored.	All the levels from district to Gram Sansad (village)
	Corporate funding support and Public/private partnerships utilised to assist DRR	Such type of is not yet done in this state.

4.4: Orientation Checklist- EFC format: To ensure the implementation of key areas, a check list for EFC format and the responsible departments are as shown below:

Task	Activity	Responsibility
Mainstreaming disaster management into development planning	1. To ascertain whether project involve any creation/ modification of structural/ engineering assets	• Line Depts. - Irrigation - Power - Water supply - Health-Roads & Buildings - Education - Health - Others • Dept. approving the project - Administratively - Financially -Technically • Urban Development Authorities • R & B Dept • Irrigation Dept. • WBSDMA/DM Deptt. • Local Bodies
	2. To ascertain the possible risks, likelihood and impact from disasters due to the location of project sites	
	3. To ascertain whether probable risks have been prioritised and the mitigation measures being contemplated, both structural and non-structural measures	

Task	Activity	Responsibility
Contd.	4.To ascertain whether the design and engineering of the structure has taken into consideration the National Building Code 2005, the appropriate BIS Codes, other applicable sources as per the type of the project and the NDMA guidelines (List of codes/guidelines for safety of building/structures from natural hazards is given in annexure 2 & 3)	
	5. To ascertain whether the cost of disaster treatment/ mitigation measures been included in the overall project cost	
	6. To ascertain whether the process of risk assessment has been done based on available information and secondary evidence	

4.4 Checklist- for preparing DPR: To ensure the implementation of key areas, a check list for DPR format and the responsible departments are as shown below:

Task	Activity	Responsibility
Mainstreaming disaster management into development planning	1.Impact Assessment of project (damage that can be caused to the project by natural disasters, design of the project that could accentuate the	• Line Depts. - Irrigation - Power - Water supply - Health - Roads & Buildings

Task	Activity	Responsibility
Contd.	the vulnerability of the area to disasters and / or lead to rise in damage / loss of lives, property, livelihood and surrounding environment), checklist for natural disaster impact assessment if given in Annexure 4 2.Risk assessment of project 3. Vulnerability assessment of project (Evaluation of site with regards to parameters such as probable maximum seismicity, probable maximum storm surge, probable maximum wind speed, probable maximum precipitation, probable maximum flood discharge and level, soil liquefaction proneness under probable earthquake intensities) 4.Complacence of o land use management o Building Code o Building use regulation o Directives and Legislation o Maintenance requirement	- Education - Health - Others ● Dept. approving the project - Administratively - Financially -Technically ● Urban Development Authorities ● R & B Dept ● Irrigation Dept. ● WBSDMA/DM Deptt. ● Local Bodies

Task	Activity	Responsibility
Contd.	Details about the location of the project, proneness of the project area to various hazards and analysis of impact on safety of the project.	
	Impact of the project on the environment and the surrounding population with respect to the type of the project and adoption of mitigation measures to reduce the impact of the same.	

4.5: Residual Agenda

The State is prone to six major disasters viz. flood, cyclone, Land Slide, draught, earthquake, and industrial (chemical) disaster. Flood and cyclone occur in the State quite often. The State economy has potential to meet with the threat and challenges posed by these disasters. Moderate disasters are being managed through state disaster relief fund and central norms for disaster assistance. However, for the major disasters like once in 100-200 years event, some specific arrangements are required to be done as under:

4.6:1: Mitigation Fund:

Key Projects

In the aftermath of the cyclone Aila of 2009 that ravaged the coastal West Bengal including Sundarban area. It was felt the number of deaths were more in the affected areas due to non-availability of safe shelter buildings in the coastal villages. The Government of Central and State correctly decided on the basis of the report prepared by ITI Kharagpur to undertake construction of multipurpose cyclone shelters in high risk areas of three costal districts of West Bengal. The details of these projects are furnished subsequently.

Geographical Spread of MPCS under PMNRF		
Sr	Districts	No. of Cyclone Shelter
01	North 24 Parganas	20
02	South 24 Parganas	15
03	East Medinipur	15

Prime Minister's National Relief Fund, (PMNRF): 50 Multipurpose Cyclone Shelter (MPCS) will be constructed under National Disaster Management Authority (NDMA). These shelters will be constructed in the 3 coastal Districts and the numbers of shelter to be constructed district wise given in the matrix.

Total cost of the project is Rs 138.65 crores. Already 15 MPCS in South 24 Parganas have been constructed and handed over to the District Administration. In North 24 Parganas out of 20 MPCS 4 are constructed and in Purba Medinipur 4 out of 15 are constructed.

Integrated Coastal Zone Management Project (ICZMP): 20 multipurpose cyclone shelters will be constructed in the district of South 24 Parganas under World Bank assisted ICZM Project. The total cost of the project is Rs. 60 crores. The report suggested that vulnerable population due to cyclone resides mostly in South 24 Parganas. In order to cope with it 20 MPCS was proposed. The construction of MPCS will be implemented by the PWD being the premier engineering department of the State Govt. Tenders for this project have already been floated.

NCRMP (National Cyclone Risk Mitigation Project): In the three coastal districts of West Bengal i.e. South 24-Pgs., North 24-Pgs. and Purba Medinapur 150 Nos. of Multipurpose Cyclone Shelters are proposed to be constructed under the scheme NCRMP (Phase II) with World Bank aided fund and State Fund in the ratio 75:25. Ministry of Home Affairs, GoI has already given approval in principle for the same in tune of approx. Rs. 500 crore. Construction of the MPCS will be implemented by the PWD. Environmental Assessment and Social Screening of all the sites have been completed including CRZ clearance. Soil testing and Total Station Survey have been completed for 60 sites and the work is under progress for the remaining sites. Already, bid document and model DPRs have been submitted to the World Bank for appraisal.

Geographical Spread of MPCS under NCRMP

Sr	Districts	No. of Cyclone Shelter
01	North 24 Parganas	45
02	South 24 Parganas	75
03	East Medinipur	30
Total		150

In all the above projects to ensure involvement of community for the maintenance of the assets so created, Multi Purpose Cyclone Shelter Management & Maintenance Committee have been constituted. During normal time, the MPCS will be used as school, training venue and for community gatherings.

National School Safety Programme (NSSP): NSSP has begun with a view to building the capacity of officials, teachers and students, carrying out rapid visual survey, retrofitting and non-structural mitigation measures of 200 schools each in three districts of Darjeeling, Jalpaiguri and Cooch Behar.

4.6.2 : Financial Sustainability

According to West Bengal State Disaster Management Policy & Framework, Government of West Bengal is committed to allocating funds in the long term to ensure the sustainability of disaster management effort. One of the key elements in ensuring the long-term sustenance and permanency of the organization is the manner in which funds would be generated and deployed on an ongoing basis. This is necessary in view of Government of West Bengal focus on disaster mitigation. Government of West Bengal intends to have a budgetary allocation for disaster management. At present it is from Calamity Relief Fund, but alternative sources of funds for activities related to disaster management in the state would also be identified.

CHAPTER 5
PREPAREDNESS MEASURES

Preparedness involves activities undertaken in advance of an emergency to develop and enhance
Operational capacity to respond and recover from an emergency. As part of a comprehensive preparedness program, there should be established - plans and procedures, prevention programs, resource management system, MoU / agreements with service providers (PPP), training awareness programs.

5.1 Preparedness Planning:
Planning is the one of the key elements in the Preparedness cycle. Preparedness cycle illustrates the way the plans are continuously evaluated and improved through a cycle of planning, organizing, training, equipping, exercising, evaluating and taking corrective action.

The state government and its departments/ ministries assigned emergency responsibilities in this plan will prepare appropriate supporting plans and related standard operating procedures that describe how emergency operations will be carried out.

- District Disaster Management Plan:
- Metropolis / City Disaster Management Plan:
- Hazard specific planning:
- PPP MoU etc.

Recovery Plan: District authority and other agencies are encouraged to develop recovery plans prior to the occurrence of a disaster. Such a plan should establish mechanisms for recovery decision-making and identify key participants in the recovery organization, including non-governmental and private sector entities. The plan should also identify processes and procedures for requesting state and central recovery assistance and ensuring that recovery activities are carried out in accordance with the requirements of these programs.

Durga Puja, Kalipuja, Idd & ganga Sagar Mela are the major annual festival in the state where millions of people participate end celebrate those events. West Bengal Police and

Kolkata Police in collaboration with respect districts use to prepare combine offsite and onsite crowd management plan as per the guide lines provided by the WBSDMA. Accordingly, 24x7 EOC monitors the entire situation during the festivals and these crowd management plans are successfully implemeented in tandom with SOPs, ESF as well this disaster management plan is used to be kept in the respective authority and updated on regular basis.

5.2 Preparedness Training & Capacity Building:

Training, tests and exercises are essential to ensure Government officials, emergency response personnel and the public are operationally ready. As part of the emergency management training
Curriculum, it is recommended that personnel with emergency responsibilities complete emergency management courses as prescribed from time-to-time by the National / State Authority.

Training program should include all stakeholders including community, civil defense, home guard, NSS, NCC, NYK, Schools and colleges, Civil society, CBOs, corporate entities, SDRF, Fire brigade, Media, Police etc.

Task	Activity	Responsibility
Training	1. Training to civil defence personal in various aspect of disaster management 2. Training to home Guards personal in various aspect of disaster management including search and rescue	● DM Deptt.. ● Home (Police) Deptt. ● Home (Civil Defence) Deptt. ● ATI, SIPRD,ILGUS
	3. Training to NCC and NSS personal in various aspect of disaster management	● Education Dep. ● Directorate NCC ● ATI, SIPRD,ILGUS
	4. Training to educational and training institutions personal in various aspect of disaster management	● NIDM ● DM Dept./WBSDMA ● ATI,SIPRD, ILGUS ● All RTCs

Task	Activity	Responsibility
Contd.	5. Training to civil society, CBOs and corporate entities in various aspect of disaster management	● NIDM ● DM Dept./WBSDMA ● ATI,SIPRD, ILGUS ● All RTCs ● NGOs
	6. Training to fire and emergency service personal in various aspect of disaster management	● NIDM ● DM Dept./WBSDMA ● ATI,SIPRD, ILGUS ● All RTCs
	7. Training to police and traffic personal in various aspect of disaster management	● NIDM ● DM/WBSDMA ● ATI, SIPRD,ILGUS ● Home Dept (Police). ● Police training Institute
	8. Training to State Disaster Response Force (SDRF) Teams in various aspect of disaster management	● NIDM/NDRF ● Home Dept. ● Addl. DGP (Arms) ● Addl. DGP (Training) ● DM Dept./WBSDMA ● ATI
	9. Training to media in various aspect of disaster management	● NIDM ● Information Dept. ● Information Training Centre ● WBSDMA/ATI
	9. Training to media in various aspect of disaster management	● NIDM ● Information Dept. ● Information Training Centre ● WBSDMA/ATI
	10. Training to govt. officials in various aspect of disaster management	● NIDM ● DM Dept.. ● Home(Police) Dept. ● Home (Civil Defence) Dept. ● ATI, SIPRD,ILGUS ● All RTCs

Task	Activity	Responsibility
Contd.	11. Training to engineers, architects, structural engineers, builders and masons in various aspect of disaster management	• Departmental Training Institutes • under R & B and • Irrigation Dept. • DM Deptt.. • Home (Police) Dept. • Home (Civil Defence) Dept. • ATI, SIPRD,ILGUS

1.2.1. Preparedness Exercise:

Exercises provide personnel with an opportunity to become thoroughly familiar with the procedures, facilities and systems which will actually be used in emergency situations. State agencies and its departments should plan for and/or participate in an all-hazards exercise program that involves emergency management/response personnel from multiple disciplines and/or multiple area. Exercises should

- Stress the application of standardised emergency management.
- Be based on risk assessments (credible threats, vulnerabilities and consequences).
- Include non-governmental organisations and the private sector, when appropriate.
- Incorporate the concepts and principles of IRS.
- Demonstrate continuity of operations issues.
- Incorporate issues related to special needs populations.

Exercises range from seminars/workshops to full scale demonstrations.

Seminars/Workshops are low-stress, informal discussions in a group setting with little or no simulation. It is used to provide information and introduce people to policies, plans and procedures.

Drills/Tests are conducted on a regular basis to maintain the readiness of operational procedures, personnel and equipment. Examples include tests of outdoor warning systems and the Emergency Alert System.

Tabletop Exercises provide a convenient and low-cost method designed to evaluate policy, plans and procedures and resolve coordination and responsibilities. Such exercises are a good way to see if policies and procedures exist to handle certain issues.

Functional Exercises are designed to test and evaluate the capability of an individual function such as communications, public evacuation, or medical.

Full-Scale Exercises simulate an actual emergency. They typically involve complete emergency management staff and are designed to evaluate the operational capability of the emergency management system.

5.2.2 Awareness:

Task	Activity	Responsibility
Information education And communication	1. Advertisement, hording, booklets, leaflets, banners, shake-table, demonstration, folk dancing and music, jokes, street play, exhibition, TV Spot, radio spot, audio-visual and documentary, school campaign, - Planning and Design - Execution and Dissemination	• DM Dept. • RC • WBSDMA • Information Dept. • Education Dept. • All line dept. • Dist. Collectors • Municipal Commissioners • Other Dist. Authorities

5.2.3 Geo-spatial DSS:

Task	Activity	Responsibility
Development of Data base for Disaster Management and implementation of GIS Decision support system (DSS)	1. Develop GIS based information system for different sectors viz. Medical and health, civil supply, fire and emergency services, etc. • Collection of information • Generation of maps • Regular updation of data	• Science & Tech. Dept. • BISAG • ISRO • All line Dept

Task	Activity	Responsibility
Contd.	2. Develop Flood Disaster Management Information System ● Development of software ● Collection and Feeding of basic data ● Users' training ● Regular updation of real-time data	● DM Dept. ● R C ● DM Dept./WBSDMA ● Irrigation Dept ● Dist. Collector ● IMD ● All line Dept.
	3. Create and disseminate database of contact details, resources, response agencies, NGOs, trained personnel, most vulnerable groups, evacuation routes, available shelters, relief centres, critical infrastructures, storage godowns, etc. ● Regular review and updation of such databases	● DM Dept. ● RC ● WBSDMA ● All line Dept

5.2.4 Techno-Legal Regime:

Task	Activity	Responsibility
Institutional Arrangements	1. Creation of State Level Disaster Management Authority	● DM Dept
	2. Formation of DM policy, guidelines and Act	● DM Dept. ● WBSDMA ● Legal Dept.
	3. Formulation of professional Civil Engineers Act. 4. Creation of regulatory body	● PWD Dept. ● Legal dept.

Task	Activity	Responsibility
Contd.	5. Revision of General Development Control Regulations (GDCR)	• UDD • Legal Dept.
	6. Emergency Medical Service Act - Creation of an Emergency Medical Services Authority (EMSA) - Establish paramedic cadre through training programmes and accredit / license them - Impart training to manpower for emergency services - Recognize and accredit trauma centres - Standardize and license ambulance services - Establish statewide medical emergency access number - Creation of City / District EMS councils - Creation of guidelines for Emergency Care of special section of people like children, elders, BPL beneficiaries, citizens of remote and disaster prone areas	• Health & Medical Dept.

Task	Activity	Responsibility
Contd.	7. Revision of BIS codes to Undertake studies, reviews and revision	• BIS • WBSDMA • PWD Dept • ISR • UDD • IMD • Fire & Emergency Services • Irrigation & Water Ways Dept.
	8. Preparation and distribution of commentaries and handbooks	• DM Dept. • WBSDMA • PWD Dept • UDD
	9. Development of relief norms and packages	• DM Dept. • Finance Dept. • Other Line Dept.
	10. Development and promotion of incentives, insurance, disaster bonds, tax rebate, etc. against the disaster	• Finance Dept. • Revenue Dept.
	11. Development of disaster management Plans • Hazard-wise State Disaster Management Plans • State Action Plans • State Contingency Plans • Departmental Disaster Management Plans • Dist., Taluka, City & Village Disaster Management Plans 12. Regular rehearsal, review and updation of plans 13. Publication & dissemination of plans	• DM Dept. • WBSDMA • All line Dept. • Dist. Collector • Municipal Commissioner

Task	Activity	Responsibility
Contd.	14. Strengthening of Early Warning System ● Conduct study ● Analyse ● Implement 15. Arrangement with service provider companies for multiple warning messages	● DM Dept. ● Science & Technology Dept. ● WBSDMA ● ISR ● IMD
	16. Hazard Risk & Vulnerability Assessment for different natural and man-made disasters prone to state ● Conduct study ● Analyse ● Mapping ● Micro zonation	● DM Dept. ● WBSDMA ● PWD Dept ● UDD
	17. Safety Measures ● Identification of places ● Alarm system ● Personnel protective equipments ● Promotion of life saving methods and techniques	● Home Dept. ● Science & Technology Dept. ● DM Dept. ● WBSDMA ● All line Dept.
	18. Strengthening of relief distribution and accounting system at state and district level ● Identification of centralised system for receipt, storage and distribution of relief ● Rate contract, procurement and stockpile of relief material	● DM Dept. ● RC ● Dist. Collector ● Municipal Commissioner ● Civil Supply Dept.

Task	Activity	Responsibility
Contd.	19. Strengthening of EOC at state, region and district level ● Retrofitting of existing buildings ● Strengthening of resources - Task forces - Equipments - SOPs - Financial ● Arrangement for optional EOC ● Arrangement of mock drills ● Arrangement of logistics ● Strengthening of communication means	● DM Dept. ● RC ● Dist. Collector ● Municipal Commissioner ● WBSDMA

5.3 Information Management:

Preparedness strategies include plans and procedures for utilizing communications and information management systems. Each agency should incorporate the following principles into their communications and information management systems:

- Common Terminology: Apply common and consistent terminology
- Protocols: Develop procedures and protocols for communications (to include voice, data, access to geospatial information, Internet/Web use and data encryption), where applicable, to utilise or share information during an incident/planned event.
- Data Collection: Institute multidisciplinary and/or multi-jurisdictional procedures and protocols for standardisation of data collection and analysis to utilize or share information during an incident/planned event.
- Common Operating Picture: Utilise systems, tools and processes to present consistent and accurate information (e.g., common operating picture) during an incident/planned event.

5.3.1 Resource Availability:

During some past disasters, it have been observed that for an organized response, a comprehensive database of disaster management related inventory is essential. More over, lack of proper and adequate information has hampered swift and measured response resulting in delay which could be critical in such eventualities. Therefore, it is felt to prepare a database of such resources, from Village level to State level. West Bengal Disaster Management dept. and WBSDMA, as part of the Disaster Risk Management Programme formulated State Disaster Resource Network (SDRN) which contains a database of resources at the Village, Block, City and District level which can come in handy during disaster situations.

5.4 Preparing Resources:

It is the policy of the state that resource maintenance and mobilisation is done at the lowest level of government possible under the established policy. When local resources are exhausted and additional resources are required, resource requests will follow an established process for ordering, tracking, mobilizing and demobilizing. Depending on the scale of the emergency, limited resources may need to be rationed or controlled.

5.4.1 State Disaster Resource Network:

The State Disaster Resource Network (SDRN) will be the nucleus for emergency resource management system. The design of SDRN will be based on following considerations:

Task	Activity	Responsibility
Resource Mapping	1. Identify available resources viz. Human, financial and equipment for disaster management with - State Dept. - Dist. Level - Block level - Village level - Public sector - Private sector - Community level	• DM Dept. • RC • Line dept. • Dist. Collectors • Municipal Commissioner • Other dist. authorities of line dept.

Task	Activity	Responsibility
Contd.	2. Identification of gaps of resources as per the need 3. Process for procurement of lacking resources	
State disaster resource network	1. Collect and compile state resource information	• RC • WBSDMA • Line Dept. • Dist. Collectors • Blocks
	2. Create GIS based state resource network and allot unique username and password	
	3. Maintain GIS based state resource network	
	4. Regular updation of resource data	• RC • WBSDMA • All Line Dept. • All Dist. Collectors • All Blocks

- Interoperability: Ensure that equipment, communications and data systems acquired through State/Territorial and local acquisition programs are interoperable.
- Interagency Assistance: Utilise response asset inventory for intrastate and interstate assistance requests during training, exercises and incidents/planned events. This includes integration of resources from private section (PPP).
- Deployment Policies: Institute policies, plans, procedures and protocols to prevent spontaneous deployment of resources/personnel and/or responding to a request that bypasses official resource coordination processes (i.e. resources requested through improper channels).

SDRN should be updated and managed under strict surveillance of state authority and Stakeholders should be regularly trained to operate State Disaster Resource Network through drills and exercises.

On-Line Application:

Online application has been developed for resource management with capabilities of mapping crucial real time information, reflecting exactly what is happening, what is most needed, and precisely where during sever incidents.

SDRN should be seamlessly integrated with National Disaster Resource network (IDRN) or any other such resource repository created by national Government.

5.4.2 Resource Ordering: All resource requests, at each level, must include the following:

- Clearly describe the current situation.
- Describe the requested resources.
- Specify the type or nature of the service the resource(s) will provide.
- Provide delivery location with a common map reference.
- Provide local contact at delivery location with primary and secondary means of contact.
- Provide the name of the requesting agency and/or Coordinator contact person.
- Indicate time frame needed and an estimate of duration.
- Resource requests involving personnel and/or equipment with operators will need to indicate if logistical support is required, (i.e. food, shelter, fuel and reasonable maintenance).

5.4.3 Resource Directories: Each state agency and local government entity should identify sources for materials and supplies internally and externally. The SEOC and DEOC maintain a list of state agencies, their roles and responsibilities as outlined in this plan and the common resources available from each.

5.4.4 Daily Updates: The requesting agencies are responsible to report to SEOC the Number and status of resources deployed on a mission on a daily basis.

5.4.5 Central Assistance: When resources are not available within the state or through existing Partners, the State may request assistance from the central government. Requests for central assistance during an emergency will be coordinated through the State Emergency Operations Center (SEOC) under established procedure.

5.5 Preparing Community:

Any disaster revolves around the copying capacity of the community and hence community should be closely associated with prevention, mitigation, preparedness, training, capacity building, response, relief, recovery i.e. short term and long term, rehabilitation and reconstruction.

Task	Activity	Responsibility
Community Preparedness	1. Selecting vulnerable community and most vulnerable groups at risk (keep gender issues in mind)	• RC- DM Dept. • WBSDMA • IMD • Finance Dept. • All Dist. Collectors • Municipal Commissioner • All SDOs & BDOs • Local self Govt. • UDD • Panchayat and Rural Dept.
	2. Disseminate information about vulnerability and risk to the community	
	3. Promote local level disaster risk management planning through participatory approach	
	4. Advice and issue direction wherever necessary for community disaster prevention, mitigation and preparedness through local resources and participatory approach	
	5. Provide necessary resources and support for disaster risk reduction at community level	
	6. Promote community managed implementations	
	7. Review the preparedness at community level	
	8. Take appropriate actions to enhance community preparedness	
	9. Promote community education, awareness and training	

Task	Activity	Responsibility
Contd.	10. Ensure fail safe mechanism for timely dissemination of forecasting and warning of impending disaster to the community	
	11. Disseminate information to community to deal with any disaster situation	

5.6 Medical Preparedness

Task	Activity	Responsibility
Medical Preparedness	1. Preparation of Authentic medical database for public and private facilities available in the state o Collection of Data o Mapping and gap analysis o Strengthening	• Medical & Health dept. • Commissioner of Health • Medical institutions
	2. Resource management o Manpower, logistics, medical equipments, medicines, antidotes, personal protective equipments, disinfectant, vaccine	• Medical & Health dept. • Commissioner of Health • Medical institutions
	3. Identification of medical incident command system - Incident Commander • State Level • Dist. Level • Disaster site	• Medical & Health dept. • Commissioner of Health • Medical institutions

Task	Activity	Responsibility
Contd.	- Identification of each section head at each level ● Operation ● Planning ● Logistic ● Administration & Finance ● Media and Public information - Identification of key members of different task force - Control room arrangement ● Departmental control room ● State and district control room - Appointment of liaison officer in shifts - Planning ● Preparation of medical management plan - State level - Dist. Level - Hospital preparedness plan - Training and capacity building ● Hospital preparedness, ● Pre hospital care, ● Mass casualty management, etc.	● Medical & Health dept. ● Commissioner of Health ● Medical institutions

5.7 Knowledge Management:

Task	Activity	Responsibility
Knowledge Management	- Documentation of disasters and to make it available in easy accessible format - Undertake research studies and application of outcomes in disaster management practices - Documenting field data, experience and indigenous technological knowledge from local community - Development of plan by using available resources like SDRN, IDRN, etc. - Sharing of data/information/reports/proceeding through consultation meeting/seminars etc. - Use of Information and communication technology at disaster management centres, state, district, taluka, village EOCs.	• DM Dept. • RC • WBSDMA • Science & Technology Dept

5.8 Communication

Task	Activity	Responsibility
Fail safe communication and last mile connectivity	- Undertake study to establish fail safe two way communication information system from state level to disaster site connecting state, district, taluka and city level. - Undertake study to establish alert/siren with multi-lingual recorded massages in coastal areas - To procure the system and run a pilot project - Establishment of multiple/alternative system - Training/IEC campaign for general public of the vulnerable areas. - Plan for re-establishment of disrupted system	• Revenue Dept. • RC • WBSDMA • Science & Technology Dept. • Information Dept. • Local and district authorities • Municipal Commissioner

5.9 Plan Testing:

Task	Activity	Responsibility
Plan Testing	- Provide copy of the plan to each stakeholder - Organise mock drills and rehearsal for plan testing - Lesson learnt through mock drill; identification of gaps through feedbacks and modification of plan - Organise annual mock drill and updation of plan	• DM Dept. • RC • WBSDMA • Science & Technology Dept. • Information Dept. • Local and district authorities • Municipal Commissioner

5.7 SMS based Early Warning System: Developed SMS based Early Warning System thorugh the IT Department for alerting the mobile users in the districts of the State of the advent of natural calamities like tropical cyclone, tsunami, earthquake, etc. This facility has been introduced by Hon'ble Chief Minister by sending Poila Baisakh Greetings Message on 14th April, 2012 (1st day of bangla month baisakh) to all the officers and genereal public. Early Warning SMS service for the government officials at State, district and block level are currently going on and the community service for the same will be kicked off very shortly.

CHAPTER 6
DISASTER RESPONSE

6.1 Response Strategy:
During the Response Phase, emergency managers set goals, prioritise actions and outline operational strategies. This plan provides a broad overview of those goals, priorities and strategies and describes what should occur during each step, when and at whose direction.

6.2 Operational Goals: During the response phase, the agencies that are charged with responsibilities in this plan should focus on the following goals:

a) Mitigate Hazards.
b) Meet Basic Human Needs.
c) Address Needs of People with Disabilities and Older Adults.
d) Restore Essential Services.
e) Support Community and Economic Recovery.

6.3 Operational Priorities: Operational priorities govern resource allocation and the response strategies for the State of California and its political subdivisions during an emergency. Below are operational priorities addressed in this plan?

a) **Save Lives -** The preservation of life is the top priority of emergency managers and first responders and takes precedence over all other considerations.
b) **Protect Health and Safety -** Measures should be taken to mitigate the emergency's impact on public health and safety.
c) **Protect Property -** All feasible efforts must be made to protect public and private property and resources, including critical infrastructure, from damage during and after an emergency.
d) **Preserve the Environment -** All possible efforts must be made to preserve California's environment and protect it from damage during an emergency.

6.4 Operational Strategies: To meet the operational goals, emergency responders should consider the following strategies:

Mitigate Hazards - As soon as practical, suppress, reduce or eliminate hazards and/or risks to persons and property during the disaster response. Lessen the actual or potential effects or consequences of future emergencies.

Meet Basic Human Needs - All possible efforts must be made to supply resources to meet basic human needs, including food, water, shelter, medical treatment and security during the emergency. Afterwards provisions will be made for temporary housing, food stamps and support for re-establishing employment after the emergency passes.

Address Needs of People with Disabilities and Older Adults - People with disabilities and older adults are more vulnerable to harm during and after an emergency. The needs of people with disabilities and the elderly must be considered and addressed.

Restore Essential Services - Power, water, sanitation, transportation and other essential services must be restored as rapidly as possible to assist communities in returning to normal daily activities.

Support Community and Economic Recovery - All members of the community must collaborate to ensure that recovery operations are conducted efficiently, effectively and equitably, promoting expeditious recovery of the affected areas.

6.5 Response Structure and Organisation:

Incident Response System (IRS) is a system of Management by Objectives through IAP (Incident Action Plan). It takes care of any expanding incident through an organizational structure of Command Staff, Sections, Branches, Divisions, Groups, Units, resources and span of control. Through Unified Command (UC) it allows all agencies having jurisdictional or functional responsibilities to jointly develop incident objectives and strategies.

6.5.1.1. IRS requires that every emergency response involving multiple area or multiple agencies include the four functions.

6.5.1.1 Command/Management: Command is responsible for the directing, ordering, and/or controlling of resources at the field response level. Management is responsible for overall emergency policy and coordination at the IRS EOC levels.

Command: A key concept in all emergency planning is to establish command and tactical control at the lowest level that can perform that role effectively in the organisation.

Management: The EOC serves as a central location from which multiple agencies or organisations coordinate information collection and evaluation, priority setting and resource management.

6.5.1.2 Operations: Responsible for coordinating and supporting operations in support of the response to the emergency through implementation of the organizational level's Action Plans (AP). At the Field Level, the Operations Section is responsible for the coordinated tactical response directly applicable to, or in support of the objectives in accordance with the Incident Action Plan (IAP). In the EOC, the Operations Section Coordinator manages functional coordinators who share information and decisions about discipline-specific operations.

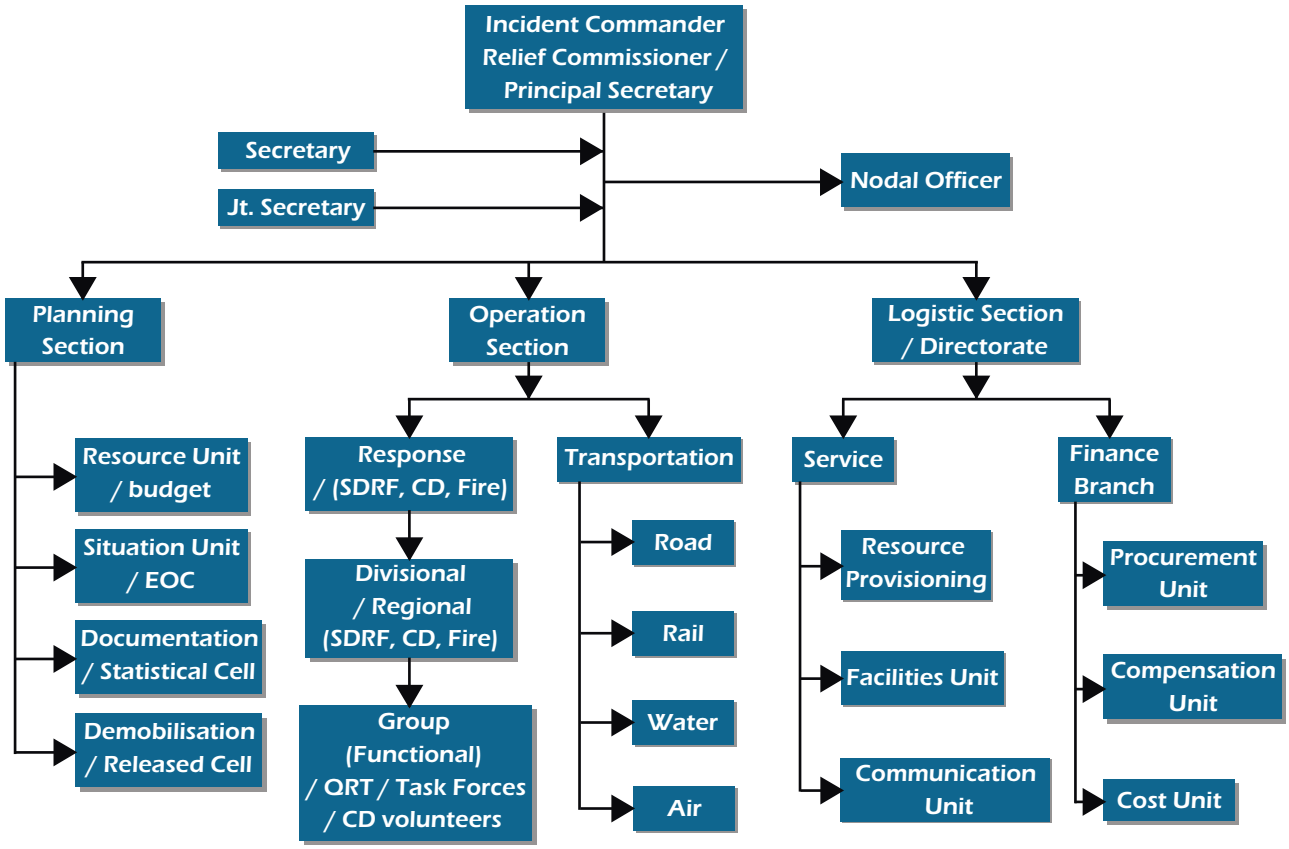
6.5.1.3 Planning: Responsible for the collection, evaluation and dissemination of operational information related to the incident for the preparation and documentation of the IAP at the Field Level or the AP at an EOC. Planning/Intelligence also maintains information on the current and forecasted situation and on the status of resources assigned to the emergency or the EOC. As needed, Unit Coordinators are appointed to collect and analyse data, prepare situation reports, develop action plans, set Geographic Information Systems (GIS) priorities, compile and maintain documentation, conduct advance planning, manage technical specialists and coordinate demobilisation.

6.5.1.4 Logistics: Responsible for providing facilities, services, personnel, equipment and materials in support of the emergency. Unified ordering takes place through the Logistics Section Ordering Managers to ensure controls and accountability over resource requests. As needed, Unit Coordinators are appointed to address the needs for communications, food, medical, supplies, facilities and ground support.

Responsible for all financial and cost analysis aspects of the emergency and for any administrative aspects not handled by the other functions. As needed, Unit Leaders are appointed to record time for incident or EOC personnel and hired equipment, coordinate procurement activities, process claims and track costs.

6.5.2 Incident Response Team (IRT)

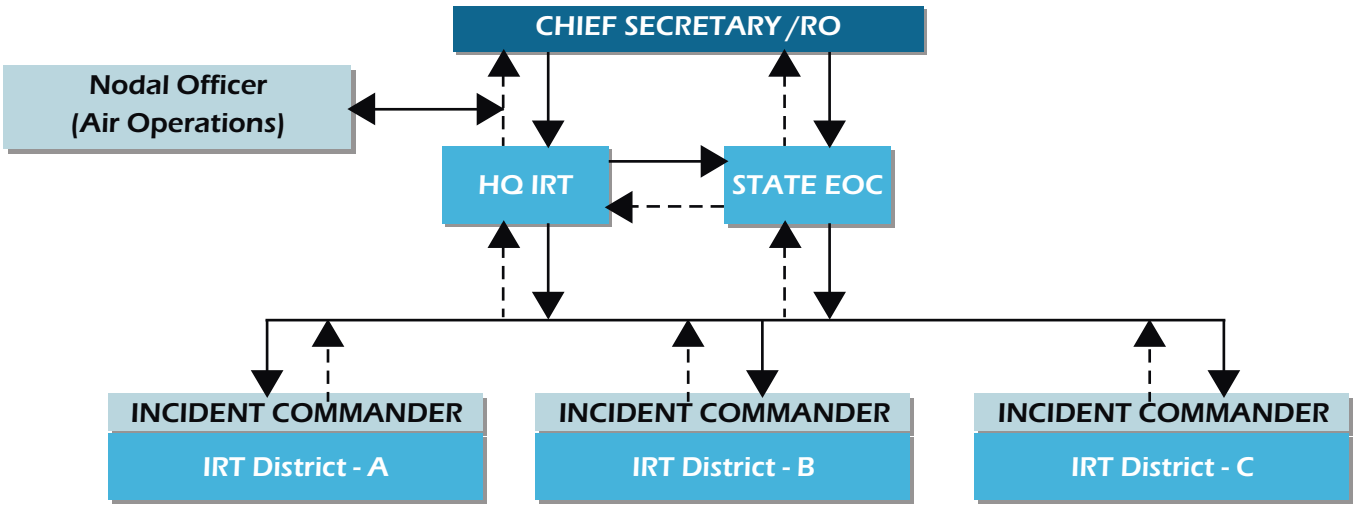
No single agency or department can handle a disaster situation of any scale alone. Different departments have to work together to manage the disaster. For proper coordination and effective use of all available resources, the different departments and agencies need a formalised response management structure that lends consistency, fosters efficiency and provides appropriate direction during response. The IRS envisages and lays down various tasks that may need to be performed by the existing administrative machinery at various levels.



The IRS organisation functions through Incident Response Teams (IRTs) in the field which are pre-designated at all levels; State, District, Sub-Division and Tehsil/Block. On receipt of Early Warning, the response officer (RO) will activate them. In case a disaster occurs without any warning, the District IRT will respond and contact RO for further support, if required. Accountability of personnel and resources are ensured through procedures and use of various forms prescribed.

6.5.2.1 State Level IRT:

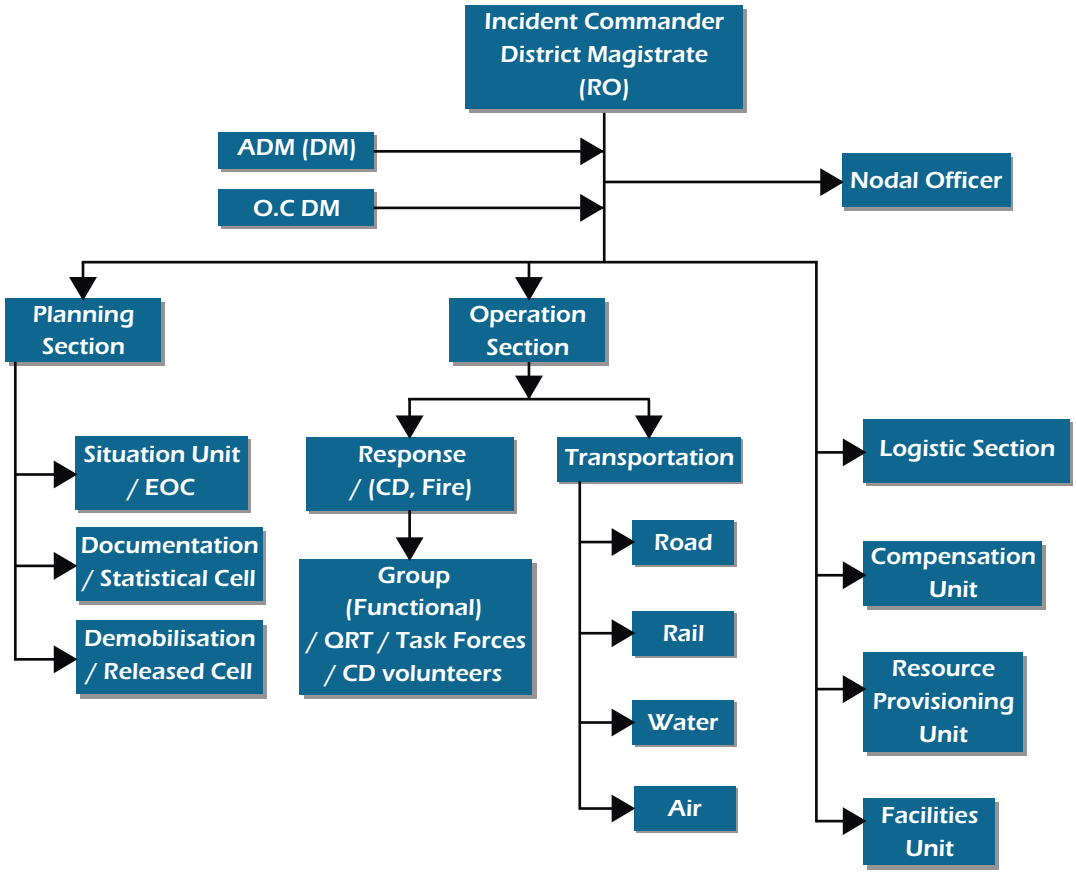
The state level of IRT prioritizes tasks and coordinates state resources in response to the requests from the Regional level and coordinates mutual aid among the mutual aid regions and between the Regional Level and State Level. The state level also serves as the coordination and communication link between the state and the National emergency response system. The state level operates out of the State Emergency Operations Centre (SEOC). The hierarchical representation of RO with State EOC, Headquarters IRT and its lower level of IRTs at District levels are shown in Fig.



The IRT is a team comprising of all positions of IRS organisation headed by IC. The OS helps to prepare different tactical operations as required. The PS helps in obtaining different information's and preparing plans as required.

6.5.2.2 District Level IRT:

The District level includes cities, Blocks. District governments manage and coordinate the overall emergency response and recovery activities within their jurisdiction. District Governments are required to use IRT when their Emergency Operations Centre (EOC) is activated or a District emergency is declared. The District Magistrate / DC / RO will issue a Standing Order for formation of IRT at District headquarters / Sub-Division and Block levels. He will ensure that appropriate and experienced officers are selected for IRTs. The complete IRS organizational structure at District level is given in the following page.



6.5.2.4 Field Level IRT - The Field Level is where emergency response personnel and resources, under the command of responsible officials, carry out tactical decisions and activities in direct response to an incident or threat.

6.5.3 Coordinating Structure:

Coordinating structures aid preparedness and response at all levels of government and within the private sector, communities, and nongovernmental entities. The structures help organise and measure the whole community's capabilities in order to address the requirements of the Response mission area, facilitate problem solving, improve access to response resources, and foster coordination prior to and following an incident.

Scalable, flexible, and adaptable coordinating structures are essential in aligning the key roles and responsibilities to deliver the Response mission area's core capabilities. The flexibility of such structures helps ensure that communities across the country can organize response efforts to address a variety of risks based on their unique needs, capabilities, demographics, governing structures, and non-traditional partners.

6.5.3.1 State Coordinating Structures:

States also leverage the capabilities and resources of line departments and other stakeholders across the state when identifying needs and building capabilities. The coordinating structures at the state level also vary depending on factors such as geography, population, industry, and the capabilities of the districts and local agencies within the state. These structures are also designed to leverage appropriate representatives from across the whole communitysome of whom may also participate in local or regional coordinating structures.

6.5.3.2 Line Departments / Emergency Support Function (ESFs) Agencies:

State governments organize their response resources and capabilities through line departments / emergency support agencies. Specific agencies / line departments have proven to be an effective way to bundle and manage resources to deliver core capabilities. The State emergency support agencies are the primary coordinating structures for building, sustaining, and delivering the response core capabilities. Most State agencies support a number of the response core capabilities. In addition, there are responsibilities and actions associated with State departments / agencies that extend beyond the core capabilities and support other response activities, as well as department and agency responsibilities.

The State Disaster Management Plan (SDMP) brings together the capabilities of State departments/ agencies and other State-level assets. State departments / agencies are grouped to work together to deliver core capabilities and support an effective response. Departments and agencies identified for emergency support function may be selectively activated by SEOC/ SDMA or as directed by the SEC to support response activities in the State or elsewhere.

6.5.3.2.1 Lead / Support Agency:

Different disasters require different types of expertise for response and major natural and human made disasters require Lead and Support agencies to deal specific tasks. For example - in case of rescue and relief in natural disaster, it will generally be the local Police and the SDRF/ NDRF / SDRF, in case of Fire it will be the Fire department, in case of drought it will be the Agriculture department, in case of Epidemics and other Biological disasters it will be the Health department that will have to play the lead role and the remaining departments will have to play the supporting role as per requirement and their core competencies.

Table given below summarises response core capabilities each emergency support agency will directly coordinate and supports. All emergency support agencies support the common core capabilities planning, Public Information and Warning, and Operational Coordinationand many agencies support more than those that are listed.

Task	Activity	Responsibility
Transportation	Assists in the management of transportation systems and infrastructure during domestic threats or in response to incidents.	• Transport Dept. • DM Dept. • RC • Dist.Level RTOs • Home Dept. • Private Sector • Local Bodies
Communications	Provides resources, support and restoration of government emergency telecommunications, including voice and data.	• DM Dept. • RC • District NIC • Home Dept. • Telecom.Dept
Construction and Engineering	Organises the capabilities and resources of the state government to facilitate the delivery of services, technical assistance, engineering expertise, construction management and other support to local area	• PWD Dept. • DM Dept. • RC • Home Dept. • Private Sector • NGOs
Fire and Rescue	Monitors the status of fire mutual aid activities. Coordinates support activities related to the detection and suppression of urban, rural and wild land fires and emergency incident scene rescue activities and provides personnel, equipment and supplies to support local area.	• F&ES Dept. • DM Dept. • RC • Local authority • Private Sector • NGOs

Task	Activity	Responsibility
Management	Coordinates and resolves issues in the four phases of emergency management to ensure consistency in the development and maintenance and management. During emergencies, serves in an advisory capacity to the EOC Director	• DM Dept. • RC • F&S Dept. • CD Dept. • F&ES • Home Dept. • Transport. • And all related line Departments
Care and Shelter	Coordinates actions to assist responsible area to meet the needs of victims displaced during an incident including food assistance, clothing, non-medical care and sheltering, family reunification and victim recovery.	• DM Dept. • RC • F&S Dept. • CD Dept. • F&ES • Home Dept. • Transport. • And all related line Departments
Resources	Coordinates plans and activities to locate, procure and pre-position resources to support emergency operations.	• DM Dept. • RC • F&S Dept. • CD Dept. • F&ES • Home Dept. • Transport. • And all related line Departments
Public Health and Medical	Coordinates Public Health and Medical activities and services state-wide in support of local jurisdiction resource needs for preparedness, response, and recovery from emergencies and disasters	• Health Dept. • DM Dept. • RC • P&RD • Private Sector • NGOs

Task	Activity	Responsibility
Search and Recue	Supports and coordinates response of personnel and equipment to search for and rescue missing or trapped persons. State Law Enforcement supports and coordinates responses to search for, locate and rescue missing or lost persons, missing and downed aircraft, high angle rock rope rescue and investigations of missing person incidents that may involve criminal acts and water rescues. State Fire and Rescue supports and coordinates responses to search for, locate and rescue victims of structure collapse, construction cave-ins, trench, confined space, high angle structure rope rescue and similar emergencies and disasters and water rescues	• CD Dept. (Dist.-QRT) • F&ES • DM Dept. • RC • Home Dept. • NGOs
Hazardous Materials	Coordinates state resources and supports the responsible area to prepare for, prevent, minimise, assess, mitigate, respond to and recover from a threat to the public or environment by actual or potential hazardous materials releases.	• DM Dept. • RC • Municipal Affair Dept. • PWD Dept. • Home Dept. • Private Sector • NGOs
Food and Agriculture	Supports the responsible area and coordinates activities during emergencies impacting the agriculture and food industry and supports the recovery of impacted industries and resources after incidents.	• F&S Dept. • Agriculture Dept. • DM Dept. • RC • P&RD • Home Dept. • NGOs

Task	Activity	Responsibility
Utilities	Provides resources and support to responsible area and in partnership with private sector to restore gas, electric, water, waste water and telecommunications.	• PWD Dept. • WBPDCL • PHE Dept. • Telecom Dept. • DM Dept. • RC • Private Sector
Law Enforcement / Police department	Coordinates state law enforcement personnel and equipment to support responsible law enforcement agencies, coroner activities and public safety in accordance with Law Enforcement	• DM Dept. • RC • F&S Dept. • CD Dept. • F&ES • Hom Dept. • Transport • And all related line Departments
Long-Term Recovery	Supports and enables economic recovery of communities and State from the long-term consequences of extraordinary emergencies and disasters.	• PWD Dept. • DM Dept. • RC • Agricultue Dept. • Private Sector • NGOs
Public Information	Supports the accurate, coordinated, timely and accessible information to affected audiences, including governments, media, the private sector and the local populace, including the special needs population.	• I&C Dept. • DM Dept. • RC • P&RD Dept. • Home Dept. • Private Sector • NGOs
Evacuation	Supports responsible area in the safe evacuation of persons, domestic animals and livestock from hazardous areas.	• CD Dept. • P&RD Dept. • DM Dept. • RC • F&ES Dept. • Home Dept. • Private Sector • NGOs

Task	Activity	Responsibility
Volunteer and Donations Management	Supports responsible area in ensuring the most efficient and effective use of affiliated and unaffiliated volunteers and organizations and monetary and in-kind donated resources to support incidents requiring a state response.	• Home Dept. • DM Dept. • RC • CMO

6.5.3.3 Local Coordinating Structures:

Local agencies and states employ a variety of coordinating structures to help identify risks, establish relationships, organize, and build capabilities. Due to the unique partnerships, geographic conditions, threats, and established capabilities each jurisdiction faces, the coordinating structures at these levels vary. Examples of local response coordinating structures include IRT at local level supported by DEOC / DDMA. These structures organize and integrate their capabilities and resources with neighbouring area, the state, the private sector, and NGOs.

6.5.3.4 Private Sector Coordinating Structures:

Business EoC or mutual aid centres, industry trade groups, and private sector information serve as coordinating structures for the private sector. These organizations, composed of multiple businesses and entities brought together by shared geography or common function (e.g., banking, supply chain management, transportation, venue management), support the collaboration, communication, and sharing of information within the private sector. Such organizations can coordinate with and support NGOs, and in many cases they serve as a conduit to local and state government coordinating structures.

6.5.4 State Wide Network of EOC:

EOC is an offsite facility which will be functioning from the State / District headquarters and which is actually an augmented control room having communication facilities and space to accommodate the various ESFs. During sever incident - an EOC is also established and activated to support field operations and resource coordination. Field Incident Commanders (IC) and EOCs will establish communications when the district / state EOCs.

6.5.4.1 Basic functions of an EOC includes, but not limited to

- Receive, monitor, and assess disaster information.
- Keep track of available resources.
- Monitor, assess, and track response units and resource requests.
- Manage resource deployment for optimal usage.
- Make policy decisions and proclaim local emergencies as needed.
- Provide direction and management for EOC operations through Standard Operations Guide (SOG), set priorities and establish strategies.
- Coordinate operations of all responding units, including law enforcement, fire, medical, logistics etc.
- Augment comprehensive emergency communication from EOC to any field operation when needed or appropriate.
- Maintain EOC security and access control.
- Provide recovery assistance in response to the situations and available resources
- Keep senior, subordinate and tenant officials informed.
- Keep local jurisdictions (Village/town/City, district and State) informed.
- Operate a message centre to log and post all key disaster information.
- Develop and disseminate public information warnings and instructions.
- Provide information to the news media.
- Manage donation / aids.

6.5.4.2 EOC ACTIVATION CRITERIA:

Emergency Operations Centres (EOCs) should be activated in accordance to the standardized Emergency Management procedure and protocols established in the State. Some of the natural hazards have a well-established early warning system. On receipt of information regarding the impending disaster, the EOC will inform the RO, who in turn will activate the required IRT and mobilise resources. The scale of their deployment will depend on the magnitude of the incident.

At times the information about an incident may be received only on its occurrence without any warning. In such cases the local IRT (District, Sub-Division, Tehsil / Block) as the case may be, will respond and inform the higher authority and if required seek reinforcement and guidance. The measures decided to be taken for response will be jotted down by the Command Staff and later handed over to PS. It will thus form the initial IAP.

Based on the HPC report levels of emergency (L1, L2, and L3) and activation guidelines are as given below:

L1 EOC Activation: Level 1 is a minimum activation. This level may be used for situations which initially only require a few people, e.g., a short term earthquake prediction at condition one or two level; alerts of storms, tsunamis; or monitoring of a low risk planned event. At a minimum, Level zero staffing consists of the EOC Head / Director. Section Coordinators and a situation assessment activity in the Planning Section may be included in this level. Other members of the organization could also be part of this level of activation e.g., the Communications Unit, from the Logistics Section, or an Information Officer.

Level 2 EOC Activation: Level Two activation is normally achieved as an increase from Level One or a decrease from Level Three. This activation level is used for emergencies or planned events that would require more than a minimum staff but would not call for a full activation of all organization elements, or less than full staffing. One person may fulfil more than one IRS function. The EOC Head / Director, in conjunction with the General Staff, will determine the required level of continued activation under Level Two, and demobilize functions or add additional staff to functions as necessary based upon event considerations. Representatives to the EOC from other agencies or area may be required under Level Two to support functional area activations.

Level 3 EOC Activation: Level Three activation involves a complete and full activation with all organizational elements at full staffing. Level Three would normally be the initial activation during any major emergency.

6.5.4.3 IRS for Nuclear and Biological Disasters:

All nuclear facilities have specialised Crisis Management Groups (CMGs) for on-site response Under the aegis of Department of Atomic Energy (DAE). For the offsite incident response at those locations, the RO / District Magistrate / DC will act as the IC and ensure that the stakeholders and communities are properly sensitised in advance through regular mock exercises. Support from local experts for such purpose may be obtained wherever available. The State Government should train and equip its own SDRF for this purpose. The help of NDRF may be taken for immediate response and for training the SDRF. The location of NDRF equipped and trained to handle CBRN emergencies has been parked with them.

6.5.4.4 For Radiological Emergencies in Metropolitan and larger cities having population of 20 lakhs and above with high vulnerability, the State RO will identify a Nodal Officer for Radiological Emergency to act as an IC. He should have designated experts to assist him in the discharge of his duties. Specially trained and equipped task forces will be earmarked which would be readily available with decontamination facilities. The details of response actions to be taken by the IC in such emergencies are given in the NDMA Guidelines on the Nuclear and Radiological emergencies, which is kept for ready reference as a separate document.

6.6. Alert and Warning :

Each district within the state is responsible for preparing for a disaster including establishing methods for alerting and warning the public, mobilizing resources and initiating protective actions. At the state level, SEOC will have a State alert and Warning centre (SAWC), which is staffed 24 hours a day, 365 days a year to serve as the official state level point of contact for emergency notifications. From this centre, Warning Centre personnel maintain contact with district warning points, state agencies, central agencies and the National EOC.

6.6.1 Notifications Received by the State Alert &Warning Centre: District / authority/ EoC notify the SAWC of emergencies in accordance with existing procedures and protocols, or when state assistance is requested or anticipated. In some specific natural disasters the notification are received from the designated national agencies as listed below.

Disaster	Agency
Earthquake	IMD
Flood	IMD, Irrigation Department, CWC
Tsunami	IMD, INCOIS
Draught	Agriculture Department
Epidemics	Ministry / Department of Health & Family Welfare
Industrial and Chemical Accidents	Industry, Labour & Employment Department, DISH

Disaster	Agency
Fire	Fire & Emergency Services / State / District/ Local agencies
Severe Weather	IMD

6.6.2 Communications, Alert and Warning System:

The SEOC/SAWC is responsible for informing, communicating, alerting and notifying state / district officials and the central Government of natural or human caused emergencies. To meet this responsibility, the SEOC is equipped with a number of telephone, data and radio systems, managed siren system, satellite communication, mass messaging and automated Notification System. Most of these systems are used on a day-to-day basis; others are available for use in an emergency, as conditions require.

6.6.3 Alerting and warning State / District/ Local agencies:

Multiple communication channels will be used to maintain constant communication with local, state and federal communications centres and to ensure the State can quickly respond to any developing emergencies. The SEOC provides local and state agencies with a broad range of information, including, but not limited to:

- Local emergencies.
- Earthquakes.
- Tsunamis (seismic sea waves).
- Floods.
- Cyclone
- Dam and failures.
- Major fires.
- Hazardous material spills.
- Radiological and nuclear incidents.
- Radioactive fallout wind data.
- Energy emergencies.
- Foreign animal disease.
- Weather watches and warnings.
- Severe weather emergencies.
- Search and rescue incidents.

6.6.4 Notification of Emergency Personnel: The SEOC maintains a list of agencies and personnel that are critical to emergency operations. The SEOC will utilize cell phone, telephone, email, smart phones and Automatic Notification System to notify State personnel of an emergency and help guide response teams across the state.

6.6.5 Public Information:

Public information consists of the processes, procedures and systems to communicate timely and accurate information by accessible means and in accessible formats on the incident's cause, size and current situation to the public, responders and additional stakeholders (both directly affected and indirectly affected).

Public information must be coordinated and integrated as part of the emergency management System across the State/ central agencies and organizations, and with the private sector and NGOs. Public information includes processes, procedures and organizational structures required to gather, verify, coordinate and disseminate information.

During an emergency, responsible district disseminate information about the emergency to keep the public informed about what has happened, the actions of emergency response agencies and to summarize the expected outcomes of the emergency actions.

State authority will coordinate the state's emergency public information efforts and provides support to other state agencies to ensure that the state government issues a timely, clear, concise, consistent message.

6.6.5.1 Media Centres: State authority may establish a Media Centre that serves as a central location for media briefings, conferences and information distribution.

6.6.5.2 Inquiry / Call Centres: State authority Agencies may activate an inquiry centre to centralize information sharing between the public, the media and government. Inquiry centres should be directly linked to media centres. Inquiry / call Canters will:

- Establishment of Public Information Hotlines
- Monitoring of radio and television stations and informing the IMO (Information and media officer) Coordination Team of inaccuracies.
- Sharing of information about the emergency or the government's response.

6.7 Sequence of Events during Disaster:

Two sequences of events are typically associated with disasters: One involves the response and the other involves local / district or State emergency declaration. The response sequence generally describes the emergency response activities to save lives, protect property and preserve the environment. This sequence describes deployment of response teams, activation of emergency management organizations and coordination among the various levels of government. The emergency proclamation sequence outlines the steps to gain expanded emergency authorities needed to mitigate the problem. It also summarizes the steps for requesting state and federal disaster assistance.

6.7.1 Before Impact:

6.7.1.1 Routine Monitoring for Alerts, Watches and Warnings: Emergency officials constantly monitor events and the environment to identify specific threats that may affect their jurisdiction and increase awareness level of emergency personnel and the community when a threat is approaching or imminent.

6.7.1.2 Increased Readiness: Sufficient warning provides the opportunity for response agencies to increase readiness, which are actions designed to increase an agency's ability to effectively respond once the emergency occurs. This includes, but is not limited to:

- Briefing government officials.
- Reviewing plans and procedures.
- Preparing and disseminating information to the community.
- Updating resource lists.
- Testing systems such as warning and communications systems.
- Precautionary activation Emergency Operations Centers.

6.7.1.3 Pre-Impact: When a disaster is foreseen as highly likely, action is taken to save lives and protect property. During this phase, warning systems are activated, evacuation begins and resources are mobilized.

The IRS organisation functions through Incident Response Teams (IRTs) in the field which are pre-designated at all levels; State, District, Sub-Division and Tehsil/Block. On receipt of Early Warning, the response officer (RO) will activate them. Accountability of personnel and resources are ensured through procedures and use of various forms prescribed.

6.7.2 Immediate Impact:

IRTs at various levels are activated by RO based on the situation. The state level of IRT prioritizes tasks and coordinates state resources in response to the requests from the Regional level and coordinates mutual aid among the mutual aid regions and between the Regional Level and State Level. The state level also serves as the coordination and communication link between the state and the National emergency response system.

During this phase, emphasis is placed on control of the situation, saving lives and minimizing the effects of the disaster.

6.7.2.1 Alert and Notification: Response agencies are alerted about an incident by the public through emergency communication at State EOC and other established methods. First responders are then notified of the incident. Upon an alert, response agencies notify response personnel.

6.7.2.2 Resource Mobilisation: Response agencies activate personnel and mobilize to support the incident response. As the event escalates and expands, additional resources are activated and mobilized to support the response. Activation and mobilization continue for the duration of the emergency as additional resources are needed to support the response. This includes resources from within the affected area, or, when resources are exhausted, from unaffected area / districts / States.

6.7.2.3 Incident Response: Immediate response is accomplished within the affected area by local area and segments of the private sector. First responders arrive at the incident and function within their established field level plans and procedures. The responding agencies will manage all incidents in accordance with IRS organizational structures, doctrine and procedures.

6.7.2.4 Establishing Incident Command: Incident Command is established to direct, order, or control resources by virtue of some explicit legal, agency or delegated authority. Initial actions are coordinated through the on-scene Incident Commander (IC). The Incident Commander develops an initial Incident Action Plan (IAP), which sets priorities for the incidents, assigns resources and includes a common communications plan. If multiple area or agencies are involved, the first responders will establish a Unified Incident Command Post (ICP) to facilitate multijurisdictional and multiagency policy decisions. The Incident Commander may implement an Area Command to oversee multiple incidents that are

handled by separate IRS organizations or to oversee the management of a very large or evolving incident that has multiple incident management teams engaged.

6.7.2.5 Activation of the Multiagency Coordination or Unified Command: Responding agencies will coordinate and support emergency management and incident response objectives through the development and use of integrated Multiagency Coordination Systems. UC is a framework headed by the Governor / LG / Administrator / CM and assisted by the CS that allows all agencies with jurisdictional responsibilities for an incident, either geographical or functional, to participate in the management of the incident.

6.7.2.6 Local EOC Activation: Local area activates their local EOC based on the magnitude or need for more coordinated management of the emergency. When activated, Local EOCs help form a common operating picture of the incident by collecting, analyzing and disseminating emergency information. The local EOC can also improve the effectiveness of the response by reducing the amount of external coordination of resources by the Incident Commander by providing a single point of contact to support multiagency coordination. When activated the local EOC notifies the OA lead that the local EOC has been activated.

6.7.2.7 Communications between Field and the EOC: When a jurisdiction EOC is activated, communications and coordination are established between the IC and the DEOC / SEOC.

6.7.2.8 Operational Area (OA) EOC Activation: If one or more Local EOCs are activated, or if the event requires resources outside the affected jurisdiction, the OA EOC activates. The OAEOC also activates if a Local Emergency is proclaimed by the affected local government. The OA EOC then coordinates resource requests from the affected jurisdiction to an unaffected jurisdiction, or if resources are not available within the Operational Area, forwards the resource request to the SEOC.

6.7.2.9 State Level Field Teams: The state may deploy Field On-Site Observation Teams to provide situation reports on the disaster in coordination with the responsible Unified Command.

6.7.2.10 State Emergency Operations Center (SEOC) Activation: The SEOC is activated when in order to:

- Continuously monitor the situation and provide situation reports to brief state officials as appropriate.
- Process resource requests between the affected regions, unaffected regions and state agency Department Operation Centers.
- Process requests for central assistance and coordinate with central CMG.
- Provide Decision support backup to DEOC and filed EOC / IC.

6.7.3 After Impact is over:

As the initial and sustained operational priorities are met, emergency management officials consider the recovery phase needs. Short-term recovery activities include returning vital life support systems to minimum operating standards. Long-term activity is designed to return to normal activities. Recovery planning should include reviews of ways to avert or mitigate future emergencies. During the recovery phase, damage is assessed, local assistance centers and disaster recovery centers are opened and hazard mitigation surveys are performed.

Demobilisation: As resources are no longer needed to support the response, or the response activities cease, resources are demobilized. Demobilization includes provisions to address and validate the safe return of resources to their original location and include processes for resource tracking and ensuring applicable reimbursement. Where applicable, the demobilization should include compliance with mutual aid and assistance provisions.

6.8 Funds generation: The GoWB allocates funds in the State Budget for relief activities. In addition, funds may be available through the State Disaster Response Fund (Detail regarding funding of SDRF is described in chapter 1). However, these funds may not be adequate to meet disaster management requirements in the aftermath of large-scale disasters like the September' 2000 flood in the State. In such circumstances, the GoWB shall explore additional sources of funding through aid, grants, loans etc., as identified in the pre-disaster phase.

6.9 Finalising relief pay-outs and packages : Relief packages would include details relating to collection, allocation and disbursal of funds to the affected people. Relief would be provided all the affected families without any discrimination of caste, creed, religion, community or sex whatsoever. GoWB also start to provide Disaster Management Kits to

the affected families in the year 2013. Each such kit contains all sorts of foods and utensils to survive a family at least 3-4 days without any help of others.

6.10 Post-relief assessment : WBSDMA, with assistance from Government departments, district administration and local authorities will document learning from the relief experience, which can be inputs into further mitigation, relief or rehabilitation and reconstruction plans.

CHAPTER 7

PARTNERSHIP WITH OTHER STAKEHOLDERS

Disaster Management is an inclusive field and requires contribution from all stakeholders in order to effectively manage the emergency situation. Coordination amongst various stakeholders hence becomes extremely important to achieve the desired results. There are various agencies / organizations / departments and authorities that constitute a core network for implementing various disaster management related functions / activities. It also includes academic, scientific and technical organisations which have an important role to play in various facets of disaster management. A brief note on the role and activities of such functionaries and the existing system of coordination established by the State Government with them is mentioned below.

7.1 NDMA :

- The National Disaster Management Authority (NDMA), as the apex body in the GoI, has the responsibility of laying down policies, plans and guidelines for DM and coordinating their enforcement and implementation for ensuring timely and effective response to disasters.
- The guidelines assist the central ministries, departments and states to formulate their respective plans. It also approves the National Disaster Management plan prepared by the National Executive Committee (NEC) and plans of the central ministries and departments.
- It takes such other measures as it may consider necessary, for the prevention of disasters, or mitigation, or preparedness and capacity building, for dealing with a threatening disaster situation or disaster.
- It also oversees the provision and application of funds for mitigation and preparedness measures. It has the power to authorise the departments or authorities concerned, to make emergency procurement of provisions or materials for rescue and relief in a threatening disaster situation or disaster. It also provides such support to other countries in times of disasters as may be determined by the central government.
- The State keeps in touch with the NDMA for implementing various projects / schemes which are being funded through the Central Government. The State also appraises the NDMA about the action taken by the State Government regarding preparation of DM plans and implementation of guidelines issued by NDMA for various hazards from time to time.

7.2 National Institute of Disaster Management (NIDM):

- The NIDM, in partnership with other research institutions has capacity development as one of its major responsibilities, along with training, research, documentation and development of a National level information base. It networks with other knowledge-based institutions and function within the broad policies and guidelines laid down by the NDMA. ATI Salt Lake has the state wing of NIDM where all sorts of activities are done.

- It organises training of trainers, DM officials and other stakeholders as per the training calendar finalised in consultation with the respective State Governments.

7.3 National Disaster Response Force (NDRF) :

- For the purpose of specialised response to a threatening disaster situation or disasters/ emergencies both natural and man-made such as those of CBRN origin, the National Disaster Management Act has mandated the constitution of a National Disaster Response Force (NDRF).
- The general superintendence, direction and control of this force is vested in and exercised by the NDMA and the command and supervision of the Force is vested in an officer appointed by the Central Government as the Director General of Civil Defence and National Disaster Response Force. Presently, the NDRF comprises eight battalions and further expansion may be considered in due course. In our state, 2nd Battelion of NDRF is assigned for this purpose. This camp is located at Madhyam Gram , North 24 Pgs adjacent to Kolkata. The force of this battalion will be manned as and when the disasters strike at different locations across the State.
- This NDRF unit maintains close liaison with the WB State Government and are available to them in the event of any serious threatening disaster situation. While the handling of natural disasters rests with all the NDRF battalions, four battalions are equipped and trained to respond to situations arising out of CBRN emergencies.
- Training centres are also set up by respective paramilitary forces to train personnel from NDRF battalions of respective forces and also meets the training requirements of State/UT Disaster Response Forces. The NDRF units also impart basic training to all the stakeholders identified by the State Governments in their respective locations. In addition, the State Government also utilizes the services of the NDRF whenever required during emergency search, rescue and response.

7.4 Armed Forces :

- Conceptually, the Armed Forces are called upon to assist the civil administration only when the situation is beyond the coping capability of the State Government. In practice, however, the Armed Forces form an important part of the Government's response capacity and are immediate responders in all serious disaster situations.
- On account of their vast potential to meet any adverse challenge, speed of operational response and the resources and capabilities at their disposal, the Armed Forces have historically played a major role in emergency support functions. These include communication, search and rescue operations, health and medical facilities, and transportation, especially in the immediate aftermath of a disaster. Airlift, heli-lift and movement of assistance to neighbouring countries primarily fall within the expertise and domain of the Armed Forces.
- The Armed Forces also participates in imparting training to trainers and DM managers, especially in CBRN aspects, high-altitude rescue, watermanship and training of paramedics. At the State and District levels, the local representatives of the Armed Forces have been included in their executive committees to ensure closer coordination and cohesion in all aspects related to Disaster Management.

7.5 Airport Authority of India (AAI) :

- When disaster strikes, the airports are quickly overwhelmed with the tons of relief materials (like food, bottled water, medical supplies, cloths, tents, etc.) arriving from all over the world. This material is urgently needed to be in the field.
- In such cases, AAI should appoint senior officer at the airport for proper handling and distribution (which includes precise unloading, inventory, temporary storage, security and distribution of relief material) of relief material during disaster situation.
- The AAI shall prepare and provide a list of equipments required for handling the material to either WBSDMA or Relief Commissioner (RC) . The equipments will be procured and maintained through nearest Emergency Response Centre (ERC) that is at Kolkata and Barrackpur ERC. Deputation of team of official along with necessary infrastructure at the airports will be made available by the RC for necessary dispatch and accounting of relief material during emergency situation.

7.6 Indian Railways:

- Indian Railways is spread over a vast geographical area over 63,000 route kilometers. Unlike in other countries where the role of Railways, in the event of a disaster, is restricted to clearing and restoring the traffic, in our country Indian Railways handles

the rescue and relief operations. Railways are preferred mode of transport both for the movement of people and relief material in bulk, if accessible.

- Railways should have a provision for transportation of mass community and proper handling and distribution of relief material (through special trains, if required) in their disaster management plan.

7.7 Indian Meteorological Department (IMD):

The role of IMD has already been discussed in previous chapters

- The meteorological department undertakes observations, communications, forecasting and weather services. IMD was also the first organization in India to have a message switching computer for supporting its global data exchange.
- In collaboration with the Indian Space Research Organization, the IMD also uses the Indian National Satellite System (INSAT) for weather monitoring of the Indian subcontinent, being the first weather bureau of a developing country to develop and maintain its own geostationary satellite system.
- During the cyclone and flood seasons, the State Government keeps close contact with the IMD Ahmedabad office for weather related forecasts.
- Earthquakes occurring in the State which are of magnitude 3.0 and above on Richter Scale are also reported by the IMD to the State Government immediately.

7.8 INCOIS :

- Indian National Centre for Ocean Information Services (INCOIS) is a national agency of the Government of India, under Ministry of Earth Sciences. It provides the coastal and ocean information services, supporting developmental and operational sectors like ports, fisheries, shipping, meteorology, environment, off shore and coastal zone management in addition to promoting advanced oceanographic research in the country.
- INCOIS generates and disseminates near real time information on Sea Surface Temperature (SST), chlorophyll, Potential Fishing Zones (PFZ) advisories, tracking of oil spills, forecast economical shipping routes, and upwelling zones along the Indian coast, utilising both remotely sensed and conventionally observed data.
- The parameters envisaged for dissemination include wind, wave, current, mixed layer depth, heat budget and maps on coral reef, mangroves, shore line change and land use pattern. INCOIS thus, plays an important role in supporting the nation for sustainable development of the coastal and ocean sectors through ocean information services.

- INCOIS has already put in place an early warning system for Tsunami through which it alerts the coastal States whenever an undersea earthquake of higher magnitude capable of triggering a Tsunami is reported.

7.9 State Disaster Response Force (SDRF):

- As per the provisions of the National Disaster Management Act, the States are being encouraged to create response capabilities from within their existing resources on similar pattern of NDRF.
- WBSDMA/DM Dept. through the Home Department.

7.10 State Fire & Emergency Services :

- Building Stronger Disaster Response system by amalgamating three Departments under one umbrella
  1. Disaster Management
  2. Fire Services
  3. Civil Defence

- The State Fire & emergency Services are crucial immediate responders during any disaster. They are the first responders (during the Golden Hour after a disaster) and hence play a vital role in saving lives and property immediately after a disaster.
- The State Government has therefore paid apt attention in equipping and strengthening the capacities of the Fire Services in responding to various disasters. The State Government (WBDMA)/DM Dept. has provided fire & emergency equipment to Municipal Corporations, Municipalities, Districts and Blocks to respond immediately after a disaster.
- Continuous training is also being provided to the fire staff in using and maintaining the equipment. Several officers of the rank of Chief Fire Officer are also sent to training organised by NIDM and other institutes of the Central Government from time to time.

7.11 Media :

- Reducing the losses of life and property caused by natural hazards is a compelling objective now receiving worldwide attention. It is now being increasingly believed that the knowledge and technology base potentially applicable to the mitigation of natural hazards has grown so dramatically that it would be possible, through a concerted cooperative effort, to save many lives and reduce human suffering, dislocation, and economic losses simply by better information, communication and awareness.

- Timely mass media communication about impending disasters can lead to appropriate individual and community action, which is the key to implementing effective prevention strategies including evacuation and survival of people. Such communications can educate, warn, inform, and empower people to take practical steps to protect themselves from natural hazards.
- The role of media, both print and electronic, in informing the people and the authorities during emergencies thus, becomes critical, especially the ways in which media can play a vital role in public awareness and preparedness through educating the public about disasters; warning of hazards; gathering and transmitting information about affected areas; alerting government officials, helping relief organizations and the public towards specific needs; and even in facilitating discussions about disaster preparedness and response. During any emergency, people seek up-to-date, reliable and detailed information.
- The State Government has established an effective system of partnering with the media during emergency situations. At the State Emergency Operation Centre (SEOC), a special media cell will be created and fully operational during emergency situations. Both print and electronic media is regularly briefed at predetermined time intervals about the events as they occur and the prevailing situation on ground. The State Government has also ensured that the interaction with media is a two way process through which not only the State Government provides the information / updates to the media but the media too, through their own sources / resources draws the attention of the Government officials to the need and requirement of the affected people. This helps the State Government to control the flow of information and prevent rumours which could create a panic situation during the disasters. The State Government also partners with the media during disaster situations.
- Information Education and Communication (IEC) campaigns carried out for creating awareness amongst general public towards the precautions to be taken for prevention and mitigation of various hazards / events. A similar set up is also active at the District Emergency Operation Centre (DEOC).
- Apart from coordination with the media during disasters, the State Government regularly partners the print and electronic media to publish / broadcast safety messages during two important festivals of the State, Diwali and Durga Puja. There has been a considerable drop in the number of cases (fire burn during Diwali and injury cases during Durga Puja) reported at the local level because of such campaigns through media.

CHAPTER 8

RECONSTRUCTION, REHABILITATION AND RECOVERY MEASURES

The recovery phase of an emergency or disaster is often defined as restoring a community to its pre-disaster condition. More realistically, recovery is the process of re-establishing a state of normalcy in the affected communities. The specific approach to recovery operations following a disaster will be determined by the location, type, magnitude and effects of the incident.

Recovery encompasses both short-term and long-term efforts for the rebuilding and revitalization of affected communities. Recovery planning must provide for a near-seamless transition from response activities to short-term recovery operationsincluding restoration of interrupted utility services, reestablishment of transportation routes and the provision of food and shelter to displaced persons. Planners should design long-term recovery plans to maximise results through the efficient use of resources and incorporate national recovery doctrine.

Transition to Recovery: While the immediate lifesaving activities are occurring, emergency managers are simultaneously assessing how soon the response phase can transition to recovery. Critical response phase operations will gradually shift to assisting individuals, households, businesses and governments in meeting basic needs and returning to self-sufficiency.

Short Term Recovery: Short-term recovery operations begin concurrently with or shortly after the commencement of response operations. Although referred to as "short-term" recovery, these activities may last for weeks. Short-term recovery includes actions required to:

Stabilise the situation

Restoration of Basic Infrastructure including roads, bridges, drinking water supply, electricity, communication network and roads/ paths leading to the villages;

Restoration/ Repair of the lifelines/critical buildings repair/reconstruct the lifeline buildings /critical buildings which are necessary for treating the affected people or rehabilitation in these buildings as shelters.

Implement critical infrastructure recovery plans to maintain operations during emergencies and the recovery phase.
Commence the planning for the restoration of the community, including economic functions

Long Term Recovery: Long-term recovery continues the short term recovery actions but focuses on community restoration. Long term recovery may continue for a number of months or years depending on the severity and extent of the damage sustained. These activitiesinclude those necessary to restore a community to a state of normalcy, given the inevitable changes that result from a major disaster. Long-term recovery activities require significant planning to maximize opportunities and mitigate risks after a major incident and may include the following:

Reconstruction of facilities and infrastructure including the technology systems and services necessary for restoration of all operations functions.
Community planning including the development of long-term housing plans.
Implementation of waivers, zoning changes and other land use legislation to promote recovery.
Assistance to displaced families, which may include financial support as well as social and health services.
Restoration of the local economic system.
Integration of mitigation strategies into recovery efforts.
Documentation of eligible disaster-related costs for reimbursement through federal grant programmes

Individuals and Households: Individuals and households will try to stabilize their circumstances by seeking adequate shelter, assessing damage to their property, resuming work and other regular activities, applying for federal assistance and obtaining insurance proceeds.

The Private Sector: The private sector engages in activities necessary to resume business operations, including assessing damage, implementing continuity of business plans, caring for employees, shifting operations to temporary facilities or other locations, applying for federal assistance and obtaining insurance proceeds. In coordination with CalEMA and local Governments, businesses also may play a key role in donating goods and services for community recovery.

Non-Government Organizations: NGO and community-based organizations will provide support to individuals and households who are displaced by a disaster and work with governmental organizations to support the transition from care and shelter operations to interim housing arrangements. Community organizations active before a disaster may expand their services to meet increased needs. Such groups may include religious organisation and other agencies engaged in social services. NGO and community based organizations may provide a range of services such as donations management, emergency food, clothing and shelter, as well as support of housing reconstruction. They provide these services independently or in coordination with state and local efforts.

District and Local Authorities - Actions: District and Local authorities, including DDMA, cities administration organize recovery operations according to their respective priorities and mechanisms for conducting business. These authorities may work with neighboring districts / cities to share resources or address common problems. Regional entities may also play a role in setting priorities and obtaining resources for recovery within their respective areas of authority. These organizations may undertake the following actions to stimulate recovery within their respective communities:

- Conduct damage and safety assessment.
- Assess the housing situation, identify potential solutions and request support.
- Assess damage to public facilities and initiate temporary repairs.
- Assess damage to private property and issue permits for repairs and demolition.
- Remove debris.
- Open transportation routes.
- Restore services such as power, water, sewer and transportation.
- Activate Local Assistance Centers to assist individuals and households.
- Coordinate program assistance to individuals, businesses, farmers etc.
- Document disaster-related costs for reimbursement through Central / State grant programmes.

  Work with states and central officials to assess damage, identify needs and secure financial assistance.

  Resume governmental functions.

  Begin planning for long-term community recovery.

  Enact appropriate zoning variances to accommodate business and commercial repairs.

  Assist with the identification of temporary housing and business space.

State Government Actions: When a State of Emergency is proclaimed in the impacted districts / Tehsil, SDMA will lead State recovery operations and coordinate assistance provided by other state agencies and the federal government. When federal assistance is required, SDMA will work together with the NDMA and other central agencies to ensure effective delivery of services.

SOC and DEOC Operations: Initially, SDMA coordinates recovery operations through the SOC and its DEOC. The recovery organization will include functions added to the existing EOC organisation.

State Agency Assistance: Other state agencies may provide support to local governments under their respective authorities, or under other Central programs. These state authorities coordinate their activities with SDMA but may direct operations from their respective Department operations Centers.

Long-Term Recovery Efforts: SDMA will coordinate long-term recovery efforts within the state. Long-term recovery may include the implementation of Emergency Support Function, Long-Term Community Recovery whereby Central agencies help affected communities identify recovery needs and potential sources of recovery funding and provide long-term community recovery planning support, as appropriate

The nodal departments are to be assigned the responsibilities of reconstruction and restoration activities and perform these activities and restore the minimum basic infrastructure in the area which is vital for sustaining human life in the area. These departments are PWD, Health & family welfare, Electricity Boards, Development authority, Roads and Buildings, water supply and sanitation departments.

Individual and Public Assistance programme: Dept. of Disaster Management /WBSDMA has many Individual and Public Assistance programme throughout the calendar year. Such schemes are :

a) Normal Gratuitous Relief
b) Special Gratuitous Relief
c) Economic Rehabilitation Grant.
d) Exgratia Grant.
e) Distribution of Tarpaulin for temporary Shelter.
f) Distribution of clothings.
g) House Building Grant.
h) Disaster Management Kits etc.

ANNEXURE-1

ABBREVIATION

AAI : Airport Authority of India
ACWC s: Area Cyclone Warning Centres
ATI: Administrative Training Institute
BIS : Bureau of Indian Standard
BPL : Below Poverty Line
CBOs : Community Based Organizations
CBRN : Chemical, Biological, Radiological and Nuclear
CCG; Central Crisis Management Group
CDMA: Code Division Multiple Access
CDO : Central Design Organization
CEO : Chief Executive Officer
CFO : Chief Fire Officer
CMG: Crisis Management Group
RC : Relief Commissioner
CP: Commissioner of Police
CWC : Central Water Commission
CWCs : Cyclone Warning Centres
CWCS : Cyclone Warning Dissemination System
DCR : District Control Room
DDMO: District Disaster Management Officer
DEOCs: District Emergency Operation Centres
DG: Director General
DGP: Director General of Police
DIG: Deputy Inspector General
DM : Disaster Management
DDM : Director of Disaster Management.
DPR: Detailed Project Report
DRM: Disaster Risk Management
DRMP : Disaster Risk Management Programme
EFC: Expenditure Finance Committee
EMS: Emergency Medical Service
EOC: Emergency Operation Centre

ERTs : Emergency Response Teams
F&ES : Fire And Emergency Services
GIS : Geographic Information System
GoWB : Government of West Bengal
GoI: Government of India
WBPCB: West Bengal Pollution Control Board
GSI : Geological Survey of India
GSM: Global System for Mobile Communications
HoD : Head of Department
HRVA: Hazard, Risk and Vulnerability Assessment
IDRN: India Disaster Resource Network
ILGUS: Institute of Local Govt. & Urban Studies
IEC: Information Education Communication
I&Ws: Irrigation and Waterways Deptt. GoWB
IMD: Indian Meteorology Department
INCOIS: Indian National Centre for Ocean Information Services
INSAT : Indian National Satellite System
IRC: Indian Road Congress
IRIS: Incorporated Research Institute for Seismology
ISRO: Indian Space Research Organisation
ITC: Information and Communication Technology
ITCS: Information Communications Technology System
MHA: Ministry of Home Affairs
MoA: Ministry of Agriculture
MoC & F : Ministry of Chemicals and Fertilizers
MoC & I : Ministry of Commerce and Industry
MoD : Ministry of Defence
MoEF: Ministry of Environment & Forests
MoF: Ministry of Finance
MoLE: Ministry of Labour and Employment
MoSRT & H: Ministry of Shipping, Road Transport and Highways
MSK: Madhyamik Shikha Kendra
NCC: National Cadet Corps
NCMC : National Crisis Management Committee
NDRF: National Disaster Response Force

NEC : National Executive Committee
NEIC: National Earthquake Information Centre
NGO: Non Government Organisation
NGRI: National Geophysical Research Institute
NIDM: National institute of Disaster Management
NIOT: National Institute of Ocean Technology
PFZ: Potential Fishing Zones
PMO: Prime Minister□s Office
PPP: Public private Partnership
PS: Principal Secretary
PWD: Public Works Department
QCI: Quality Council of India
QRT: Quick Response Team
RESECO: Remote Sensing and Communication Centre
RSO: Radiological Safety Officer
SAR: Search and Rescue
SCG: State Crisis Management Group
SCMC: State Crisis Management Committee
SDMA : State disaster Management Authority
SDMP: State Disaster Management Plan
SDRF : State Disaster Response Force
SDRN: State Disaster Response Network
SEC: State Executive Committee
SEOC: State Emergency Operation Centre
SIPRD: State Institute of Panchayat and Rural Development
SMS : Short Messaging Service
SOP : Standard Operation Procedure
SRPF: State Reserve Police Force
SSK : Shishu Shikha Kendra
SST: Sea Surface Temperature
UNDP : United Nations Development Programme
UTs: Union Territories
WBSDMA : West Bengal State Disaster Management Authority

ANNEXURE-2

List of codes/guidelines for safety of building/structures from natural hazards

As these codes and guidelines are being updated from time to time by different Institutions/organizations therefore the latest updated version shall be referred at the time of conceiving a project. List has been attempted which may not be complete.

I. For General Structural Safety

1. BIS National Building Code 2005
2. IS: 456:2000 "Code of Practice for Plain and Reinforced Concrete
3. IS: 800-1984 "Code of Practice for General construction in Steel
4. IS: 801-1975 "Code of Practice for Use of Cold Formal Light Gauge Steel Structural Members in General Building Construction
5. IS 875 (Part 2) : 1987 Design Loads (other than earthquake) for buildings and structures part 2 Imposed Loads
6. IS 875 (Part 4) : 1987 Design Loads (other than earthquake) for buildings and structures part 4 Snow Loads
7. IS 875 (Part 5) : 1987 Design Loads (other than earthquake) for buildings and structures part 5 special load and load combination
8. IS: 883:1966 "Code of Practice for Design of Structural Timber in Buildings
9. IS: 1904:1987 "Code of Practice for Structural Safety of Buildings: Foundation's
10. IS:1905:1987 "Code of Practice for Structural Safety of Buildings: Masonry Walls
11. IS 2911 (Part 1): Section 1: 1979 "Code of Practice for Design and Construction of Pile Foundation Section 1

Part 1: Section 2 Based Cast-in-situ Piles Part 1: Section 3 Driven Precast Concrete Piles Part 1: Section 4 Based precast Concrete Piles Part 2: Timber Piles Part 3: Under Reamed Piles Part 4: Load Test on Piles II Protection from Cyclones / Wind Storms

12. IS 875 (3) -1987 "Code of Practice for Design Loads (Other than Earthquake) for Buildings and Structures, Part 3, Wind Loads"
13. IS: 15498 - 2004 "Guidelines for construction of cyclone shelters."
14. IS: 15498 - 2004 "Guidelines for improving the cyclonic resistance of low rise houses & other building/structures.
15. Guidelines (Based on IS 875 (3)-1987) for improving the Cyclone Resistance of Low rise houses and other building.

III For Earthquake Protection

16. IS: 1893-2002 "Criteria for Earthquake Resistant Design of Structures (Fifth Revision
17. IS: 13920-1993 "Ductile Detailing of Reinforced Concrete Structures subjected to Seismic Forces - Code Practice"
18. IS:4326-1993 "Earthquake Resistant Design and Construction of Buildings - Code of Practice (Second Revision)"
19. IS:13828-1993 "Improving Earthquake Resistance of Low Strength Masonry Buildings - Guidelines"
20. IS:13827-1993 "Improving Earthquake Resistance of Earthen Buildings -Guidelines"
21. IS:13935-1993 "Repair and Seismic Strengthening of Buildings - Guidelines"

IV Flood Management / River Valley Projects

22. IS: 4189-1985 "Guide for preparation of project report for river valley projects."
23. IS: 4410 (Part 3): 1988 "Glossary of terms relating to river valley project part 3 River and river training."
24. IS: 4410 (Part 11): Sec 5-1977 "Glossary of terms relation to river valley projects: Part 11 Hydrology Section 5 Floods."
25. IS: 4410 (Part 21): 1987 "Glossary of terms relating to river valley projects: Part 21 Flood control."
26. IS:11532-1995 "Construction and maintenance of river embankments (levees) - Guidelines"
27. IS: 12094 - 2000 "Guidelines for planning and Design of River Embankments (Levees)"
28. IS: 14262 - 1995 "Planning and design of revetments - Guidelines".
29. IS: 5477 (Part 4) : 1971 "Methods for Fixing the capacities or reservoirs: part 4 Flood storage"
30. IS: 7323 - 1994 " Operation of Reservoirs - Guidelines".
31. IS: 8408 - 1994 "Planning and design of groynes in alluvial river - Guidelines".
32. IS: 14815 - 2000 "Design Flood for River Diversion Works - Guidelines".

V Landslide Hazard

33. IS: 14458 (Part 1): 1998 Guidelines for retaining wall for hill area: Part 1 Selection of type of wall.
34. IS: 14458 (Part 2): 1997 Guidelines for retaining wall for hill area: Part 2 Design of retaining? Breast walls.

35. IS: 14458 (Part 3): 1998 Guidelines for retaining wall for hill area: Part 3 Construction of dry stone walls.
36. IS: 14496 (Part 2): 1998 Guidelines for preparation of landslide - Hazard Zonation maps in mountainous terrains: Part 2 Macro-Zonation.
37. IS: 14680: 1999 Guidelines for land slide control.
38. IS: 14948: Code of practice for Reinforcement of Rock Slopes with plain edge of failure
39. BIS 12023: Code of practice for Field Monitoring and Movement of Structures using Tape Extensometer.
40. BIS: 14804: Guidelines for Sitting, Designing and selection of materials for Residential Building in Hilly Areas.

VI For Protection of Saline Embankments and Coastal Canals

41. IS: 8835 - 1978 "Feasibility study and preparation of preliminary project report".
42. IS: 10635 - 1993 (reaffirmed 2003) "Freeboard requirements in embankments and dams".
43. IS: 12169 - 1987 - "Criteria for design of small embankment dams."
44. IS: 8835- 1978: Feasibility study, preparation of
45. IS: 12094 - 1978: Preliminary Project Report
46. IS: 10635 - 1993 (reaffirmed 2003): Freeboard requirements in embankments in embankments and dams.
47. IS: 11532 - 1995 (reaffirmed 2005): Construction and maintenance of river embankments
48. IS: 12094 - 2000 (reaffirmed 2005): Planning and design of river embankment
49. IS: 12169 - 1987: Criteria for design of small embankments dams.

RAILWAY CODES & MANUALS - RDSO PUBLICATIONS

1. RBF - 20: "Estimation of design discharge based on regional flood frequency approach for sub-zones 3(a), 3(b), 3(c), 3(e)".
2. RBF - 22: "50 year 24 hour set of is pluvial maps of India maps of short duration ratios".
3. RBF - 23: "Validation of flood estimation report No.UTN-7-1983 for sub-zone-3 (f)".
4. RBF - 24: "Validation of flood estimation report No.3/1980 for sub-zone-3 (f)".
5. RBF - 25: "Estimation of design discharge based on regional flood frequency approach for sub-zone-3 (f)".
6. RBF - 26: "Validation of flood estimation report No.UGP-9-1984 for sub-zone-1 (e)".
7. RBF - 27: "Validation of design discharge based on regional flood frequency approach for sub-zone-3 (e)".

8. RBF - 28: "Estimation of design discharge based on regional flood frequency approach for sub-zone-3 (i)".
9. RBF - 29: "Estimation of design discharge based on regional flood frequency approach of sub-zone-3 (b)".
10. RBF - 32: "Validation of flood estimation report no.c/16/1988 subzone - 1 (b) (chambal basin)".
11. RBF - 33: "Estimation of design discharge based on regional flood frequency approach for sub-zone-1 (d) (sone basin)".
12. RBF - 34: "Validation of flood estimation report no.S/15/1987 sub-zone-1 (d) (sone basin)".
13. GE - 1: "Guidelines - Erosion control on slopes of banks and cuttings".
14. GE - 6: "Guidelines for earthwork in conversion projects".

ANNEXURE-3

List of Indian Road Congress (IRC) Codes/Manuals

1. IRC: 5 -1998 (Seventh Revision) - "Standard specifications and codes of practice for Road, Bridges Section 1 - General features of Design".
2. IRC: 10-1961 - "Recommended Practice for Borrow pits for Road Embankments constructed by Manual Operation".
3. IRC: 34-1970 - "Recommendations for Road Construction in Waterlogged Area".
4. IRC: 36-1970 - "Recommendations Practice for the construction of Earth Embankments for Road Works".
5. IRC: 45-1972 - "Recommendations for Estimating the Resistance of Soil Below the Maximum Scour Level in the Design of well foundations of Bridges".
6. IRC: 52-2001 (Second Revision) - "Recommendations about the Alignment Survey and Geometric Design of Hill Roads."
7. IRC: 56-1974 - "Recommendations Practice for treatment of Embankment Slopes for Erosion Control."
8. IRC: 75-1979 - "Guidelines for the Design of High Embankments."
9. IRC: 78-2000 (Second Revision) - "Standard specifications and Code of practice for road, bridges, section VII - Foundations and substructure.
10. IRC: 89-1997 (First Revision) - "Guidelines for Design and Construction of River Training and Control Works for Road Bridges".
11. IRC: 104-1988 - "Guidelines for Environmental Impact Assessment of Highway Projects".
12. IRC: SP: 13-2004 (First Revision) - "Guidelines for the Design of Small Bridges and Culverts."
13. IRC: SP: 35-1990 - "Guidelines for Inspection and Maintenance of Bridges".
14. IRC: SP: 42-1994 - "Guidelines on Road Drainage".
15. IRC: SP: 50-1999 - "Guidelines of Urban Drainage".
16. IRC: SP: 54 -2000 - " Project preparation Manual for Bridges".
17. IRC: 6 - 2000 - "Standard specifications and code of practice for road bridges - section II Loads & Stresses".
18. IRC: SP: 57 -2001 - "Guidelines for quality systems for road construction."
19. IRC: 28 - 1967 - "Recommendation of road construction in water logged areas".
20. IRC: SP: 26 1984 - "Project preparation manual for bridges".
21. IRC: 87 - 1984 - "Guidelines for design and erection."

22. IRC: 21 - 2000 - "Standard specification and codes for roads and bridges."
23. IRC: SP: 20 - 2002 - "Rural Roads."
24. MORT & H Pocket Book for Highway Engineers, 2002 (Second Revision)
25. IRC: SP33: 1989 Guidelines on supplemental Measures for Design, Detailing & Durability of Important Bridge Structures.

ANNEXURE-4

Dos and Don'ts for various Hazards:

Cyclone Safety: Don'ts before and during a cyclone :

- Have your dwellings checked before a cyclone season starts and carry out whatever repairs that are needed.
- Talk to children and explain about cyclones without scaring them.
- Create storm awareness by discussing effects of a cyclonic storm with family members so that everyone knows what one can and should do in an emergency. This helps to remove fear and anxiety and prepares everyone to respond to emergencies quickly.
- Keep your valuables and documents in containers, which cannot be damaged by water.
- Keep information about your blood group.
- Keep lanterns filled with kerosene, torches and spare batteries. These must be kept in secure places and handy.
- Make plans for people who are either sick, suffer from disabilities, aged and children.
- Store up at least seven-day stock of essential food articles, medicines and water supply.
- Keep blankets & clothes ready for making beds. Also keep cotton bandages.
- Store some wooden boards so that they can be used to cover windows.
- Keep trees and shrubs trimmed. Remove damaged and decayed parts of trees to make them resist wind and reduce the potential for damage. Cut weak branches and make winds blow through.
- All doors, windows and openings should be secured.
- Continue to listen to warning bulletins and keep in touch with local officials. Keep radio sets in working condition. Battery powered radio sets are desirable.
- Evacuate people to places of safety when advised.
- Take steps to protect your assets.
- Store extra drinking water in covered vessels.
- Remain calm.

Don'ts during a Cyclone:

- During the storm do not venture out unless advised to evacuate.
- If you have a vehicle and wish to move out of your house, leave early before the onset of a cyclone. It is often best to stay at home.
- Avoid remaining on the top floor of dwellings. Stay close to the ground.

- Fishermen are advised not to venture out into the sea. They should keep boats and rafts tied up in a safe place.
- Avoid taking shelters near old and damaged buildings or near trees.
- Do not touch power lines. One may get electrocuted.

Dos after the Cyclone :

- Watch out for broken glass and other sharp items in debris.
- Watch out for snakes and insects. Try to call for help.
- Listen to the advice of local officials and emergency workers.
- Be sure that the storm has subsided before venturing out.
- It is advisable to wait for the "all clear message" on radio and TV networks.
- Wait for emergency relief teams to arrive. It may take a little time before relief becomes effective.
- Stay away from flooded areas.
- Fishermen should wait for at least 24 hours before resuming fishing.
- Volunteer to help people who may need assistance like:
- Bringing evacuated people back home and in recording damages suffered
- Rendering first aid to the wounded
- Donating blood
- Locating places where dead bodies can be kept until they are disposed off
- Organising clearing-up so that normalcy returns as soon as possible

Earthquake safety: Dos and don'ts before Earthquake :

- Tell the facts about earthquake to your family members
- Construct new buildings with earthquake resistant method and strengthen the old buildings
- Insure your house and family members
- Take the training for first aid and fire fighting
- Do not keep cots near the glass window
- Do not keep heavy and fragile things in the selves
- Do not hang photo frames, mirrors, or glasses up your bed
- Keep your important documents, some cash and necessary articles ready in a bag
- Get your house insured before the earthquake
- Identify special skills of neighbor (medical, technical) so that it can be utilised in emergency.

Dos and don'ts during Earthquake:

- Do not panic
- If already inside, than Stay indoors! Get under a heavy desk or table and hang on to it.
- If fire breaks out, drop on the floor and crawl towards the exist
- If you are out doors during the quake, keep away from buildings, trees and electricity lines. Walk towards open places, in a calm and composed manner.
- If you are driving, quickly but carefully move your car as far out of traffic as possible and stop. Do not stop on or under a bridge or overpass or under trees, light posts, power lines, or signs. Stay inside the car until shaking stops
- If you are in a school, get under a desk or table and hold on

Dos and don'ts after the Earthquake :

- Do not be afraid of the aftershocks
- Listen to radio-TV and other media for Government Announcement
- Check for injuries to yourself and those around you. Take first aid where you can extinguish fire, if any
- Examine walls, floors, doors, staircases and windows to make sure that the building is not in danger of collapsing
- Do not enter into the unsafe or risky houses or buildings
- Inspect for Gas leaks-If you smell gas or hear blowing or hissing noises, open a window and quickly leave the building. Don't light your kitchen stove if you suspect a gas leak.
- Do not keep telephone lines busy unnecessarily
- Switch off electric lines

Fire safety: Do:

- Buy Fireworks from the licensed shop.
- Keep fireworks in a closed box
- Store crackers away from source of fire or inflammation
- Follow all safety precautions issued with the fire works
- Go to open spaces like playgrounds, fields
- Light them at arm's length using a taper.
- Stand back while lighting the crackers
- Discard used fireworks in a bucket of water
- Keep buckets of water and blankets ready, in case a firebreaks out.
- Wear thick cotton clothes for maximum safety from fire.

- If clothes catch fire, Stop, Drop and Roll
- In case of uncontrolled fire wrap the victim in a blanket, till it stops.
- In case of burns splash tap water (not ice water), the process may be repeated till the burning sensation reduces.
- If fingers or toes are burned, separate them with dry, sterile, non-adhesive dressings.
- Make sure the burn victim is breathing, if breathing has stopped or if the victim□s airway is blocked then open the airway and if necessary begin rescue breathing.
- Elevate the burned area and protect it from pressure and friction.
- Cover the area of the burn with a moist sterile bandage, of clean cloth (do not use blanket or towel for healing burns).
- Consult the doctor as soon as possible for the proper medication
- Consult an ophthalmologist immediately in case of eye injuries.
- Do contact at the Fire Brigade (Tel. No. 101), for getting the details of the doctors on duty during the festival.

Don'ts:

- Don't burn crackers in crowded, congested places, narrow lanes or inside the house.
- Don't let children burst crackers unaccompanied by an adult
- Don't put fireworks in your pocket or throw them
- Don't cover crackers with tin containers or glass bottles for extra sound effect
- Don't dare to examine unburst crackers...leave it!! Light a new cracker
- Don't show the Dare-devilry of lighting crackers on own hands.
- Don't use fireworks inside a vehicle
- Avoid long loose clothes, as they are fast in catching fire
- Don't remove burnt clothing (unless it comes off easily), but do ensure that the victim is not still in contact with smoldering materials.
- Don't apply adhesive dressing on the burnt area.
- Don't break the burst blister

Flood Safety Dos and Don'ts after flood :

- There is a possibility of spread of water borne diseases after flood, and hence medical treatment should be taken immediately.
- Do not enter deep, unknown waters.
- Do not go near the riverbank even after the floodwater has receded.
- Sprinkle medicines in the stagnant dirty water.

- Inspect your house for any cracks or other damage. Check all the walls, floor, ceiling, doors and windows, so that any chance of house falling down can be known and you can be aware about the immediate danger.
- If the floodwater has entered the house or has surrounded the house, then it is advisable not to enter such house.
- Keep listening to weather forecast on radio and television. Move to your residence only when instructed by the competent authority. It is not safe to believe that the problems have ended after the flood water have receded
- Inform the competent authority/officer for restoration of the necessary connections like gas, electricity, telephone, drainage, etc.
- Beware of the various insects or poisonous snakes that may have been dragged inside the house along with the floodwater.
- Destroy the food commodities that have been affected by floodwater.
- Check properly all the electric circuits, floor level furnace, boilers, gas cylinders, or electric equipments like motor pump etc. Check whether any inflammable or explosive item has not entered along with the floodwater.
- Switch off the main electric supply, if any damage is noticed to the electric equipments.
- If you find any breakage in the drainage system stop using latrines and do not use tap water.
- Do not use polluted water.
- Sewerage system should be checked and any damage should be repaired immediately so as to curtail spread of diseases.
- Empty the water clogged in the basement slowly with help of water pump so that damage to infrastructure can be minimized
- Check gas leakage which can be known by smell of gas or by hearing the sound of leakage; immediately open all windows and leave the house.
- Boil drinking water before usage and drink chlorinated water.
- Eat safe food.
- Rescue work should be undertaken immediately after flood situation as per the instruction. Do not follow any shortcut for rescue work.
- Do not try to leave the safe shelter to go back home until the local officials declare normalcy after flood and instruction to return home are not given.

Tsunami Safety: Dos and Don'ts before Tsunami:

- Be familiar with the tsunami warning signals. People living along the coast should consider an earthquake or a sizable ground rumbling as a warning signal. A noticeable rapid rise or fall in coastal waters is also a sign that a tsunami is approaching.
- Make sure all family members know how to respond to a tsunami. Make evacuation plans. Pick an inland location that is elevated.
- After an earthquake or other natural disaster, roads in and out of the vicinity may be blocked, so pick more than one evacuation route.
- Teach family members how and when to turn off gas, electricity, and water
- Children should be taught in advance about the evacuation plans
- Prepare emergency kit beforehand. The emergency kit should contain Flashlight and extra batteries, battery-operated radio and extra batteries, First aid kit Emergency food and water, essential medicines etc.

Dos and Don'ts during Tsunami :

- Listen to a radio or television to get the latest emergency information, and be ready to evacuate if asked to do so.
- If you hear a tsunami warning, move at once to higher ground and stay there until local authorities say it is safe to return home.
- Move in an orderly, calm and safe manner to the evacuation site
- Stay away from the beach. Never go down to the beach to watch a tsunami come in.
- If you can see the wave you are too close to escape it.
- Return home only after authorities advise it is safe to do so.

Dos and Don'ts after Tsunami :

- Stay tuned to a battery-operated radio for the latest emergency information.
- Help injured or trapped persons.
- Stay out of damaged buildings. Return home only when authorities say it is safe.
- Enter your home with caution. Use a flashlight/torch when entering damaged buildings. Check for electrical shorts and live wires.
- Do not use appliances or lights until an electrician has checked the electrical system.
- Open windows and doors to help dry the building.
- Shovel mud while it is still moist to give walls and floors an opportunity to dry.
- Check food supplies and test drinking water.
- Fresh food that has come in contact with flood waters may be contaminated and should be thrown out

ANNEXURE-5

DISASTER MANAGEMENT

Important Functionaries telephone Numbers- State level

Designation	Name	Contact Number		
		Office	Residence	Mobile
Minister-in-Charge, Disaster Management Dept.	Janab Javed Ahmed Khan	(033) 2214 4052 (033) 2254 4026	(033) 2229 8527	98309 77758
Chief Secretary	Sanjay Mitra, IAS	(033) 2214 5858	(033) 2432 4700	94330 24700 91631 03000
Home Secretary	Basudeb Banerjee, IAS	(033) 2214 5656	(033) 2287 6740	98311 80157 99031 00000
Principal Secretary, Disaster Management & State Relief Commr.	Indevar Pandey, IAS	(033) 2214 3674		90071 54222
Principal Secretary, Finance Deptt.	H.K. Dwivedi, IAS	(033) 2214 3695	(033) 2287 6464	98301 25000
Addl. Chief Secretary, I&W Deptt.	Gopal Krishna, IAS	(033) 2321 6980		99032 54000
Secretary, Irrigation & Waterways	Dhiman Mukherjee	(033) 2321 6980		98300 42457
Principal Secretary, Civil Defence	P. Ramesh Kumar, IAS	(033) 2214-1617	4518	(0)9981122779
Director, Civil Defence	Gangeswar Singh, IPS	(033) 2225 2179		98364 02121
Principal Secretary, PHE Deptt.	Saurabh Kr. Das, IAS	(033) 2248 6769	(033) 2290 2244	99039 31373
Principal Secretary, PWD Deptt.	Indevar Pandey, IAS	(033) 2214 5444		90071 54222
Pr. Secy., Health & F. W. Deptt.	Malay Kumar De, IAS	(033) 2357 5899	(033) 2335 0335	98312 12250
Secretary, Agriculture Deptt.	Subrata Biswas, IAS	(033) 2214 5506		94332 53984
Secretary, ARD Deptt.	Rajeev Kumar, IAS	(033) 2335 1152		93312 75575 9331275501
Addl. Chief Secretary, F P I & H	C. M. Bachhawat, IAS	(033) 2337 4244	(033) 6500 1242	96743 85002
Principal Secretary, Fisheries	Sayeed Ahmed Baba	(033) 2357 0077		8017999587

Designation	Name	Contact Number		
		Office	Residence	Mobile
Deputy Director, Marine Fisheries	Sandip Mondal	(033) 2357 6416 (No. of Dir., Fisheries)		90514 34056
Director General of Police	G. M. P. Reddy, IPS	(033) 2214 5400	(033) 2555 9925 (033) 2533 4941	90512 70444
Commissioner of Police	Surojit Kar Purakayastha, IPS	(033) 2214 5060	(033) 2456 6011	98315 91268
IG (Admn.) as Nodal Officer for DMG, West Bengal Police	Sanjoy Mukherjee, IPS	(033) 2214 4498		98300 05111
Addl. C.P. Nodal of K. P., DMG	Debashish Roy, IPS	(033) 2250 5361		98367 77722
DG, Fire & Emergency Services	D. P. Tarenia, IPS	(033) 2252 7172	(033) 2359 8866	98310 56497
Commissioner, KMC	Khalil Ahmed, IAS	(033) 2286 1234	(033) 2461 4831	98300 33355
OSD (Superintending Engineer), PHE	Tanay Das	(033) 2248 6036		94332 42129

Disaster Management Department

Control Room		1070 (Toll free)) (033) 2214 3526 (033) 2254 4478		(033) 2214 1378 (Fax)
Secretary	Shri Subrata Mukherjee, ITS	(033) 2214 1938 6447		83349 00094 94330 00202
Joint Secretary	Ikhlaque Islam, WBCS(Exe)	(033) 2214 3526 98301 96328	(033) 2334 9610	94341 02091 89020 01070
Indian Meteorological Department	Shri G. C. Debnath, Director, IMD	(033) 2479 0596 (033) 2479 3167 (033) 2479 3782		94338 36994

ANNEXURE-6

DISASTER MANAGEMENT
Field Organisation

Sl. No.	Designation	Organisation	Officer	Contact Number		
				Office	Mobile	Fax
1	Disaster Management Department	Control Room		1070 2214 3526 2254 4478	89020 01070	2214 1378
		Principal Secretary	Indevar Pandey, IAS	(033) 22143674	9007154222	(033) 22144005
		Secretary	Subrata Mukherjee, ITS	(033) 2214 1938 6447	8334900094 94330 00202	(033) 22141989
		Joint Secretary	Ikhlaque Islam, WBCS(Exe)	(033) 2214 3526 98301 96328	89020 01070 94341 02091	(033) 2214 1378
2	ADG(L&O)	Control Room		(033) 2214 5486 (033) 2214 4031		(033) 2214 4031 (033) 2214 4031
		A.D.G.E	Shri Sanjay Mukherjee	(033) 2214 4041	9830005111	(033) 2214 4031
3	Commissioner of Police	Control Room		(033)2250 5000 (033)2250 5090		(033)2250 5000 (033)2250 5090
		Nodal Officer	Debasish Roy, IPS	(033)2214 1515 (033)2409 5273 (r)	98367 77722	(033)2250 5000 (033)2250 5090
		Alternative Officer	Satyajit Banerjee, IPS	(033) 2409 9096	97359 00501	(033)2250 5000 (033)2250 5090
4	HQ Bengal Area Pin: 908752 c/o 99 APO	G.S.O. 1 (ops) Control Room	D.N Rai 86979 72073	(033)2248 7195	9051165478	(033)2248 7195

Sl. No.	Designation	Organisation	Officer	Contact Number		
				Office	Mobile	Fax
5	DG, F&ES	Control Room		(033) 2252 1165		(033) 2252 2223 (F)
		Nodal Officer	Shri D. P. Tarenia, IPS,Director, Fire Services	(033) 22527172	9831056497	(033) 23598866
		Alternative Officer	Debapriya Biswas, IPS [Retd.]OSD to Deptt. F & ES		98300 68025	
6	KMC	Control Room		(033) 2286 1212 (033) 2286 1313		(033) 2286 1334 (033) 2286 1434 (033) 2286 1444
		Nodal Officer	Mr. P.K Dhuya D.G	(033) 2286 1271	9830324329	(033) 2286 1334 (033) 2286 1434
		Alternative Officer	Sajhzad Shibli Jt. Municipal Commr.	(033) 2286 1126	9830158232	(033) 2252 2678
7	NDRF 2nd Bn. Haringhata, Nadia	Control Room		(033) 2587 3601 (033) 2526 4394		(033) 2526 4394
		DG, NDRF	Dr. Mehboob Alam, IPS	(011) 2671 2851	09911357888	
		Nodal Officer	Sukhdev Raj, Commandant, 2nd Bn.	8017166658	94347 42836	(033)2587 5032
		Alternative Officer	Mr. Mukesh, Deputy Commandant	8017166657	94347 42866	(033)2587 5032
8	IAF Advance HQ, Eastern Air Command, IAF, Fort William PIN-938562		K. Mukherjee	(033) 2248 2152 Extn. 305 (033) 2248 2152 Extn. 305	8697322453	(033)2262 5336

Sl. No.	Designation	Organisation	Officer	Contact Number		
				Office	Mobile	Fax
9	Disaster Management Cell at HQ EAC, Upper Shillong	Nodal Officer	OC - in - Charge	0364 2560978		0364 2560978
10	Coast Guard Haldia	Director General of Police, Coastal Security, W.B.	Shri Raj Kanojia, IPS	(033) 2337 1428	9830940682	(033) 2337 1482
		Inspector	Aloke Ghosh	(033) 2479 4050	9830326383	(033) 2479 4050
		Army	Vikram Singh, GOC Bengal Area	(033) 2248 9351		
		Air Force	Joseph Suares, Group Captain	(033) 2248 5287	8420956606	(033) 2248 0208
		Navy	Ravi Ahluwalia	(033)2242 0446 (033)2242 0119 (r)	9051553111	
11	IG BSF	South Bengal Frontier	Rajnikanta Mishra, IPS	(033) 2282 6690	94347 62685 9434738827	(033) 2282 6690
		North Bengal Frontier	S.K. Sood	(0353) 2580155	94347 57007	(0353) 2580155
12	Director, Civil Defence		Gangeswar Singh, IPS, Control Room	(033)2225 2179 (033) 2237 4033/ (033) 2236 3594	98364 02121	(033) 2237 4438
13	Irrigation & water ways Dept.		Gopal Krishna, IAS Addl. Chief Secretary	(033) 2321 5616		99032 54000
			Dhiman Mukherjee, Secretary	(033) 2321 6980	77978 49941	98300 42457
			Control Room	(033) 2321 8341 (033) 2334 0117 (Toll Free)		(033) 2321 5604

Sl. No.	Designation	Organisation	Officer	Contact Number		
				Office	Mobile	Fax
14	AIR Duty Room 24x7	Program Officer	Duty Officer	(033)2248 6064		(033)22313469
			Control Room	(033) 2248 5938		
			Dr. D.C. Podder		94330 99340	
			News Room	(033)2248 9364		(033)2248 9364
15	DD News Room		Snehashish Sur	(033) 2423 5757	98300 28644	(033) 2423 5858
			Head of News	(033) 2423 5343 (033) 2423 5757		(033) 2231 3469 (033) 2423 5454

ANNEXURE-7

Sl. No.	Name, designation & address of the officer	Telephone Number			Fax
		Office	Residence	Mobile	
1	Dr. Satheesh Shenoi Dir. INCOIS Indian National Centre for Ocean information services director@incois.gov.in shenoi@incois.gov.in	23895000 23886001	23894647	09441013377	23895001
2	T.Srinivasa Kumar Scientist Incharge, ITWC (Interim tsunami warning centre) srinivas@incois.gov.in	23895006 23886006	23892022	09441229297	23895012
3	Dr. E.Pattabhi Ram Rao (Data Management Group)	23895008	23046412	09490191923	23895001

ANNEXURE-8

No.	Name	Designation	Office	Residence	Fax
1	Dr.A.V. Tyagi	D.G.M., New Delhi	011-24611842	24633692	24611792
2	Dr. C. V. V. Bhadram	D.D.G.M.(C.W.) New Delhi-3	011-24611068	24644937	24619167
3	R. S. Dattatreyan	Director (Seismo)	011-24611305	2622827	
4	Surya Bali Jaiswar	D.D.G.M.(Seismo) New Delhi-3	011-24629770	24648067	24629770
5	A. K. Shukla	Director (EREC) New Delhi-3	011-24619943	24634714	24629770
6	S.B. Yadav	Director (C.W.C) New Delhi	011-24631913	26196225	24643128
7	B. K. Bandopadhyay	Director (N.H.A.C.) Delhi	011-24619167	246110068	
8	Dr. R.D. Vashisth	D.D.G.M. (SI) Pune	020-25535411	27442954	25533201
9	Dr. R. P. Samui	DDGM (ag.) Pune	020-25533420	25535953	
10	Dr. R. V. Sharma	D.D.G.M. (RMC Mumbai-5)	022-22150517	22150517	22150517
11	M. S.Tomar	Dir. Meterology Center Ahmedabad	22865165 (M)9978406424	26852615	22865449

No.	Name	Designation	Office	Residence	Fax
12	Shri Jayant Sarkar	Meteorologist Weather Forecasting A'bad	22861413	26852615	22865449
13	Shri B. K. Rastogy	D G, Institute of Seismological Research, Gandhinagar	23252703 , 9824020907	23259100	23259192
14	B. H. Shah	Asst. Meteorologist II IMD, Bhuj	02832-250575	223051	250575
15	A.C. Fojdar D.T. Rav	Kevadia Observatory	02640- 232122, 232041	231137	232122
16	IMD (Seismo) New Delhi			011-24619943	
17	IMD , Ahmedabad (MET)			079-22865012	22865449
18	Shri Jayant Sarkar	Director, A'bad			079-22865165
19	Manorama Mohanty	Met. (I/c), A'bad		079-22861413	22865449
19	Duty Officer, CWC, A'bad			079-22865012	22867206

ANNEXURE-9

List of District Magistrates and Superintendents of Police

District	Designation	Name	STD	TEL (O)	TEL (R)	Fax	Mobile
Coochbehar	D.M.	Shri P. Ulaganathan	03582	227101	227201	227000 225000	9434027101
	S.P.	Shri Anoop Jaiswal	03582	227755	227632	227745	09775802301
Darjeeling G.T.A- donboxo lepcha- 7602359729	D.M.	Shri Puneet Yadav	0354	2254233 2256201	2256182	2254338	9434054233
	S.P.	Shri Akhilesh Kr. Chaturvedi	0354	2254270	2254278	2254203 2254204	09733008001
Jalpaiguri	D.M.	Smt. Pritha Sarkar	03561	230127	227333 228133	224811	9800025000
	S.P.	Shri Kunal Aggarwal	03561	230492	232024	231237 223237	9434016610 8170040001
Malda	D.M.	Dr. Sharad Kr. Dwivedi	03512	252381	253092 252415	253092 253049	9775844844
	S.P.	Shri Prasun Bandapadhaya	03512	252520	255699	253345 266223	9775802302
Uttar Dinajpur	D.M.	Smt. Smita Pandey	03523	252925	252441 250005	252250	9434049215
	S.P.	Shri Rajesh Kumar Yadav	03523	252461	252527	253033	9674735351
Dakshin Dinajpur	D.M.	Shri Tapas chaudhury	03522	255201	255202	255488	9434055201
	S.P.	Shri Sheesh Ram Jhajharia	03522	255321	255689	255323	9474519607
Murshidabad	D.M.	Shri Y. Ratnakara Rao	03482	251650	250002	277546 250145	9434770000
	S.P.	Dr. Humayun Kabir	03482	250751	252003	251850 250511	9434222000
Nadia	D.M.	Shri P. B. Salim	03472	251001	252052	252294 253030	9434340101
	S.P.	Shri Sabya Sachi Raman Mishra	03472	252229	252303	253154 253121	9732522222
Purulia	D.M.	Shri Tanmay Chakraborty	03252	222302	222301	222490 222511	9434001122
	S.P.	Shri Sudheer Kumar Neelakanta	03252	222304	222303	224379	9434001500 8145500325

District	Designation	Name	STD	TEL (O)	TEL (R)	Fax	Mobile
Bankura	D.M.	Shri Vijay Bharti	03242	250304	250303	251076 254807	9434037744
	S.P.	Shri Mukesh	03242	250305	250306	250727 250601	9434000328 9564100100
Birbhum	D.M.	Shri P. M. K. Gandhi	03462	255222	255223	256222 (O) 255646 (R)	9434009861
	S.P.	Shri Alok Rajoria	03462	255353	2525219	250806	9051217042
Burdwan	D.M.	Shri Sumitra Mohan	0342	2662428	2625700 2625702	2625703 2561899	9734750500 Sr. D.C.-0342-2662347
	S.P.	Shri Syed Md. Hussain Meerza	0342	2662495	262 4400	266 3808	9830489770
Howrah	D.M.	Smt. Subhanjan Das	033	26412024	26412961	26413367	9831076865
	S.P. (Rural)	Shri Bharat Lal Meena	033	2641 2626	2638 2086	2641 2386	8017577777 9674100400
Hooghly	D.M.	Smt. Manmeet Nanda	033	26802044	26802040	2680 2048	9432013662
	S.P.	Shri Sunil Kr. Chaudhury	033	2680 4827	2680 2325	2680 4739	7407006666
North 24 - Parganas	D.M.	Shri Sanjay Bansal	033	25523662	25523474	25626177 25523535	9051022000
	S.P.	Shri Tanmay Ray Chaudhury	033	2542 3055 2538 9202	2562 1282	2552 2247	9830522253
South 24-Parganas	D.M.	Shri Santanu Basu	033	24791469	24793713	24793456 24791694	9874706555
	S.P.	Shri Pravin Kr. Tripathi	033	2479 3333	2488 3626	2479 3333 2479 1261	98367-59227
Paschim Medinipur SDO, Ghatal, Adib Ray-9434744670/ 03225255145	D.M.	Shri Md. G. A. Ansari	03222	275571	275570	275427	9434750400
	S.P.	SMt. Bharati Ghosh	03222	275609	275608 263769	274298	9836832777
Purba Medinipur	D.M.	Smt. Antara Acharya	03228	263098	263120	263500	9434000700
	S.P.	Shri Sukesh Kumar Jain	03228	263580	263602	269763 266038	7797219090 9874020008

1	Police Commissioner, Lalbazar, Kolkata 1.	2214-5060/ Fax No. 22145424
2	PS to Police Commissioner- Mr. Verghese Kunjachan , Lalbazar 9.15 am to 9.15 pm.	2250-5133

Howrah Police Commissioner	Ajay Mukund, IAS 8017311111	26415614	26400400/Police Control Room- 26415614
Howrah Railway Station Control Room	2641-4217/ 26410667 Platform Enquiry 26506886		

ANNEXURE-10

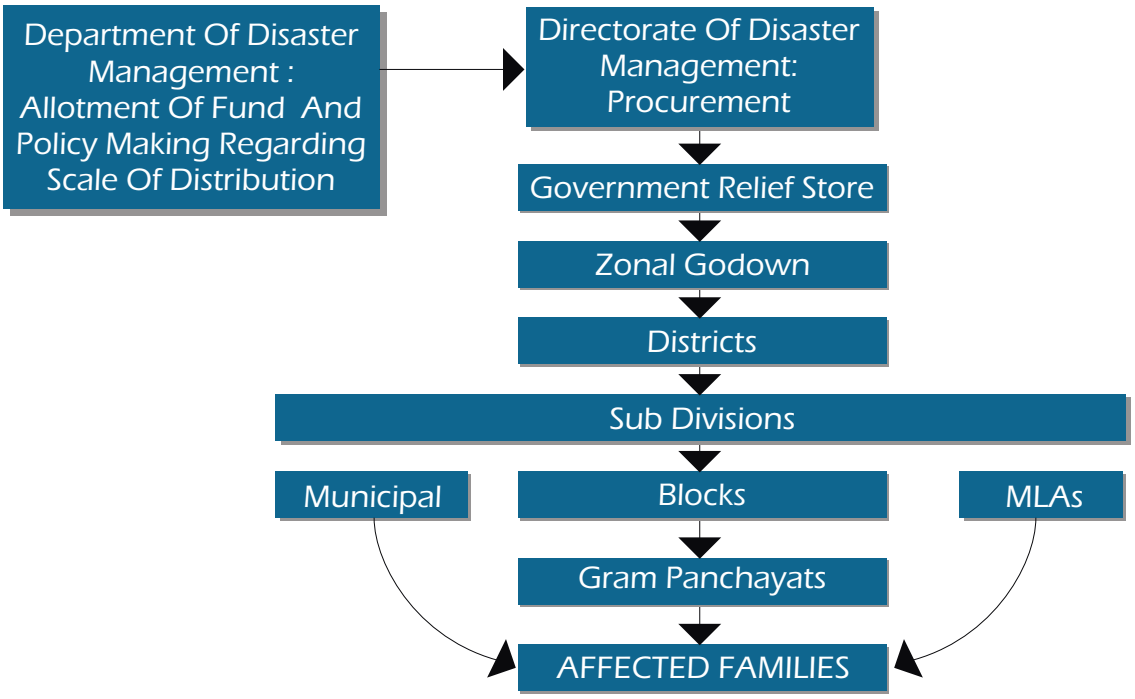
Telephone Numbers of ADM (Disaster Management)

Name of District	Mobile Nos. Of ADM (Disaster Management)	S.T.D. Code	Telephone Nos. (Office)	Fax Nos. (Office)
Coochbihar	Debjani Bhattacharjee 9434027303	03582	227-102/227-114	227-002
Darjeeling	Kausik Bhattacharjee 9434058101	0354	2254-313	2256-202
Jalpaiguri	Amyas Tshering 7797860200	03561	231-101	224-811
Malda		03512	253-049	253-049 223-775
U. Dinajpur	P.D. Pradhan 9434155218	03523	252-347	252-347
D. Dinajpur	Sajal Kanti Tikadar 9434055612	03522	255-248	255-121
Murshidabad	Enaur Rahman 9434770005	03482	250-389	261-800 250-693
Nadia	Utpal Bhadra 9434111515	03472	252-293	252-893/253-030
Purulia	Sabuj Baran Sarkar 9434246605	03252	223-120	223-120
Bankura	Aditi Das Gupta 9434754806	03242	250-355/250-757	250-751
Birbhum	Nibil Iswarary 9434748890	03462	255-272	255-422

Name of District	Mobile Nos. Of ADM (Disaster Management)	S.T.D. Code	Telephone Nos. (Office)	Fax Nos. (Office)
Burdwan	Utpal Biswas 9734484699	0342	2662-443	2662-443
Howrah	Arshad Hasan Warsi 9830570982	033	2638-3529/ 2641-4721	2638-0756
Hooghly	Abid Hussain 9836422998	033	2680-2043/2680-2317	2680-2217
North 24-Pgs.	Bijit Kr. Dhar 8017043888	033	2552-3878	2552-3355 2552-3878
South 24-Pgs.	Abhijit Kr. Latua 8334972555	033	2479-1233	2479-1552
W. Midnapore	R. Arjun 8900359767	03222	275-455	275-785
E. Midnapore	Abhijit Maitra 8373063001	03228	263-667	263-994/263-500

ANNEXURE-11

Flow Chart of Distribution of Relief Articles



WEST BENGAL

DISASTER MANAGEMENT PLAN 2014

PART 2

Department of Disaster Management

CONTENTS

1. Action Plan for Earthquake 4
1.1 Introduction 4
1.2 Institutional mechanism of the State Government to respond to earthquake disaster 4
1.3 Trigger mechanism on receiving the report of occurrence of an earthquake 5
1.5 Response mechanism of the concerned line departments along with the roles and responsibilities of each one of them 6
1.6 Immediate relief to be provided to the affected population 13
2. Action Plan for Cyclone 16
2.1 Introduction 16
2.2 Associated Authority 17
2.3 Disaster Declaration 17
2.4 4-stage warning system for Tropical Cyclones 17
2.5 Warning Dissemination process 18
2.6 Plan Activation 18
2.7 Roles and Responsibility 19
2.8 Immediate relief to be provided to the affected population 35
3. Action Plan for Flood 38
3.1 Introduction 38
3.2 Declaration of Flood Disaster 40
3.3 Flood Forecasting and Warning 40
3.4 Trigger Mechanism: Plan Activation 42
3.5 Roles and Responsibilities 43
3.6 Relief 44
4. Action Plan for Tsunami 47
4.1 Introduction 47
4.2 Associated Authority 47
4.3 Early Warning 47
5. Action Plan for Technological Disasters 50

Action Plan for Earthquake

1.1 Introduction :

The seismic zonation map (2002) as prepared by Bureau of Indian Standard shows:

- Eastern section of northern districts of Jalpaiguri and Coochbehar lie in Zone V
- The remaining part of these two districts, along with the districts of Darjeeling, Uttar Dinajpur, Dakshin Dinajpur, Malda, 24 Paraganas (south & north) lie in Zone IV
- The rest of the state along with Kolkata lies in Zone III expect some portions of Purulia, Bankura and Paschim Medinipur.
- Small part of Purulia, Bankura and Medinipur lies in Zone II.

It is also found from seismic map that two fault lines run through the state.

With a view to minimise the adverse impacts of earthquakes in the future, the Government of West Bengal has taken various initiatives to combat the effects of earthquake. This Chapter will mainly focus on the Action Plan of the State Government to manage earthquake disaster after its occurrence. The Action Plan will consist of the following activities:

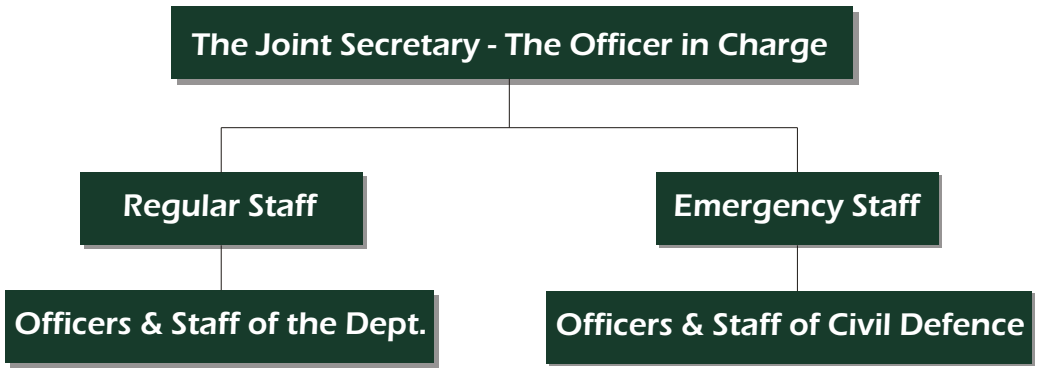
i) Institutional mechanism of the State Government to respond to earthquake disaster
ii) Trigger mechanism on receiving the report of occurrence of an earthquake
iii) Response mechanism of the concerned line departments along with the roles and responsibilities of each one of them and
iv) Immediate relief to be provided to the affected population

1.2 Institutional mechanism of the State Government to respond to earthquake disaster :

Until 2004, no organised effort was made to build the capacity for earthquake preparedness, mitigation and risk and vulnerability reduction in the West Bengal. However, in the aftermath of 2004 Tsunami & the earthquake of 18th September 2011 initiated the State government to undertake long term capacity building initiatives to deal with future earthquakes. The focus of the government has now broadened to include earthquake risk reduction, mitigation and preparedness also, along with response & relief.

West Bengal has its Disaster Management Department which is primarily responsible for emergency response and relief in the State, while the West Bengal State Disaster Management Authority (WBSDMA) along with the Department of Disaster Management works for formulation of policies, long term planning, coordination and monitoring body for mitigation, reduction and preparedness for disasters in the State.

The structure of the EOC in the state is as follows :



1.3 Trigger mechanism on receiving the report of occurrence of an earthquake:

An earthquake of magnitude 5 or more is likely to cause deaths and injuries to human beings and damage to all kinds of property, both private and public. Unfortunately there is very little warning available before the earthquake. Therefore planning should cater for a quick response at all levels to reduce the effects of the earthquake to the minimum.

1.4 Element At Risk:

Several key factors that contribute to vulnerability of human populations to earthquakes:

- Location of settlements in an earthquake prone area, especially on soft ground, on area prone to landslides or along fault lines.
- Dense collection of weak buildings with high occupancy.

Non-engineered building constructed by earth, rubble, buildings with heavy roofs (more vulnerable than light weight structures), poor quality and maintenance of buildings.

The Disaster Management Department/WBSDMA of the State is the nodal department for formulating, controlling, monitoring and directing measures for earthquake preparedness, organizing rescue, relief and rehabilitation. All other concerned departments should extend full cooperation in all matters pertaining to the management of the earthquake disaster whenever it occurs.

The occurrence of an earthquake may be reported by the IMD/INCOIS to the Relief Commissioner by the fastest means. The State Crisis Management Committee (SCMC) under the chairmanship of the Chief Secretary should be activated immediately on the occurrence of any major earthquake.

1.5 Response mechanism of the concerned line departments along with the roles and responsibilities of each one of them:

1.5.1 Information and reporting:

The agency who provides information to the SEOC about the occurrence of an earthquake in the State is the

- IMD, Kolkata
- INCOIS, Hyderabad

The SEOC should be activated for emergency response on the occurrence of any major earthquake. The SEOC should initiate following activities:

i) State EOC should report the occurrence of a major earthquake to the following:

- Relief Commissioner & the Principal Secretary (Disaster Management)
- Chief Secretary of the State
- Joint Secretary & Officer in Charge SEOC
- Members of Crisis Management Committee
- Hon'ble Chief Minister
- Hon'ble Minister-in- Charge, Department of Disaster Management
- National Disaster Management EOC at MHA, GoI
- Vice Chairman, National Disaster Management Authority (NDMA)
- Secretary, MHA

ii) State EOC to alert the Quick Response Team for emergency response as also fire brigade personnel.

iii) State EOC to verify the authenticity of the information from authorized scientific agencies as well as district and block control rooms.

iv) State EOC to contact its regular and emergency staff to report immediately.

v) All Secretaries of the State Departments to be contacted to be available in the EOC immediately.

vi) State EOC to remain in constant touch with control rooms at national district and Block level.

vii) Overall management of state EOC shall be taken over by the Relief Commissioner.

On receipt of information, RC to:

- Contact all member of Crisis Management Group to inform them about the venue and time of first meeting (chaired by Chief Secretary) to assess the situation and decide the course of action to be adopted by the State government.

- Issue instructions to all departments to ensure that all state government employees to report for duty immediately in order to execute their responsibilities.
- Instruct all line departments to ensure their duty officers to remain available round the clock in state EOC with full updated information of the activities of their departments.
- Prepare and submit daily situation report to Government of India, Chief Secretary, Principal Secretary (Disaster management), etc.
- If necessary depute Senior state level officers to worst affected blocks for effective implementation and supervision of Relief Operation.
- Mobilise additional manpower from the departments to the affected district / blocks for supporting the Relief Operation. They should be provided task force action Plans of the concerned blocks / district prepared earlier.
- Management of Media (Press/TV Channels/Government Press Notes) to be carried out by the Secretary (Information & Broadcasting) with special emphasis on rumor control. He shall maintain constant liaison with Disaster Management Department.

1.5.2 Restoration of lines of communications and essential services to facilitate emergency response:

- Establishment of Emergency Communication
- Restoration of Communication Links (Rail, Road & Air)
- Restoration of power and electricity
- Supply of safe drinking water
- Restoration of essential lifeline infrastructure

1.5.3 Search, rescue and medical assistance:

- Identification of areas where Quick Response Teams (QRTs) to be deployed for search & rescue
- Coordination of QRTs for their quick deployment in allotted areas
- Provision of quick transport of QRTs to affected areas with the well equipped vehicles containing all the necessary arrangements for search & rescue and medical assistance.
- The department of PWD (Roads) to evolve a mechanism for clearing access routes and debris in order to facilitate search and rescue operations.
- Mobilisation of specialised equipments and machinery to affected areas.
- Cordoning of affected areas with control of entry and exit.
- Traffic Management by establishment of traffic points and check-posts.
- The Home Department to evolve a mechanism for providing security of properties of government and public in the affected areas.

- Setting up of field hospitals in the affected areas and deployment of mobile hospitals.
- Providing logistical support to the health sectors round the clock
- Arrangements to be made for quick transportation of injured victims to the hospitals.
- Secretary (Health) to evolve a mechanism for speedy treatment of casualties.

1.5.4 Emergency relief (shelter, food, clothing, etc.)

(a) Establishment of Temporary shelters for evacuees.

(b) Ensuring provision of essential services as under:

- Arrangement for food, clothing, blanket/bedding, drinking water, sanitation and hygiene, lighting arrangements and essential medicines.
- Deployment of mobile hospitals in affected areas for treatment of victims.
- Providing counseling services to the earthquake victims and their relatives.

(c) Arrangement for providing transport facility to send dead bodies of non-locals to their natives. The administration should also ensure Law and Order during shifting of the dead bodies.

(d) Ensure establishment of communication link between the affected people and their relatives outside.

A Task and Responsibility Matrix for Emergency Response Phase (first 72 Hours of the incident) is given below:

Time Frame	Sl. No.	Task	Responsibility
0 + 15 Minutes	1	Report the occurrence of earthquake to the RC, PS (DM), Heads of all line departments, Chief Secretary and Chief Minister's Office and NDMA	Joint Secretary, DMD
0 + 30 Minutes			
	2	Establish communication link by activating alternate communication equipment i.e. satellite phone, HF / VHF set, VSAT etc. in State / District EOCs and block control rooms	SEOC

Time Frame	Sl. No.	Task	Responsibility
Contd.	3	Verify the authenticity of the incident from agencies like IMD and also from District/block control rooms, Police and Fire Brigade control rooms	Joint Secretary, DMD
	4	Instruct duty officers of line departments to report in SEOC	RC
	5	Hold first meeting with duty officers	
	6	Contact the Heads of all line departments including the Information Department to reach SEOC	
	7	Alert QRTs for quick mobilisation to affected areas	Joint Secretary, DMD
	8	Request for the services of NDRF/ SDRF and Armed forces, if required through designated representative	RC
0 + 1 Hour			
	9	Instruct both regular and emergency staff of EOC to report for duty	Joint Secretary, DMD
	10	Dispatch of QRTs to the affected areas with necessary equipments and vehicles	
	11	Instruct Quick Response Team to submit preliminary need and loss assessment report of the affected areas	Joint Secretary, DMD
	12	Alert Quick Medical Response Teams to the affected areas	
	13	Make arrangements for aerial survey of the affected areas	RC
	14	Instruct local administration to evacuate victims to safer sites	

Time Frame	Sl. No.	Task	Responsibility
Contd.	15	Contact Chief Secretary for deciding on time and venue for holding Crisis Management Group (CMG) meeting at the earliest	
	16	Inform all CMG members to attend CMG meeting in designated venue to assess situation and review emergency measures	
	17	Instruct concerned authorities or Agencies to shut down critical operations	
	18	Contact ISRO and Ministry of Defence for aerial / satellite imageries of the affected areas	
0 + 2 Hour			
	19	Ensure all State Government employees report for emergency duties as soon as possible	RC
	20	CMG to assess situation, delegate responsibilities for organising rescue and relief operations	
	21	Senior State level officers to be deputed to the affected areas	
	22	Activate Operations Section of IRS for Emergency Response Operation	
	23	Assess the conditions of road, rail and air communication link for quick mobilisation of Emergency Teams and resources to affected areas and take follow up actions	
	24	Director, Information and Broadcasting - (I & B) to establish media management / information cell for public information, guidance and rumor control	Secretary, I & B

Time Frame	Sl. No.	Task	Responsibility
Contd.	25	Request may be made for assistance from Central Government (MHA and MOD) if required	RC
	26	Request the nearest headquarters of the Armed Forces to render assistance in emergency search, rescue and relief operations	
	27	Contact private / public sector agencies in the State to assist in emergency rescue and relief operations	RC
	28	Inform Secretaries of the departments to provide necessary logistics support to emergency operation task forces	
	29	If necessary, assistance may be asked from neighbouring states and outside agencies	
	30	Set up separate desks for each operation task force and NGO coordination desk in the SEOC for coordinating emergency operations	
	31	Provide security in affected areas and maintain law and order situation	Secretary, Home
	32	Mobilise Medical First Response Teams to affected areas	Secretary, Health
	33	Instruct district information officers to establish information centre near affected areas to provide guidance to volunteers and aid agencies	RC / Director - Information
0 + 3 Hour			
	34	Instruct district information officers to establish information centre near affected areas to provide guidance to volunteers and aid agencies	RC / Director - Information
	35	Maintain constant touch with the National / District and Block EOCs	RC and SEOC

Time Frame	Sl. No.	Task	Responsibility
Contd.	36	Establish Press / Media Centre for media management and information dissemination	Director, Information
	37	Arrange for press / media release for rumour control and public information and guidance	Director, Information
	38	Arrange for press / media release for rumour control and public information and guidance	Secretary I & C and RC
0+6 hrs			
	39	Establish relief coordination centre at the airport, railway station, etc. for arrival of Search @ Rescue and Medical Teams coming for humanitarian aid	RC
	40	Establish central relief coordination centre nearer to State Head Quarter	
	41	Instruct to cordon affected areas and setting up of check posts to control entry and exit	Secretary, Home
	42	Open access routes and manage traffic for mobilisation of equipment, machinery and volunteers to the affected areas	Secretary, Home & Secretary Transport
	43	Conduct aerial survey and also mobilise quick assessment teams to affected areas	Secretary Transport
	44	Establish information centres at the arrival and departure points especially at the airports, railway stations and interstate bus terminus	RC / DMD / Line Departments
0+12 hrs			
	45	Mobilise relief materials i.e. tents, food materials, water, essential medicines, blankets, etc. to the affected districts and Blocks	RC / DMD / Line Departments

Time Frame	Sl. No.	Task	Responsibility
Contd.	46	Arrange to shift evacuated persons to temporary shelters and ensure provision of food, water facilities, blankets and storage of relief materials	RC
	47	Arrange road, rail and air transport at State / District headquarters for dispatch of relief materials to the affected areas	RC
	48	Set up field hospitals near the affected areas	Secretary, Health
	49	Arrange to shift injured persons to field hospitals	Secretary, Health

1.6 Immediate relief to be provided to the affected population

1.6.1 Short-Term Relief Measures

(1) Provide temporary shelter to affected people

(2) Evacuation site should be safe, and easily accessible.

(3) Continue to provide essential services to the affected people i.e. food, water, clothing, sanitation and medical assistance

The RC to ensure the following in the relief camps:

- Special emphasis on Hygiene and sanitation aspects should be given in relief camp sites.
- Separate area should be earmarked within the relief camp for storage of relief materials.
- Adequate manpower and transport facilities for the camp site.
- Arrangements to be made for trauma management.
- Mobile medical units to be sent to remote areas with a view to provide medical assistance to the victims/injured.
- Information centre should be established by the administration.

1.6.2 Interim Relief Measures

- Arrangements to be made for identification and maintenance of the records of disposal of dead bodies in the affected areas.
- Arrangements to be made to record the complaints of all persons reported missing. Follow up action in terms of verification of the report also needs to be made.

- Sub-Divisional magistrates to be empowered to exempt the requirement of post-mortem in case of mass casualties.
- Unclaimed/unidentified dead bodies to be disposed off at the earliest after keeping their records.
- Additional manpower to be deployed in the affected areas for supplementing the efforts of the local administration.
- Separate Cell to be established at state/district/Blocks level to coordinate with the NGOs and outside donor/aid agencies.
- Regular meetings of the different stakeholders/departments should be organized at state level for sharing of information, developing strategies for relief operations.
- Information & Broadcasting Dept to coordinate with the media to play a positive role in disseminating appropriate information to public and the government in order to facilitate the speedy recovery.

1.6.3 Assessment of Damage / Loss and Relief needs

- The RC to issue instructions to the District Magistrates provide „the need and loss assessment.
- Adequate manpower, vehicles, stationery etc should be provided to supplement the efforts for need/loss assessment.
- Identification and demolition of dangerous structures in the affected areas to minimize further loss of life and injuries.
- Arrangements for debris removal and its appropriate disposal.
- Arrangements for distribution of gratuitous relief and cash doles.
- Arrangements to be made for survey of human loss and distribution of exgratia relief to the families of deceased persons.
- Teams to be formed and dispatched to the affected areas for detailed assessment of houses and property assessment.
- As reconstruction of houses will take a long period, arrangements to be made to provide interim shelters to the affected
- Providing essential services at the interim shelter sites such as water, power, drainage / sanitation, PDS shops, etc.
- Distribution of shelter materials to individual families

2. Action Plan for Cyclone

2.1 Introduction:

The coastal stretch of West Bengal is necessarily highly vulnerable to cyclone. The phenomenal storm surge in coastal West Bengal is due to its peculiar bathymetry and nature of coastal belt. The northern part of the Bay of Bengal is very shallow. The coast is also landlocked on three sides. As a result when a very severe cyclonic storm or a hurricane approaches the coast, the enormous storm surge generated by the wind pressure submerges the coastal belt at the time of the storm crossing the belt. The frequency of storms crossing this belt is also high. Another peculiar characteristic of this coast is that it is crisscrossed by innumerable rivers and rivulets, with the elevation of the islands about 4 to 5 meters. The seadykes and embankment are not strong enough to resist strong wind-driven waves and naturally cave in during depression / cyclonic storm situation.

In peninsular India, cyclone occurs frequently on both the coasts i.e. The West Coast (Arabian Sea) and East Coast (Bay of Bengal) but the east coast is considered to be one of the most cyclone prone areas of the world.

About 80 tropical cyclones (with wind speeds equal to or greater than 35 knots) form in the world's waters every year. Of these about 6.5% develop in the Bay of Bengal and Arabian Sea. Since the frequency of cyclones in the Bay of Bengal is about 5 to 6 times the frequency of those in the Arabian Sea, the Bay of Bengal's share comes out to be about 5.5%.

The regions of West Bengal that may suffer the possible impact of tropical cyclones come belong to the following districts:

1. **Purba Medinipur (Blocks Ramnagar I, Ramnagar II, Contai I, Contai II, Khejuri II, Nanadigram I, Sutahata)**
2. **24 Parganas-South (Blocks Kultali, Canning I, Canning II, Gosaba, Basanti, Kakdwip, Namkhana, Sagar, Patharpratima)**
3. **24 Parganas-North (Blocks Hingalganj, Sandeshkhali I, Sandeshkhali II, Hasnabad, Gaighata, Bongaon, Bagdah).**
4. **Howrah (Blocks Uluberia I, Shyampur II)**
5. **Paschim Medinipore (Danton)**

The State capital Kolkata also falls in the cyclone prone region, as stated before.

2.2 Associated Authority:

The Nodal Department for controlling, monitoring and directing measures for organizing rescue, relief and rehabilitation is the Disaster Management Department of the State/WBSDMA. All other concerned Departments should extend full cooperation in all matters pertaining to the management of the Cyclone disaster whenever it occurs. The State Departments like Agriculture, Home including Transport, Ports & Fisheries, Power, Finance, Information and Broadcasting etc. shall have a major role in emergency response during occurrence of Cyclone.

2.3 Disaster Declaration:

The purpose of declaration of disaster is to organize effective response and mitigating the Cyclone effects. Such a declaration provides wide powers and responsibilities to the State Relief Commissioner and the District Magistrates in order to handle the incident effectively.

2.4 4-stage warning system for Tropical Cyclones

1) **Pre-Cyclone Watch**
   It is issued when a depression forms over the Bay of Bengal irrespective of its distance from the coast and is likely to affect Indian coast in future. The pre-cyclone watch is issued by the name of Director General of Meteorology and is issued at least 72 hours in advance of the commencement of adverse weather. It is issued at least once a day.
2) **Cyclone Alert**
   It is issued at least 48 hours before the commencement of the bad weather when the cyclone is located beyond 500 Km from the coast. It is issued every three hours.
3) **Cyclone Warning**
   It is issued at least 24 hours before the commencement of the bad weather when the cyclone is located within 500 Km from the coast. Information about time /place of landfall are indicated in the bulletin. Confidence in estimation increases as the cyclone comes closer to the coast.
4) **Post landfall outlook**
   It is issued 12 hours before the cyclone landfall, when the cyclone is located within 200 Km from the coast. More accurate & specific information about time /place of landfall and associated bad weather indicated in the bulletin. In addition, the interior distraction is likely to be affected due to the cyclone are warned in this bulletin.

2.5 Warning Dissemination process

1. Cyclone/flood forecasting is generally the responsibility of the Indian Meteorological Department (IMD). IMD is the nodal agency for providing cyclone warning services. IMD□s INSAT satellite based Cyclone Warning Dissemination System (CWDS) is one of the best currently in use in India to communicate cyclone warnings from IMD to community and important officials in areas likely to be affected directly and quickly. There are 6 CWDS stations in West Bengal.
2. After getting information from IMD, warning dissemination is a responsibility of State Government (RC). The RC under the Disaster Management Department is responsible for disseminating cyclone warnings to the public and Line Departments.
3. On receiving an initial warning, the office of the RC disseminates the warning to all Line Departments, the District administration and DG Police. Warning messages are transmitted though wireless to all districts and Blocks. District Magistrates are provided with all sorts of equipments to maintain effective communication, even if terrestrial and cell-phone communication fails.
4. The state EOC and control rooms of the other line departments at the State level as well as district level also get the warnings. The control rooms are activated on receiving the warnings.

2.6 Plan Activation:

The cyclone response structure will be activated on the receipt of cyclone warning by the Indian Meteorological Department (IMD). The occurrence of a cyclone may be reported by the IMD to the Relief Commissioner/WBSDMA by the fastest means. The Relief Commissioner (RC) will activate all the Departments for emergency response including the State EOC, District EOC and ERCs. He will issue instructions to include the following details:

- Specify exact resources (in terms of manpower, equipments and essential items from key dept./stakeholders) required.
- The type of assistance to be provided
- The time limit within which assistance is needed
- Details of other Task/Response Forces through which coordination should take place

The State EOC, ERCs and other control rooms at the state level as well as district control rooms should be activated with full strength. The state Government may publish a notification in the official gazette, declaring such area to be disaster-affected area.

2.7 Roles and Responsibility

Time Frame	No.	Task	Responsibility	Activity
0-72 hrs	1	Warning receipt and dissemination	IMD, RC	Report the generation of Cyclone in Bay of Bengal/ Indian Ocean after getting information from IMD to following officials; - RC - Principal Secretary (DM) - Chief Executive Officer, WBSDMA - Chief Secretary of the State - Members of Crisis Management Group - Hon. Chief Minister - Hon. Minister Disaster Management - National Disaster Management Authority, GoI. - All concerned District Magistrates as well as Control Rooms of the district/s likely to be affected as per preliminary warning of IMD. - Ministers and Secretaries of all line departments ● Instruct all District Magistrates (of the districts likely to be affected) to activate District Control Room at full strength. ● Alert all response teams in the State for deployment. ● Remain in constant touch with control rooms at National & State Level. ● Instruct and alert all heads of departments of the key line departments to activate their departmental plan and SOPs for Cyclone response.

Time Frame	No.	Task	Responsibility	Activity
Contd.	1	Establishment of lines of Communication	RC	Activate alternative communication equipments i.e. satellite phones, HF/VHF sets, Ham radio, VSAT in State EOC and ERCs, District and Blocks control rooms. ● Establish communication links with ERCs and Search & Rescue Teams in all Municipal Corporations and alert them to be in stage of readiness. ● Establish communication links with villages likely to be affected as per the contact details available in SDRN.

Time Frame	No.	Task	Responsibility	Activity
0- 48 hrs	1	Review of situation and reporting	RC	● Establish contact with IMD, CWC, ACWC, ISRO and the defense ministry of GoI for aerial / satellites imageries of the latest Cyclone threat. ● Get the latest weather report from IMD/other international Web Sites to know the exact location of Cyclone and the likely area where landfall will take place. ● After reviewing the weather report and satellite images issue instructions and orders for emergency response to areas likely to be affected.

Time Frame	No.	Task	Responsibility	Activity
Contd.	2	Management of EOC, ERCs and Cyclone Response	DM Dept./RC	● Take over full command of State EOC and ERCs. ● Instruct line departments to depute representatives at the State and District EOCs. ● Hold a meeting with leaders of task forces and entrust them their tasks. ● Ensure that Cyclone information is disseminated to all who are at danger ● Arrange emergency meeting with State Crisis Management Group to device a plan of action.
			RC	Arrange dissemination of information through various means of communication such as Radio, TV, Cable Network, SMS about Cyclone warning to districts/areas which are likely to be hit by Cyclonic Storm.
			Secretary Transport	Impose restriction on all transport activities heading towards coastal areas that are likely to be affected by Cyclone.
			RC	Alert following teams to remain in readiness: ● Evacuation ● Emergency Medical Services ● Search and Rescue Alert following emergency response forces to remain in readiness: ● Fire & Emergency Services ● NDRF

Time Frame	No.	Task	Responsibility	Activity
Contd.				• Village Disaster Management Teams • Police, Home Guards • State Reserve Police Force • Army (if required) • Air Force (if required)

Time Frame	No.	Task	Responsibility	Activity
0- 48 hrs	3	Cyclone response to coastal areas (likely to be affected)	DM Dept., Transport Dept. and Dist. District Magistrates, Municipal Commissioner	• Based on the warning issued by IMD, pin point the districts and villages likely to be affected by Cyclone and start the procedure for identifying safe places/shelters for evacuation in those villages. • Village wise data of safe sheltering for evacuation available on SDRN should be referred and the dist. District Magistrates/Village level officers should be contacted to know the status of the shelters with the capacity of the shelter and other available facilities at the site. • Make transport arrangement for mobilisation of all emergency response teams.
			Ports & Fisheries Dept., DM Dept.	• Ensure arrangements are in place to evacuate fishermen and salt workers if needed.
			Tourism Dept.	• Ensure safety of tourists visiting beaches along the coastline.

Time Frame	No.	Task	Responsibility	Activity
Contd.	3		Home Dept., Dist. District Magistrates	● Cordoning off coastal areas for restricting entries of rail or road traffic. ● Ensure law and order is maintained in areas likely to be affected.
			Line Depts.	● Ensure that all critical activities (mainly industrial production) in areas likely to be affected are shutdown
			Education Dept.	● Ensure that the schools and colleges are closed in areas likely to be affected by Cyclone and associated hazards.
			Dist. District Magistrates, Municipal Commissioner, Information Dept.	● Ensure dissemination of information to remote areas by local means. ● Ensure that local help lines are opened and effectively managed for public information, guidance and rumor control. ● Ensure that the information to public and media about the progress of Cyclone at periodic intervals is released.
			Dist. District Magistrates, Municipal Commissioner, Line Dept	● Make arrangements for logistic support to all emergency response teams.
			Health Dept.	● Health Department to activate their Departmental Cyclone Disaster Management Plan and Departmental SOPs for Management of casualties

Time Frame	No.	Task	Responsibility	Activity
0 - 24 hrs	1	Review of situation and reporting	DMD	● Establish contact with IMD, CWC, ACWC, ISRO and the defense ministry of GoI for aerial / satellites imageries of the latest Cyclone threat. ● After reviewing the weather report and satellite images issue instructions and orders for emergency response to areas likely to be affected areas.
			DMD, Information Dept.	Review and monitor following activities: ● Evacuation of people from coastal areas likely to be affected ● Positioning of Search and Rescue Teams ● Positioning of mobile communication units ● Positioning of quick medical response teams ● Mobilisation of restoration teams of respective departments ● Requirement of armed forces in rescue and relief operations ● Dissemination of information to the vulnerable areas ● All preparedness measures to be taken by various authorities ● Keep in touch with National, District and Blocks Control Rooms ● Release information at appropriate time to media and public regarding response measures organised by the Government

Time Frame	No.	Task	Responsibility	Activity
Contd.			RC, Dist District Magistrates	● If reports regarding striking of Cyclone are confirmed by IMD and other sources, start the emergency response and relief operations.
			RC, Dist District Magistrates	● Divert the emergency services to areas likely to be affected as per the warning issued by IMD.
			RC, Dist District Magistrates Municipal Commissioner, Home Dept.	● Inform the public residing in areas likely to be affected to evacuate through various means such as SMS, AIR, FM Radio, Doordarshan, etc. ● Start evacuation from the likely affected areas through Police support, if necessary
			Coast Guard, RC	● To account for the exact number of fishermen in the sea and fishermen that have already reached the shore
			DMD	● Ensure that the Relief Management work planned in the areas likely to be affected by the Cyclone are well organised.
			DMD, Civil Supply Dept., Revenue Dept. & Dist. District Magistrates, Municipal Commissioner Water Supply Dept., GEB, Health Dept.	Ensure that the arrangement for basic amenities(shown below) at evacuation/relief centres are made by the respective departments: ● Drinking water ● Food ● Clothing ● Sanitation and hygiene, ● Lighting ● Medicines and other Health ● Care

Time Frame	No.	Task	Responsibility	Activity
Contd.			DMD	Inform following agencies to be in a state of readiness for assisting in the Cyclone response measures (if required): ● Public sector agencies ● Private sector agencies ● NGOs ● CBOs ● Volunteer Organisations ● Request for help (if needed) to ● MHA/National Disaster ● Management Authority
			Information Dept.	● Make necessary arrangements for public information /guidance, public opinion and rumor control.
			Transport Dept. and Dist. District Magistrates, Municipal Commissioner	● Restriction may be imposed for transportation in threatened areas.
0 hrs	1	Disaster Declaration	DMD, Dist District Magistrates	● When Cyclone makes a landfall, Cyclone affected Dist. District Magistrates should send a communication to the State Govt. to declare the area as disaster affected, if necessary, (depending upon the nature and intensity of impact)

Time Frame	No.	Task	Responsibility	Activity
Contd.	2	Preliminary assessment, deployment of emergency response teams and information dissemination	Dist. District Magistrates, Municipal Commissioner	● Dist. District Magistrates should send teams to the affected areas to take stalk of the effects of Cyclone and associated rain. ● District District Magistrates should send sector wise situation reports to: ● State EOC/RC
		Preliminary assessment, deployment of emergency response teams and information dissemination	RC, Dist. District Magistrates, Municipal Commissioner	Deployment of following teams to Cyclone affected areas: ● Emergency Communication Teams ● Emergency Medical Services Teams ● Search and Rescue Teams (With Equipments) ● Preliminary damage Assessment Teams ● Need Assessment Teams
		Preliminary assessment, deployment of emergency response teams and information dissemination	DMD, Dist. District Magistrates, Information Dept.	● Establish communication link with affected districts by activating alternate communication equipments such as Satellite Phones, HF/VHF Sets, Ham Radio, V Set etc., in State/District EOCs and Taluka Control Rooms. ● Arrange dissemination of information about occurrence of Cyclone and areas that are

Time Frame	No.	Task	Responsibility	Activity
0+24 hrs	1	Mobilisation and Deployment	DMD, Dist. District Magistrates, Municipal Commissioner, Key line Dept.	● Remain in constant touch with IMD for updates on weather forecast for the coming hours and plan accordingly. ● Immediate mobilisation of following units/teams to areas affected by Cyclone and associated rains. ● S & R Teams of Fire and Emergency Services ● QRT for medical assistance, damage & loss assessment, Dead Body disposal & Carcasses disposal, debris clearance, etc.
	2	Measures for quick and organised response	DMD, Dist. District Magistrates, Municipal Commissioner, Key line Dept.	● State EOC, ERCs, the District Magistrates of the affected District/s Should ensure that the following response activities are carried out immediately
	a	Clearance of access roads to reach at the sites of affected areas	Transport Dept., Railways, DMD	● To survey the access roads/routes leading to the affected areas and manage traffic for mobilization of equipments, machinery and volunteers. Identify alternate roads/routes for evacuation. Undertake repairing/restoration of damaged roads leading to the affected areas. Identify and declare unsafe buildings/structures in Cyclone affected areas.

Time Frame	No.	Task	Responsibility	Activity
Contd.				● Evacuate people from unsafe buildings/structures and shift them to relief camps/sites. ● Divert/stop transport activities (Rail + Road) heading towards Cyclone affected areas.
	b	Necessary Arrangements at evacuation/ relief centres	Revenue Dept., Civil Supply Dept., District Magistrates, Municipal Commissioner, Water Supply Dept., Health Dept., WBSEB, Power & Energy Dept., & Local Authorities, Home Dept.	● To ensure that necessary arrangements at evacuation/relief centers is made with sufficient availability of: a. Food, b. Water, c. Blankets/Clothing d. Medicines e. Lighting f. Sanitation and hygiene etc. ● To ensure necessary security arrangements for the personals (Emergency responders/relief teams) who are working at Relief Centers and involved in distribution of Relief Materials. ● To ensure that law and order is maintained at evacuation/relief centers and in the affected areas as well.
	c	Safety of fishermen	RC, Port And Fisheries Dept., Tourism Dept., Industrial Dept.	Immediate actions to be taken for safety of fishermen, salt workers and visitors at Cyclone affected coastal areas. Ensure that all the fishermen and salt workers have returned from the sea or those who are in the sea are rescued and evacuated to safer places

Time Frame	No.	Task	Responsibility	Activity
Contd.	d	Ensure immediate health and minimisation of outbreak of disease	Health Dept., Transport Dept.	● To establish camp hospitals near the affected areas. ● To make transportation arrangements to shift seriously injured persons to nearest- a. Camp Hospitals, b. Block and District Hospitals, c. Regional and State Hospitals ● Ensure that the Hospitals are well prepared to deal with seriously injured persons. To ensure that the required medical assistance/aid and medicines are provided to the affected people at site as well as at evacuation/relief centers in the affected area and necessary records are maintained. ● Take sanitation and epidemic control measures for preventing any water borne disease. ● Keep adequate stock of essential medicines, first-aid etc. at block/district hospitals ● Take steps to purify drinking water sources If required, take the help of doctors/paramedics from the list of doctors/paramedics available at the block/district level for immediate medical assistance.

Time Frame	No.	Task	Responsibility	Activity
Contd.		Ensure immediate health and minimisation of outbreak of disease	Animal Husbandry Dept.	● Assess need for fodder if required. ● Keep ready teams for carcass disposal (if required).
	e	Information to public and media	Information Dept., COR	● Establish Media/Press Centre for media management and information dissemination ● Ensure that the information to media /general public about the response of the State Government is released in an organised manner. ● Organise media briefing twice a day at pre-determined intervals.
	f	Other important work related to immediate response	DMD	● Prepare quick need assessment report for planning of relief operation. ● Additional assistance may be asked for emergency response/relief from GoI-NDMA (If needed). ● Maintain constant touch with National, District and Block EOCs and other control rooms. ● Conduct Arial survey of affected areas for taking a stalk of the situation.
0+24 to 48 hrs	1	Restoration of critical infrastructure/ essential services	DMD, Line Depts., Dist. District Magistrates, Municipal Commissioner	● Ensure that the essential services/critical infrastructure of the affected areas have been restored or alternative arrangement is made for

Time Frame	No.	Task	Responsibility	Activity
Contd.				ensuring safety of people and smooth management of emergency response. ● Ensure that key administrative and lifeline buildings are brought back to operation quickly. ● Ensure following primary necessities are restored O Power O Water O Telecommunication O Roads O Bridges
0+24 to 48 hrs	2	Disposal of Dead bodies	Revenue Dept., District Magistrates, Municipal Commissioner, Home Dept., Health Dept., Local Authorities	● Ensure following procedure followed before disposal/handing over of dead bodies: o Photographs of the dead bodies are taken, o Identification of the dead bodies is done, o Post Mortem where ever necessary and possible is carried out, o Handing over dead bodies of persons known/identified to their relatives, o Disposal of unclaimed and unidentified dead bodies.
			Animal Husbandry Dept, Local Authorities, health dept.	● Animal Husbandry Department to ensure medical aid to cattle who are injured. ● Disposal of animal carcasses with the help of local bodies/health dept.

Time Frame	No.	Task	Responsibility	Activity
	3	Public Information and Media Management	DMD, Information Dept. and Dist. District Magistrates, Municipal Commissioner	● Ensure that the information about progress of rescue and relief is provided to media/public in an organized manner at least twice a day. ● Establish help lines for facilitating communication between the victims and their relatives residing outside the affected area/s. ● Establish Information Centers at strategic locations for providing information about persons evacuated to the relief centres/hospitals.
	4	Miscellaneous rescue and relief works	DMD, Districts District Magistrates, Municipal Commissioner	● Assess the situation and take appropriate action to accelerate the Search & Rescue Operations. ● Depute additional officers and supporting staff to cyclone affected areas from non-affected areas (if required) to accelerate the rescue and relief operations.
0+48 to 96 hrs	1		DMD, Dist. District Magistrates, Food Supply Dept.	● Remain in constant touch with IMD for updates on weather forecast for the coming days and plan accordingly. ● Arrange for procurement of additional relief material required for relief operations (on the basis of need assessment).

Time Frame	No.	Task	Responsibility	Activity
Contd.				● Mobilise additional relief material required for relief operations. ● Maintain constant touch with State & Districts EOCs.
0+48 to 96 hrs	2		DMD Health Dept. and Transport Dept.	● Arrangement for transportation of injured from field hospital to base hospital ● Arrangement for transport of dead bodies to their native places.
	3		Line Depts., Dist. District Magistrates, RC	● Ensure maintenance of record, timely reporting and information management. ● Ensure maintenance of record and information database.
0 + 96 to 168 Hrs	1		DMD	● Remain in constant touch with IMD for updates on weather forecast for the coming days and plan accordingly. ● Review the restoration of all the public and essential in Cyclone affected areas. ● Review and follow-up all necessary arrangements for emergency response & relief in the affected area/s.
	2		DMD, IMD	● On receiving the message from IMD about degradation of Cyclone, inform the concern dist. District Magistrates.

Time Frame	No.	Task	Responsibility	Activity
	3		DMD, Dist. District Magistrates, Municipal Commissioner	● Organise a quick rapid visual survey of the affected areas (through a technical team of engineers) to ascertain the safety of the structures decide on giving the go-ahead to people to move back to their respective houses.
	4		DMD, District Magistrates, DSP	● After receiving the massage of de-warning, ensure that people are moved back safely to their houses.
	5		DMD	● Ensure relief disbursement, allotment of funds and grants to line department and District Magistrates for organising emergency response, relief and evacuation arrangements.

2.8 Immediate relief to be provided to the affected population:

2.8.1 Short-term Relief Measures:

Search, rescue and medical assistance

- Identification of areas where QRTs to be deployed
- Coordination of QRTs for their quick deployment in allotted areas
- Provision of quick transport of SAR teams to affected areas.
- The department of Roads and Buildings to evolve a mechanism for clearing access routes in order to facilitate search and rescue operations.
- Mobilisation of specialised equipments and machinery to affected areas.
- Cordoning of affected areas with control of entry and exit.
- Traffic Management by establishment of traffic points and check-posts.
- The Home Department to evolve a mechanism for providing security of properties of government and public in the affected areas.
- Emergency relief (shelter, food, clothing, etc.)

- Establishment of Temporary shelters for evacuees.
- Ensuring provision of essential services as under:
- Arrangement for food, clothing, blanket/bedding, drinking water, sanitation and hygiene, lighting arrangements and essential medicines.
- Deployment of mobile hospitals in affected areas for treatment of victims.
- Providing counseling services to the cyclone victims and their relatives.
- Ensure establishment of communication link between the affected people and their relatives outside.
- The RC to ensure the following in the relief camps:
- Special emphasis on Hygiene and sanitation aspects should be given in relief camp sites.
- Separate area should be earmarked within the relief camp for storage of relief materials.
- Adequate manpower and transport facilities for the camp site.
- Arrangements to be made for trauma management.
- Mobile medical units to be sent to remote areas with a view to provide medical assistance to the victims/injured.
- Information centre should be established by the administration.

2.8.2 Interim Relief Measures

- Arrangements to be made for quick identification and maintenance of the records of disposal of dead bodies in the affected areas (Home, Revenue, Health Dept., Local Authorities).
- Arrangements to be made to record the complaints of all persons reported missing.
- Follow up action in terms of verification of the report also needs to be made. (Home Dept.)
- District Magistrates and sub-divisional magistrates to be empowered to exempt the requirement of identification and post-mortem in case of mass casualties. DMD may depute additional executive magistrates to expedite disposal of the dead bodies.
- Unclaimed/unidentified dead bodies to be disposed off with the help of pre identified voluntary Agencies at the earliest after keeping their records. (DMD, Health Dept. & Local Bodies)
- Additional manpower to be deployed in the affected areas for supplementing the efforts of the local administration.
- Separate Cell to be established at state/district/Block level to coordinate with the NGOs and outside donor/aid agencies. (DMD)

- Regular meetings of the different stakeholders/departments should be organized at state level for sharing of information, developing strategies for relief operations. (DMD, RC & District Magistrates at District Level).
- Information & Public Relation Dept to coordinate with the media to play a positive role in disseminating appropriate information to public and the government in order to facilitate the speedy recovery.

2.8.3 Assessment of Damage/Loss and Relief needs:

Form CA II should be filled up by the affected districts/blocks in the prescribed format where all the details of damage and death are to given.

- The Relief Commissioner to consolidate the same and to prepare "**state's damage and loss assessment report**" which will be useful in planning and implementing the relief operation after the disaster for the victims of the disaster.
- Adequate manpower, vehicles, stationery etc should be provided to supplement the efforts for need/loss assessment. (DMD.)
- The relief need assessment report should be provided by the District Magistrates. (Relief Commissioner & District Magistrates)
- Identification and demolition of dangerous structures in the affected areas to minimize further loss of life and injuries. (Agricul. Dept., DM Dept and Local Bodies)
- Arrangements for distribution of gratuitous relief and cash doles. (DM Dept., Panchayat Dept., and District Magistrates)
- Arrangements to be made for survey of human loss and distribution of ex-gratia relief to the families of deceased persons. (DM Dept.)
- Teams to be formed and dispatched to the affected areas for detailed assessment of houses and property damage assessment. (DM Dept and Local authorities)
- As reconstruction of houses will take a long period, arrangements to be made to provide interim shelters to the affected. (DMD and Line Departments like PHE., PWD Dept. etc)
  - Identification of the site for interim shelter
  - Allocation of areas to affected families
  - Providing appropriate shelters to the affected families
  - Providing essential services as under in the interim shelter sites.

● Water ● Transportation ● Power ● Road ● Drainage/Sanitation ● School ● PDS Shops ● Health ● Protection ● Distribution of shelter materials to individual families .

3. Action Plan for Flood

3.1 Introduction:

According to the Irrigation Department, 37.6 lakhs Ha of West Bengal (42.4% of the total geographical area and 69% of its net cropped area) has been identified as flood prone area; of this 29.8 lakh Ha (i.e., 58% of the flood prone area) is Protected Area. Strong monsoon, rivers and floods are an integral part of Bengal's characteristic ecology that shaped its civilization and culture and at the same time, cause of flood hazard and disasters for the society as a whole. West Bengal, mostly being a deltaic plain, has to face flood situation almost every year. Also it is a densely populated sate and has developed a very effective flood SOP. SOP for proper management of flood comprises of three phases:

A) Pre-flood phase,
B) During flood phase and
C) Post-flood phase.

A. PRE-FLOOD PHASE:

Activities during pre-flood phase are essentially aimed towards:

1. Preparedness and 2. Mitigation.

1. PREPARATORY MEASURES:

1.1 Vulnerability Assessment
1.2 Database Preparation
1.3 Early Warning Dissemination system:
1.4 Stocking of Essential Commodities
1.4.1 Relief Materials
1.4.2 Kerosene Oil
1.4.3 Medicine
1.4.4 Animal feed
1.4.5 Drinking Water

1.4.6 A list of locations where essential commodities are stored for emergency use during and or after flood should be prepared, updated and maintained. It is also important that such sites are adequately secured against plundering during crisis

1.5 CO-ORDINATION
1.6 ACTIVATING CONTROL ROOMS
1.7 MAINTENANCE OF ESSENTIAL SERVICES

1.8 RESPONSIBILITY AND ACCOUNTABILITY: *As far as possible, responsibility for every level of authority during flood should be fixed. Every such official should be accountable for his action/discretion during disaster.*

1.9 PREPARDNESS FOR EMERGENCY RESPONSE

1.9.1 Evacuation Plan

1.9.2 Search & Rescue

1.9.3 Relief Shelters

1.9.4 ***Arrangement of boats & other equipments***

1.10 STRUCTURAL VERIFICATION AND CHANGES

2. MITIGATION MEASURES

2.1 Planning & Capacity Building

B) DURING FLOOD PHASE:

3.1 Role of local govt. representatives

3.2 Local Coping Mechanisms

3.3 Operationalisation of the control room

3.4 Co-ordination

3.5 Disposal of Caracas & dead bodies

C.) POST FLOOD PHASE

4. Assessment of damages
5. Verification of loss of life
6. Rehabilitation of the affected people
7. Animal care
8. Physical, Economic & Social Rehabilitation
9. Documentation

The Action Plan will consist of the following activities:

1. Declaration of Flood disaster
2. Flood Forecasting and Warning
3. Trigger mechanism
4. Response mechanism of the concerned line departments along with the roles and responsibilities
5. Relief

3.2 Declaration of Flood Disaster:

The Disaster Management Department of the State Government declares any area where flood have occurred or likely to occur as disaster affected area on the recommendations of the State Relief Commissioner or the District Magistrates. The purpose of the declaration is to organize effective response in mitigating the flood effects. Such a declaration provides wide powers and responsibilities to the State Relief Commissioner and the District Magistrates in order to handle the incident effectively.

3.3 Flood Forecasting and Warning:

Flood forecasting is a process whereby the authorities are alerted to impending conditions where floods may be likely. Flood forecasting requires understanding of meteorological and hydrological conditions, and is therefore the responsibility of the appropriate government agencies. National organisation is required, but information needs to be made available at a river basin scale. This allows forecasting to integrate with flood warning arrangements.

The main components of a national flood forecasting and warning system are as follows:

- Collection of real-time data and prediction of flood severity and time of onset of particular levels of flooding
- Preparation of warning messages, describing what is happening, predictions of what will happen and expected impact.
- The communication and dissemination of such messages
- Interpretation of the predictions and other flood information to determine flood impacts on communities
- Response to the warnings by the agencies involved and communities
- Review of the warning system and improvement in the system after flood event
- If predictions fail, the reasons of prediction failure should be communicated to communities in order to establish trust.

For a flood warning system to work effectively, all these components must be present and they must be integrated with each other rather than operating in isolation.

3.3.1 Community based flood forecasting and warning systems :

It is important that the people in each community receive information as early as possible about the possibility of flooding in their area. In addition to the valuable information from the official flood warning system, communities should attempt to develop their own warning systems.

At community level, it is important that warnings are received by all individuals. The way in which messages are disseminated in communities will depend on local conditions, but may include some or all of the following:

- Media warnings (print and electronic)
- General warning indicators, for example sirens
- Warnings delivered to areas by community leaders or emergency services
- Dedicated automatic telephone warnings to at-risk properties
- Information about flooding and flood conditions in communities upstream. One approach to disseminating messages is to pass warning messages from village to village as the flood moves downstream
- Keep watch and be regularly informed about the river level and embankment conditions in the local area. The monitoring of the river and embankment should be increased as the water level increases and crosses the critical danger level
- A community-based warning system to pass any information about an approaching flood to every family

3.3.1 Involvement of communities in data collection and local flood warning systems:

If communities become involved in data collection for flood forecasting, and the importance of their role is understood, a sense of ownership is developed. Individuals can be appointed for the following tasks:

- Taking care of installations/ equipments
- Trained as gauge readers for manual instruments (rain gauges, water level recorders)
- Radio operators to report real-time observations
- Trained individuals within the community should be able to gather and update information to:
  - Know the depth of past severe floods in the local area
  - Know the causes of flooding in the local area
  - Know how quickly the waters might rise
  - Know how long the floodwaters might remain in the locality
  - Know the direction of movement of the floodwaters

The involvement of members of the community also helps to prevent vandalism and damage to installations going unreported.

3.3.3 Procedure for disseminating warnings to remote areas:

Communities in remote areas may not be able to receive the types of warnings described in the previous section. Responsibilities need to be defined clearly for lower tiers of administration and the emergency services to have predefined links with communities in remote areas.

This should include:

- Local radio, which should be supplied with clear and accurate information
- Use of appointed community wardens with direct two-way radio or mobile telephone access to warning agencies and emergency authorities
- Local means of raising alarms, for example church bells, sirens, loud hailers, loudspeakers etc. The latter could be the responsibility of selected individuals or wardens, who need to be provided with equipment and transport, for example motor cycles or bicycles;
- 'Sky Shout' from emergency service helicopters.
- SMS based alert system
- Doordarshan and the local cable channels (TV channels & radio Channels including FM radio)
- Bulletins in the Press
- Satellite Based disaster Warning Systems
- Fax
- Telephone

3.4 Trigger Mechanism: Plan Activation:

The flood response system will be activated on the occurrence of a heavy rain. The Joint Secretary, Department of Disaster Management will activate all the Departments for emergency response including the State EOC. He will issue instructions to include the following details:

- Specify exact resources required
- The type of assistance to be provided
- The time limit within which assistance is needed
- The state, district or other contact persons/agencies for the provision of the assistance
- Other Task Forces with which coordination should take place

The state EOC and other control rooms at the state level as well as district control rooms should be activated with full strength. The state Government may publish a notification in the official gazette, declaring such area to be disaster-affected area.

Once the situation is totally controlled and normalcy is restored, the COR declares End of Emergency Response and issues instructions to withdraw the staff deployed in emergency duties.

3.5 Roles and Responsibilities:

Sl. No.	Action To be Taken	Responsible Department
1	Reporting the occurrence of flood to RC, Heads of line departments, Chief Secretary and Chief Minister's Office and National Disaster Management EOC, GoI.	West Bengal State Emergency Operation Centre (WBSEOC)
2	Establish communication links by communication equipments like phone, fax etc. in state/district EOC and Sub- Division & Block Control Rooms.	State Emergency Operation Centre (SEOC)
3	Verifying authenticity of flood from agencies like IMD	SEOC
4	Hold meetings with Officers of Line Departments (especially Irrigation & Water Supplies Department)	DMD
5	Dispatch of QRTs to the affected areas.	DMD
6	Make arrangements for the aerial survey of affected areas	RC
7	Instruct local administration to evacuate victims to safer sites	RC
8	Assess the condition of road and rail network for quick mobilisation of Emergency teams and resources to affected areas and take follow up steps.	RC
9	Maintain constant touch with National /District EOCs and Sub-Division & Block Control Rooms	DMD

Distribution of activities among various State Departments in West Bengal during flood

Sl. No.	Response To be Taken	Responsible Department
1	Providing temporary shelters to evacuated persons	Local Administration & DMD
2	Providing food materials to the victims	Food & Supply
3	Providing safe drinking water to the victims	Public Health Engineering Dept.
4	Provision of hygienic sanitation facilities	Public Health Engineering Dept.
5	Provision of health assistance	Health Department
6	Clothing and Relief articles	Local Administration & DMD
7	Relief camps	Local Administration & DMD

3.6 Relief :

3.3.2 Short-term relief measures:

- **Food & nutrition :**
  In an extreme flood situation, people lose standing crops and stored food grains. In such cases, free distribution of foods are made to avoid hunger and malnutrition to the affected. Wherever possible, dry rations should be distributed for home cooking.

- **Water :**
  Water supply is invariably affected in natural disasters. Availability of safe drinking water is very challenging particularly during floods. It must be ensured that affected people have adequate facilities and supplies to collect, store and use clear and safe water for drinking, cooking and personal hygiene. The Public Health Engineering (PHE) takes every possible initiative in this respect.

- **Health :**
  During post disaster phase many factors increase the risk of diseases and epidemics because of overcrowding, inadequate quantity and quality of water, poor environmental and sanitary conditions, decaying biological matter, water stagnation,

inadequate shelter and food supplies. There should be adequate supply of medicines, disinfectants, fumigants etc. to check outbreak of epidemics. It should be ensured that the medicines have not reached expiry date.

- **Clothing & Utensils (Disaster Management Kit):**
  The people affected by the disaster shall be provided with sufficient clothing, blankets etc. to ensure their safety and well-being. Each disaster-affected household shall be provided with DM Kits that include cooking and eating utensils.

- **Shelter :**
  In case of flood, a large number of people are rendered homeless. In such situations shelter becomes a critical factor for survival and safety of the affected population. In view of this, flood affected people who have lost their houses, are provided sufficient covered space for shelter. Disaster-affected households are provided with House Building Grant as per NDRF/SDRF norms.

- **Relief camp:**
  Relief camps also provide temporary arrangements for people affected by flood. Adequate numbers of buildings or open space are identified where relief camps can be set up during emergency. The use of premises of educational institutions for setting up relief camps are encouraged. The requirements for operation of rescue camps are worked out in detail in advance. The temporary relief camps should have adequate provision of drinking water and bathing, sanitation and essential health-care facilities.

- Sanitation and Hygiene
  Sanitation services are crucial to prevent an outbreak of epidemics in post disaster phase. Therefore a constant monitoring of any such possibilities needs to be carried out. It should be ensured that disaster-affected households have access to sufficient hygiene measures.

3.6.2 Interim Relief Measures:

- Arrangements to be made for quick identification and maintenance of the records of disposal of dead bodies in the affected areas (DMD, Health Dept. and Local Authorities).
- Arrangements to be made to record the complaints of all persons reported missing. Follow up action in terms of verification of the report also needs to be made. (Home Dept., DMD).
- District Magistrates and sub-divisional magistrates to be empowered to exempt the requirement of identification and post-mortem in case of mass casualties.

- Unclaimed/unidentified dead bodies to be disposed off with the help of pre identified voluntary Agencies at the earliest after keeping their records. (Home Dept., DMD, Health Dept. & Local Bodies)
- Additional manpower to be deployed in the affected areas for supplementing the efforts of the local administration. (DMD).
- Separate Cell to be established at state/district/sub-division/block level to coordinate with the NGOs and outside donor/aid agencies. (DMD)
- Regular meetings of the different stakeholders/departments should be organized at state level for sharing information, developing strategies for relief operations. (Relief Commissioner & District Magistrates at District Level).
- Information & Public Relation Dept to coordinate with the media to play a positive role in disseminating appropriate information to public and the government in order to facilitate the speedy recovery. (I. & C. Dept.)

3.6.3 Assessment of Damage/Loss and Relief needs:

- The Relief Commissioner issues instructions to the District Magistrates to provide the CA-II/ "Need Assessment Report. The Relief Commissioner consolidates the same and to prepare "State's Need Assessment Report.
- The relief need assessment report should be provided by the District Magistratess to the RC and DMD.
- Identification and demolition of dangerous structures in the affected areas to minimize further loss of life and injuries. (DMD and Local Bodies)
- Arrangements for distribution of gratuitous relief and cash doles. (DMD and District Magistrates)
- Arrangements to be made for survey of human loss and distribution of ex-gratia relief to the families of deceased persons. (DMD.)
- Teams to be formed and dispatched to the affected areas for detailed assessment of houses and property damage assessment. (DMD. and Local authorities).

4. Action Plan for Tsunami

4.1 Introduction:

The purpose of a Tsunami action plan is to assist the delivery of the right people, to the right location with the right equipments to complete the tasks required during a tsunami disaster.

4.2 Associated Authority:

The Nodal Department for controlling, monitoring and directing measures for organizing rescue, relief and rehabilitation is the Disaster Management Department of the State. All other concerned Departments should extend full cooperation in all matters pertaining to the management of the Tsunami disaster whenever it occurs. The state departments like Transport, Ports & Fisheries, Home, Power, Finance, Information and Culture, Health etc. shall have a major role in emergency response during occurrence of Tsunami generating earthquake and Tsunami hitting the shore.

4.3 Early Warning:

Public may be able to protect themselves from the Tsunami emergency if they are informed and educated before an emergency. Most of the time tsunami hazard is predictable so warning to public is important part of Action Plan.

Decision Support system is the set of rules to be followed for issue of tsunami bulletins. These rules are appropriately coded in the form of software that automatically generates bulletins by accessing the real-time data from the observing network as well as the model scenario database. The Action Plan is the set of routine activities to be followed by the staff at the tsunami warning centre for observation, evaluation, confirmation, and dissemination of bulletins.

Warning/ Alert / Watch:

Based on earthquake parameters, region's proximity to the earthquake zone (Travel Times) and expected run-up from pre-run model scenarios Warnings to Far Source Regions: Issued only after confirmation of tsunami triggering based on real-time water-level observations and correction of scenarios. This will reduce possibility of false warnings.
Category of tsunami advisory bulletins, time-line for generation, content of the alert and dissemination contact information is detailed in the following page:

Types of TWC Tsunami Bulletin Messages:

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

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

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

Tsunami Watch (T+30 Min) (YELLOW) contains information about the earthquake and a tsunami evaluation message indicating that tsunami is expected. (e. g. For earthquakes with > M6.5 occurring in the Ocean within a depth of < 100 Km, a tsunami watch will be

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

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

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

4.4 Plan Activation:

The tsunami response structure will be activated on the occurrence of a major tsunami. The Relief Commissioner (RC) will activate all the Departments for emergency response including the State EOC. He will issue instructions to include the following details:

- Specify exact resources required.
- The type of assistance to be provided
- The time limit within which assistance is needed
- The state, district or other contact persons/agencies for the provision of the assistance
- Other Task Forces with which coordination should take place

The state EOC and other control rooms at the state level as well as district control rooms should be activated with full strength.

Once the situation is totally controlled and normalcy is restored, the RC should declare End of Emergency Response and issues instructions to withdraw the staff deployed in emergency duties.

5. Action Plan for Technological Disasters

5.1 Introduction:

5.1.1 Background:

West Bengal, being a industrialised State is prone to chemical and industrial hazards. Usually, little or no warning precedes incidents involving technological hazards. In many cases, victims may not know they have been affected until many years later.

The number of technological incidents is escalating, mainly as a result of the increased number of new substances and the opportunities for human error inherent in the use of these materials.

5.1.2 Sources of Technological Disasters:

Industrial and technological developments have increased the use of chemicals and minerals. These are found everywhere. They purify drinking water, increase crop production, and simplify household chores. But chemicals also can be hazardous to humans or the environment if used or released improperly. Hazards can occur during production, storage, transportation, use, or disposal. Our community are at risk if a chemical is used unsafely or released in harmful amounts into the environment where you live, work, or play.

Chemical manufacturers are one source of hazardous materials, but there are many others, including service stations, hospitals, and hazardous materials waste sites.

Chemical accidents may originate in:

1. Manufacturing and formulation installations including during commissioning and process operations; maintenance and disposal.
2. Material handling and storage in manufacturing facilities, and isolated storages; warehouses and godowns including tank farms in ports and docks and fuel depots.
3. Transportation (road, rail, air, water, and pipelines).

5.1.3 Causative Factors Leading to Technological Disasters

Technological disasters, in general, may result from:

1. Fire
2. Explosion
3. Toxic release
4. Poisoning
5. Combinations of the above

5.1.4 Initiators of Chemical Accidents:

A number of factors including human errors could spark off chemical accidents with the potential to become chemical disasters. These are: **Process and Safety System Failures:**

1. Technical errors: design defects, fatigue, metal failure, corrosion etc.
2. Human errors: neglecting safety instructions, deviating from specified procedures etc.
3. Lack of information: absence of emergency warning procedures, nondisclosure of line of treatment etc.
4. **Organisational errors:** poor emergency planning and coordination, poor communication with public, noncompliance with mock drills/exercises etc., which are required for ensuring a state of quick response and preparedness.

Natural Calamities: West Bengal is highly prone to natural disasters, which can also trigger chemical disasters.

Terrorist Attacks/Sabotage: Vulnerability to chemical disasters is further compounded by likely terrorist and warfare activities, which include sabotage and attack on HAZCHEM installations and transportation vehicles. This can occur at sources, anywhere, and at any time.

Apart from the above, the following disasters are also worth mentioning

Biological Disasters :

Biological disasters of natural origin are largely the result of the entry of a virulent organism into a congregation of susceptible people living in a manner suited to spread the infection. In crowded areas anthrax spreads by spore dispersal in the air, small pox spread by aerosols, typhus and plague through lice, fleece, rodents, etc. Disasters occur when environmental factors are conducive.

Epidemics :

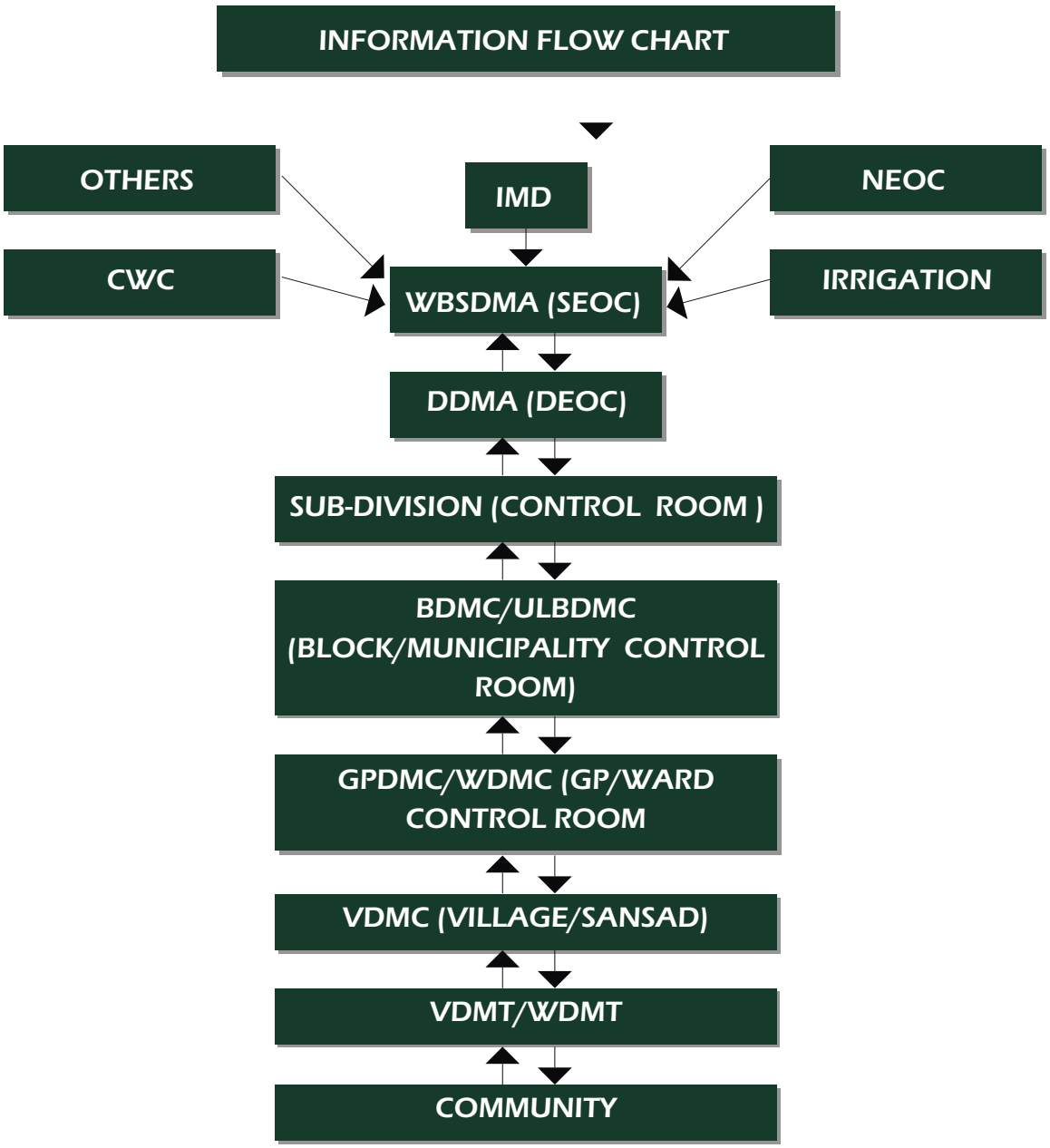
The introduction of a pathogen capable of establishing a transmission chain into a susceptible population will result in an epidemic. Experience with the highly pathogenic avian influenza virus (H5N1) in West Bengal in January 2008 is a good example of the economic and health issues, and actions needed to control epidemics and epizootics.

Institutional Mechanism :

There are various national health programmes run by the Director General Health Services, Ministry of Health & Family Welfare, either as a central sector scheme or in partnership with the state government. Some of these programmes, such as the National TB Programme, National Vector Borne Disease Control Programme, National Programme for Control of Iodine Deficiency Disorders and National AIDS Control Programme which have their networks throughout the country, run as vertical programmes, merging horizontally with service delivery at the grass-root level and have focused strategic approach with inbuilt components for surveillance and monitoring. Many of these programmes were successful in achieving their objective to control/prevent major biological disastersmalaria, smallpox and AIDS are prime
examples .

National Institute of Cholera and Enteric Diseases (NICED), Kolkata: It is an ICMR institution specialising in diarrhoeal diseases and provides expertise in tackling national emergencies caused by epidemics of cholera and other diarrhoeal diseases.

All India Institute of Hygiene and Public Health, Kolkata: It is among the oldest public health institutions in India involved in public health teaching, training and research. It runs regular postgraduate training programmes in public health, environmental health, public health engineering, etc.


INFORMATION FLOW CHART
OTHERS
IMD
NEOC
CWC
WBSDMA (SEOC)
IRRIGATION
DDMA (DEOC)
SUB-DIVISION (CONTROL ROOM)
BDMC/ULBDMC (BLOCK/MUNICIPALITY CONTROL ROOM)
GPDMC/WDMC (GP/WARD CONTROL ROOM
VDMC (VILLAGE/SANSAD)
VDMT/WDMT
COMMUNITY

Department of Disaster Management