



# TRAINING MODULE

## **Project**

Virtual Cadre for Disaster Risk Reduction

## **Department**

Water Resources Department/Kerala Water Authority

## **Published by**

Kerala State Disaster Management Authority

## **Technical Support**

UNDP & SEEDS India



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Version 1 | 2019

Published by

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Prepared under the

Virtual Cadre Project of KSDMA

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## Project Background

Kerala is prone to natural disasters and the changing climatic dynamics given its location along the seacoast and with a steep gradient along the slopes of the Western Ghats. The floods and landslides destroyed public and private infrastructure, including houses, roads, bridges, schools, health facilities, and other utility services and seriously influenced the production sectors. However, the recent floods in Kerala highlighted the need for a robust preparedness, response and recovery mechanism to mitigate impacts of disasters. Considering the vulnerability of the state to disasters, highlighted in the disaster management plan of the state, disaster preparedness assumes high priority. Building capacities of individuals and institutions goes a long way towards preparedness. There is a growing global consensus on the need to invest in disaster risk mitigation, with a focus on mainstreaming mitigation into sustainable development. Coastal states are particularly vulnerable to disasters due to growth of population in unsafe areas, climate change, environmental degradation and lack of local capacities. The Section 38(2) (g) of the Disaster Management Act mandates the preparation of departmental Disaster Management Plans and Section 39 to integrate measures of disaster preparedness and mitigation in developmental plans in accordance with the NDMA and SDMA guidelines. However, the departments do not have the needed expertise to prepare Disaster Management Plans and the Disaster mitigation concerns are not integrated in the developmental plans. The Virtual Cadre once full capacitated will be able to support the departments in doing the above-mentioned tasks. Keeping the above at forefront, UNDP is implementing the project titled “Capacity Development of Virtual Cadre Officials of Kerala.” The project is being implemented by SEEDS Technical Services Pvt. Ltd. The main objective is to build and strengthen the capacity of virtual cadre officials at state and district level for acting as champions in the area of disaster preparedness and management, eight departments of state government has been selected to provide training on different areas specific to their department in the context of any emergency. This study will involve both formative research to assess and identify training and capacity needs; and the creation of a framework, strategy and plan to effectively address those needs.

## Objective

Develop capacities of the departmental virtual cadre of officials at district and state level to act as DRR champions.

## Role definition for Virtual Cadre Officials for Disaster Management in Kerala

The Kerala State Disaster management Plan (SDMP) 2016 recommends that the State Government shall ensure that there is a professionally trained virtual cadre of officers in all the departments of the State for disaster management. The virtual cadre will principally be 15 selected individuals (one each in each district and one in the State level) with at least 20 years more of service left. The members of this virtual cadre shall be the departmental nodal officers for disaster management who shall be as individuals responsible for supporting the

district and state disaster management authorities in disaster management. The KSDMA will ensure that these individuals are adequately trained in matters related to disaster management. These officers shall be trained in rapid damage assessment and certification in the respective sector. The disaster-specific nodal departments through this virtual cadre will ensure liaison and coordination with KSDMA and DDMA's in the smooth implementation of the departmental disaster management plan and with SEOC and DEOCs for ensuring coordinated response to events.

## Selected Departments of Kerala under the Project

**Agriculture:** Around 52% of Kerala's geographical area is under cultivation. Being the spice capital of India, Kerala accounts for 89% of total small cardamom and 98% of total nutmeg production in the country. The state also accounts for 34% of total pepper production. Agriculture along with livestock and fisheries contributes to 11% of the Gross State Value Addition (GSVA) at current prices. In Kerala, 17.15% of the population depends on agriculture. The lowest regions of midland plains host paddy fields and the elevated land slopes has rubber and fruit trees along with black pepper, tapioca and other crops. The coastal belt of Kerala is flat with paddy fields, coconut trees and by a network of interconnected canals and rivers.

**Animal Husbandry:** Around 8.8 million households in Kerala are involved in animal husbandry and nearly 94% of the livestock population is concentrated in rural areas. In the subsector of animal husbandry and dairy development, Alappuzha, Kottayam, Pathanamthitta, Ernakulam, and Thrissur districts suffered the most in the 2018 floods. The share of livestock in Kerala's GSVA is 3.84%.

**Mining and Geology:** Kerala State is endowed with a number of occurrences/deposits of minerals. The contribution of mining and quarrying sector to Gross State Value Added (GSVA) of Kerala at constant prices is estimated at ₹3,658 crore in 2017-18.

**Minor Irrigation:** Minor Irrigation departments lifts the schemes, that having a Cultivable Command Area (CCA) up to 2,000 ha. Minor irrigation scheme comprises of surface water schemes like minor irrigation tanks and canal systems, diversion weirs, lift irrigation schemes and sub-surface schemes.

**Health:** Kerala has made significant gains in health indices such as high life expectancy, low infant mortality rate, birth rate, and death rate. The health status of the marginalised communities like adivasis and fishing workers is also poor compared to that of the general population. Also, 70% of Kerala's healthcare is privately provided, which is making it expensive. In addition, the number of disaster incidents are increasing causing loss of lives and affects a large number of people.

**Water Authority:** The Kerala Water Authority (KWA) is the primary institution for the development and regulation of water supply and wastewater collection and disposal in Kerala. There are 1081 schemes under Kerala Water Authority in total and have a total installed capacity of 3468 MLD. The per capita availability through the KWA schemes is 176 LPCD.

**Land Revenues:** The largest department under the Government, with more than 19000 employees, also known as the “Mother of All Departments”. Some of the major functions of the department are collection of basic tax, plantation tax, building tax, etc., land/mineral conservancy, census, election, natural calamity operations, redressing grievances of citizens, law and order, distribution of social welfare pensions etc. Although this is also getting affected from the disasters occurred in the state. A total of 342 landslides occurred in the Revenue Department marked land extents.

**Soil Conservation:** This is one of the important department, which plan, promote, coordinate and oversee the implementation of soil and water conservation programmes with an aim to conserve the valuable resource trinity of soil, water and biomass in a sustainable manner ensuring active participation of all stakeholders.

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# Chapter 1

## Introduction to Disaster Management

### What is disaster management?

We act before, during and after disasters strike, often helping in some of the world's most hostile environments. Our disaster management activities seek to:

1. Save lives and reduce human suffering
2. Protect and restore livelihoods
3. Reduce the risks faced by communities affected by disaster and conflict.

Disaster Management can be defined as the organization and management of resources and responsibilities for dealing with all humanitarian aspects of emergencies; in particular – mitigation, preparedness, response, and recovery in order to lessen the impact of disasters.<sup>1</sup>

### Definition of Key Terms

#### **Build back better**

The use of the recovery, rehabilitation and reconstruction phases after a disaster to increase the resilience of nations and communities through integrating disaster risk reduction measures into the restoration of physical infrastructure and societal systems, and into the revitalization of livelihoods, economies and the environment.

#### **Capacity**

The combination of all the strengths, attributes and resources available within an organization, community or society to manage and reduce disaster risks and strengthen resilience.

Annotation: Capacity may include infrastructure, institutions, human knowledge and skills, and collective attributes such as social relationships, leadership and management.

**Coping Capacity** is the ability of people, organizations and systems, using available skills and resources, to manage adverse conditions, risk or disasters. The capacity to cope requires continuing awareness, resources and good management, both in normal times as well as during disasters or adverse conditions. Coping capacities contribute to the reduction of disaster risks.

## Contingency planning

A management process that analyses disaster risks and establishes arrangements in advance to enable timely, effective and appropriate responses. Contingency planning is an important part of overall preparedness. Contingency plans need to be regularly updated and exercised.

Annotation: Contingency planning results in organized and coordinated courses of action with clearly identified institutional roles and resources, information processes and operational arrangements for specific actors at times of need. Based on scenarios of possible emergency conditions or hazardous events, it allows key actors to envision, anticipate and solve problems that can arise during disasters.

## Critical infrastructure

The physical structures, facilities, networks and other assets which provide services that are essential to the social and economic functioning of a community or society.

## Disaster

A serious disruption of the functioning of a community or a society at any scale due to hazardous events interacting with conditions of exposure, vulnerability and capacity, leading to one or more of the following: human, material, economic and environmental losses and impacts.

## Disaster management

The organization, planning and application of measures preparing for, responding to and recovering from disasters.

Annotation: Disaster management may not completely avert or eliminate the threats; it focuses on creating and implementing preparedness and other plans to decrease the impact of disasters and “build back better”. Failure to create and apply a plan could lead to damage to life, assets and lost revenue.



## Disaster risk

The potential loss of life, injury, or destroyed or damaged assets which could occur to a system, society or a community in a specific period, determined probabilistically as a function of hazard, exposure, vulnerability and capacity.

## **Disaster risk management**

Disaster risk management is the application of disaster risk reduction policies and strategies to prevent new disaster risk, reduce existing disaster risk and manage residual risk, contributing to the strengthening of resilience and reduction of disaster losses.

Community-based disaster risk management promotes the involvement of potentially affected communities in disaster risk management at the local level. This includes community assessments of hazards, vulnerabilities and capacities, and their involvement in planning, implementation, monitoring and evaluation of local action for disaster risk reduction.

## **Disaster risk reduction**

Disaster risk reduction is aimed at preventing new and reducing existing disaster risk and managing residual risk, all of which contribute to strengthening resilience and therefore to the achievement of sustainable development.

## **Early warning system**

An integrated system of hazard monitoring, forecasting and prediction, disaster risk assessment, communication and preparedness activities systems and processes that enables individuals, communities, governments, businesses and others to take timely action to reduce disaster risks in advance of hazardous events.

## **Multi-hazard early warning systems**

These systems address several hazards and/or impacts of similar or different type in contexts where hazardous events may occur alone, simultaneously, cascading or cumulatively over time, and considering the potential interrelated effects. A multi-hazard early warning system with the ability to warn of one or more hazards increases the efficiency and consistency of warnings through coordinated and compatible mechanisms and capacities, involving multiple disciplines for updated and accurate hazards identification and monitoring for multiple hazards.

## **Evacuation**

Moving people and assets temporarily to safer places before, during or after the occurrence of a hazardous event in order to protect them.

## **Exposure**

The situation of people, infrastructure, housing, production capacities and other tangible human assets located in hazard-prone areas.

## **Hazard**

A process, phenomenon or human activity that may cause loss of life, injury or other health impacts, property damage, social and economic disruption or environmental degradation.

Multi-hazard means (1) the selection of multiple major hazards that the country faces, and (2) the specific contexts where hazardous events may occur simultaneously, cascading or cumulatively over time, and considering the potential interrelated effects.

Hazards include (as mentioned in the Sendai Framework for Disaster Risk Reduction 2015-2030, and listed in alphabetical order) biological, environmental, geological, hydrometeorological and technological processes and phenomena.

## **Mitigation**

The lessening or minimizing of the adverse impacts of a hazardous event.

Annotation: The adverse impacts of hazards, in particular natural hazards, often cannot be prevented fully, but their scale or severity can be substantially lessened by various strategies and actions. Mitigation measures include engineering techniques and hazard-resistant construction as well as improved environmental and social policies and public awareness. It should be noted that, in climate change policy, “mitigation” is defined differently, and is the term used for the reduction of greenhouse gas emissions that are the source of climate change.

## **Preparedness**

The knowledge and capacities developed by governments, response and recovery organizations, communities and individuals to effectively anticipate, respond to and recover from the impacts of likely, imminent or current disasters.

## **Prevention**

Activities and measures to avoid existing and new disaster risks.

Annotations: Prevention (i.e., disaster prevention) expresses the concept and intention to completely avoid potential adverse impacts of hazardous events. While certain disaster risks cannot be eliminated, prevention aims at reducing vulnerability and exposure in such contexts where, as a result, the risk of disaster is removed. Examples include dams or embankments that eliminate flood risks, land-use regulations that do not permit any settlement in high-risk zones, seismic engineering designs that ensure the survival and function of a critical building in any likely earthquake and immunization against vaccine-preventable diseases. Prevention measures can also be taken during or after a hazardous event or disaster to prevent secondary hazards or their consequences, such as measures to prevent the contamination of water.

## Reconstruction

The medium- and long-term rebuilding and sustainable restoration of resilient critical infrastructures, services, housing, facilities and livelihoods required for the full functioning of a community or a society affected by a disaster, aligning with the principles of sustainable development and “build back better”, to avoid or reduce future disaster risk.

## Recovery

The restoring or improving of livelihoods and health, as well as economic, physical, social, cultural and environmental assets, systems and activities, of a disaster-affected community or society, aligning with the principles of sustainable development and “build back better”, to avoid or reduce future disaster risk.

## Rehabilitation

The restoration of basic services and facilities for the functioning of a community or a society affected by a disaster.

## Resilience

The ability of a system, community or society exposed to hazards to resist, absorb, accommodate, adapt to, transform and recover from the effects of a hazard in a timely and efficient manner, including through the preservation and restoration of its essential basic structures and functions through risk management.

## Response

Actions taken directly before, during or immediately after a disaster in order to save lives, reduce health impacts, ensure public safety and meet the basic subsistence needs of the people affected.

Annotation: Disaster response is predominantly focused on immediate and short-term needs and is sometimes called disaster relief. Effective, efficient and timely response relies on disaster risk-informed preparedness measures, including the development of the response capacities of individuals, communities, organizations, countries and the international community.



Photograph © SEEDS/Siddharth Behl

## **Retrofitting**

Reinforcement or upgrading of existing structures to become more resistant and resilient to the damaging effects of hazards.

Annotation: Retrofitting requires consideration of the design and function of the structure, the stresses that the structure may be subject to from hazards or hazard scenarios and the practicality and costs of different retrofitting options. Examples of retrofitting include adding bracing to stiffen walls, reinforcing pillars, adding steel ties between walls and roofs, installing shutters on windows and improving the protection of important facilities and equipment.

## **Risk transfer**

The process of formally or informally shifting the financial consequences of particular risks from one party to another, whereby a household, community, enterprise or State authority will obtain resources from the other party after a disaster occurs, in exchange for ongoing or compensatory social or financial benefits provided to that other party.

Annotation: Insurance is a well-known form of risk transfer, where coverage of a risk is obtained from an insurer in exchange for ongoing premiums paid to the insurer. Risk transfer can occur informally within family and community networks where there are reciprocal expectations of mutual aid by means of gifts or credit, as well as formally, wherein governments, insurers, multilateral banks and other large risk-bearing entities establish mechanisms to help cope with losses in major events. Such mechanisms include insurance and reinsurance contracts, catastrophe bonds, contingent credit facilities and reserve funds, where the costs are covered by premiums, investor contributions, interest rates and past savings, respectively.

## **Structural and non-structural measures**

Structural measures are any physical construction to reduce or avoid possible impacts of hazards, or the application of engineering techniques or technology to achieve hazard resistance and resilience in structures or systems. Non-structural measures are measures not involving physical construction which use knowledge, practice or agreement to reduce disaster risks and impacts, through policies and laws, public awareness raising, training and education.

## **Underlying disaster risk drivers**

Processes or conditions, often development-related, that influence the level of disaster risk by increasing levels of exposure and vulnerability or reducing capacity.

Annotation: Underlying disaster risk drivers — also referred to as underlying disaster risk factors — include poverty and inequality, climate change and variability, unplanned and rapid urbanization and the lack of disaster risk considerations in land management and environmental and natural resource management, as well as compounding factors such as

demographic change, non-disaster risk-informed policies, the lack of regulations and incentives for private disaster risk reduction investment, complex supply chains, the limited availability of technology, unsustainable uses of natural resources, declining ecosystems, pandemics and epidemics.

## **Vulnerability**

The conditions determined by physical, social, economic and environmental factors or processes which increase the susceptibility of an individual, a community, assets or systems to the impacts of hazards.

# **History of Disaster Management in India**

## **Disaster Management during British Administration and Post-Independence**

During the British administration, relief departments were set up for emergencies during disasters. The policy was relief-oriented, and activities included designing the relief codes and initialising food for work programmes. Post-Independence, the task for managing disasters continued to rest with the Relief Commissioners in each state, who functioned under the Central Relief Commissioner, with their role limited to delegation of relief material and money.

## **Emergence of Institutional Arrangement in India**

A permanent and institutionalised setup began in the decade of 1990s with set up of a disaster management cell under the Ministry of Agriculture. Following series of disasters such as Latur Earthquake (1993), Malpa Landslide (1994), Orissa Super Cyclone (1999) and Bhuj Earthquake (2001), a high powered Committee under the Chairmanship of Mr. J.C. Pant, Secretary, Ministry of Agriculture was constituted for drawing up a systematic, comprehensive and holistic approach towards disasters. There was a shift in policy from an approach of relief through financial aid to a holistic one for addressing disaster management. Consequently, the disaster management division was shifted under the Ministry of Home Affairs in 2002 vide Cabinet Secretariat's Notification No. DOC.CD-108/2002 dated 27/02/2002 and a hierarchical structure for disaster management evolved in India.

## **Present Structure for Disaster Management in India**

The institutional structure for disaster management in India is in a state of transition. The National Disaster Management Authority has been established at the centre, and the SDMA at state and district authorities at district level are gradually being formalized. In addition to this, the National Crisis Management Committee, part of the earlier setup, also functions at the Centre. The nodal ministries, as identified for different disaster types of function under the overall guidance of the Ministry of Home Affairs (nodal ministry for disaster

management). This makes the stakeholders interact at different levels within the disaster management framework.

Within this transitional and evolving setup, two distinct features of the institutional structure for disaster management may be noticed. Firstly, the structure is hierarchical and functions at four levels – centre, state, district and local. In both the setups – one that existed prior to the implementation of the Act, and other that is being formalized post-implementation of the Act, there have existed institutionalized structures at the centre, state, district and local levels. Each preceding level guides the activities and decision making at the next level in hierarchy. Secondly, it is a multi-stakeholder setup, i.e., the structure draws involvement of various relevant ministries, government departments and administrative bodies.

## Disaster Management Act, 2005

This Act provides for the effective management of disaster and for matters connected therewith or incidental thereto. It provides institutional mechanisms for drawing up and monitoring the implementation of the disaster management. The Act also ensures measures by the various wings of the Government for prevention and mitigation of disasters and prompt response to any disaster situation.

The Act provides for setting up of a National Disaster Management Authority (NDMA) under the Chairmanship of the Prime Minister, State Disaster Management Authorities (SDMAs) under the Chairmanship of the Chief Ministers, District Disaster Management Authorities (DDMAs) under the Chairmanship of Collectors/District Magistrates/Deputy Commissioners. The Act further provides for the constitution of different Executive Committee at national and state levels. Under its aegis, the National Institute of Disaster Management (NIDM) for capacity building and National Disaster Response Force (NDRF) for response purpose have been set up. It also mandates the concerned Ministries and Departments to draw up their own plans in accordance with the National Plan. The Act further contains the provisions for financial mechanisms such as creation of funds for response, National Disaster Mitigation Fund and similar funds at the state and district levels for the purpose of disaster management. The Act also provides specific roles to local bodies in disaster management.

## Institutional Bodies

### **National Disaster Management Authority (NDMA)**

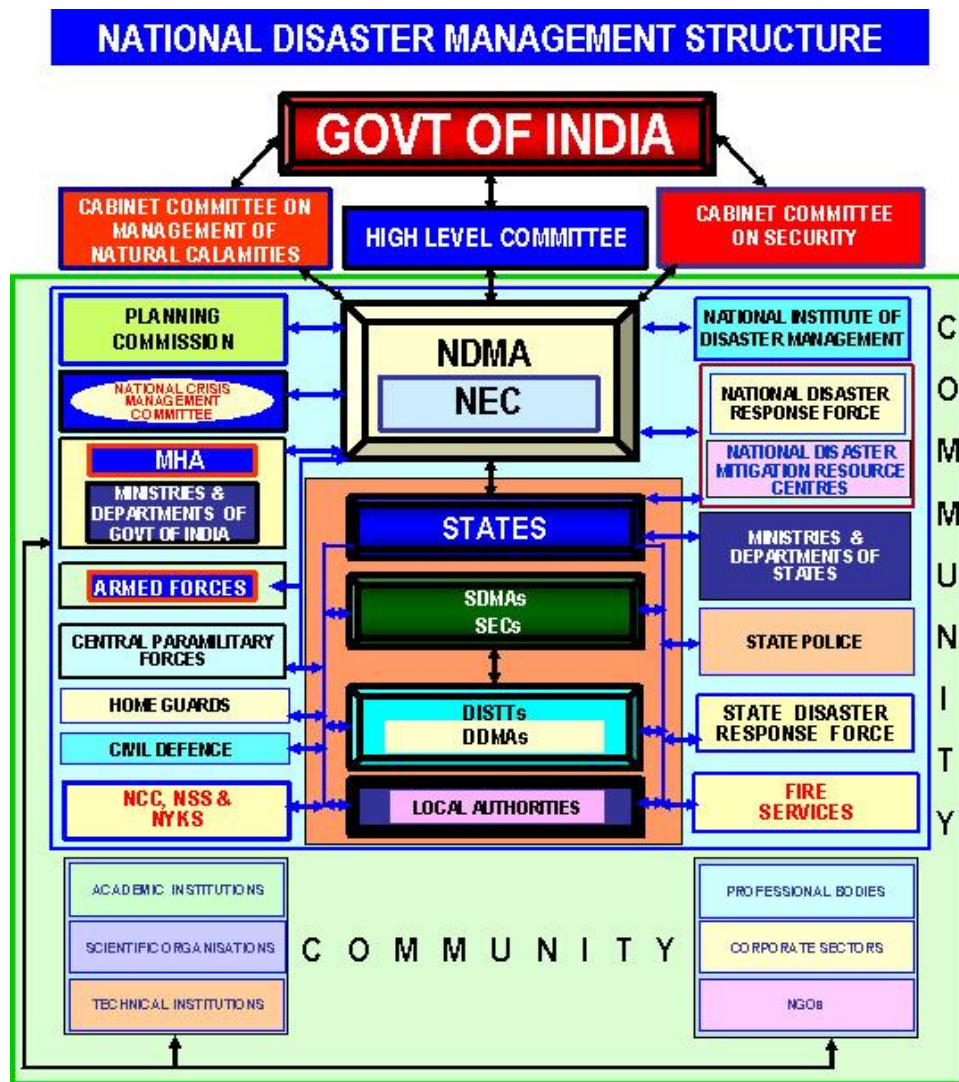
The National Disaster Management Authority (NDMA) was initially constituted on May 30, 2005 under the Chairmanship of Prime Minister vide an executive order. Following enactment of the Disaster Management Act, 2005, the NDMA was formally constituted in accordance with Section-3(1) of the Act on 27th September 2006 with Prime Minister as its Chairperson and nine other members, and one such member to be designated as Vice-Chairperson. Details of these responsibilities are given as under:



1. Lay down policies on disaster management;
2. Approve the National Plan;
3. Approve plans prepared by the Ministries or Departments of the Government of India in accordance with the National Plan;
4. Lay down guidelines to be followed by the State Authorities in drawing up the State Plan
5. Lay down guidelines to be followed by the different Ministries or Departments of the Government of India for the purpose of integrating the measures for prevention of disaster or the mitigation of its effects in their development plans and projects;
6. Coordinate the enforcement and implementation of the policy and plan for disaster management;
7. Recommend provision of funds for the purpose of mitigation;
8. Provide such support to other countries affected by major disasters as may be determined by the Central Government;
9. Take such other measures for the prevention of disaster, or the mitigation, or preparedness and capacity building for dealing with the threatening disaster situation or disaster as it may consider necessary;
10. Lay down broad policies and guidelines for the functioning of the National Institute of Disaster Management.

### **National Executive Committee (NEC)**

National Executive Committee is constituted under Section 8 of DM Act, 2005 to assist the National Authority in the performance of its functions.



## State level Institutions

State Disaster Management Authority (SDMA) The DM Act, 2005 provides for constitution of SDMAs and DDMA's in all the states and UTs.

## District level Institutions

District Disaster Management Authority (DDMA)

Section 25 of the DM Act provides for constitution of DDMA for every district of a state. The District Magistrate / District Collector/ Deputy Commissioner heads the Authority as Chairperson besides an elected representative of the local authority as Co-Chairperson except in the tribal areas where the Chief Executive Member of the District Council of Autonomous District is designated as Co-Chairperson. Further in district, where Zila Parishad exist, its Chairperson shall be the Co-Chairperson of DDMA.

The District Authority is responsible for planning, coordination and implementation of disaster management and to take such measures for disaster management as provided in the guidelines. The District Authority also has the power to examine the construction in any area in the district to enforce the safety standards and to arrange for relief measures and respond to the disaster at the district level.

## International Frameworks

### **The Hyogo Framework for Action 2005-2015**

The Hyogo Framework for Action (HFA): Building the Resilience of Nations and Communities to Disasters has been the first plan to explain, describe and detail the work that is required from all different sectors and actors to reduce disaster losses. It was developed and agreed on with the many partners needed to reduce disaster risk – governments, international agencies, disaster experts and many others- bringing them into a common system of coordination. The HFA guidelines five priorities for action and offers guiding principles and practical means for achieving disaster resilience. Its goal was to substantially reduce disaster losses by 2015 by building the resilience of nations and communities to disasters. This means reducing loss of lives and social, economic and environmental assets when hazards strike.<sup>2</sup>

In January 2005, 168 Governments adopted a 10-year plan to make the world safer from natural hazards at the World Conference on Disaster Reduction, held in Kobe, Hyogo, Japan. The Hyogo Framework is a global blueprint for disaster risk reduction efforts during the next decade. Its goal is to substantially reduce disaster losses by 2015 - in lives, and in the social, economic, and environmental assets of communities and countries. The Framework offers guiding principles, priorities for action, and practical means for achieving disaster resilience for vulnerable communities.

1. Ensure that disaster risk reduction is a national and a local priority with a strong institutional basis for implementation.
2. Identify, assess, and monitor disaster risks - and enhance early warning.
3. Use knowledge, innovation, and education to build a culture of safety and resilience at all levels.
4. Reduce the underlying risk factors.
5. Strengthen disaster preparedness for effective response at all levels.<sup>3</sup>

### **Sendai Framework for Disaster Risk Reduction**

The Sendai Framework is a 15-year, voluntary, non-binding agreement which recognizes that the Government has the primary role to reduce disaster risk, but that responsibility should be shared with other stakeholders including local government, the private sector and other stakeholders. It aims for the following outcome:

The substantial reduction of disaster risk and losses in lives, livelihoods and health and in the economic, physical, social, cultural and environmental assets of persons, businesses, communities and countries. The Sendai Framework is the successor instrument to the Hyogo Framework for Action (HFA) 2005-2015: Building the Resilience of Nations and Communities to Disasters. It is the outcome of stakeholder consultations initiated in March 2012 and inter-governmental negotiations held from July 2014 to March 2015, which were supported by the UNISDR upon the request of the UN General Assembly.

## The Four Priorities for Action Plans

### **Priority 1. Understanding disaster risk**

Disaster risk management should be based on an understanding of disaster risk in all its dimensions of vulnerability, capacity, exposure of persons and assets, hazard characteristics and the environment. Such knowledge can be used for risk assessment, prevention, mitigation, preparedness and response.

### **Priority 2. Strengthening disaster risk governance to manage disaster risk**

Disaster risk governance at the national, regional and global levels is very important for prevention, mitigation, preparedness, response, recovery, and rehabilitation. It fosters collaboration and partnership.

### **Priority 3. Investing in disaster risk reduction for resilience**

Public and private investment in disaster risk prevention and reduction through structural and non-structural measures are essential to enhance the economic, social, health and cultural resilience of persons, communities, countries and their assets, as well as the environment.

### **Priority 4. Enhancing disaster preparedness for effective response and to “Build Back Better” in recovery, rehabilitation and reconstruction**

The growth of disaster risk means there is a need to strengthen disaster preparedness for response, take action in anticipation of events, and ensure capacities are in place for effective response and recovery at all levels. The recovery, rehabilitation and reconstruction phase are a critical opportunity to build back better, including through integrating disaster risk reduction into development measures.

## Chapter 2

# Disaster Management Cycle

### Important terms

#### **Disaster**

A serious disruption of the functioning of a community or a society at any scale due to hazardous events interacting with conditions of exposure, vulnerability and capacity, leading to one or more of the following: human, material, economic and environmental losses and impacts.

#### **Emergency**

It is sometimes used interchangeably with the term disaster, as, for example, in the context of biological and technological hazards or health emergencies, which, however, can also relate to hazardous events that do not result in the serious disruption of the functioning of a community or society.

#### **Disaster management**

The organization, planning and application of measures preparing for, responding to and recovering from disasters. It focuses on creating and implementing preparedness and other plans to decrease the impact of disasters and “build back better”. Failure to create and apply a plan could lead to damage to life, assets and lost revenue.

#### **Hazard**

A process, phenomenon or human activity that may cause loss of life, injury or other health impacts, property damage, social and economic disruption or environmental degradation. Hazards may be single, sequential or combined in their origin and effects. Each hazard is characterized by its location, intensity or magnitude, frequency and probability.

#### **Disaster risk**

The potential loss of life, injury, or destroyed or damaged assets which could occur to a system, society or a community in a specific period, determined probabilistically as a function of hazard, exposure, vulnerability and capacity.<sup>4</sup>

## Approach

A holistic and integrated approach will be evolved towards disaster management with emphasis on building strategic partnerships at various levels. The themes underpinning the disaster management policy are:

- (1) Community based DM, including last mile integration of the policy, plans and execution.
- (2) Capacity development in all spheres.
- (3) Consolidation of past initiatives and best practices.
- (4) Cooperation with agencies at national and international levels.
- (5) Multi-sectoral synergy.<sup>5</sup>

### Goals of Disaster Management:

- (1) Reduce, or avoid, losses from hazards;
- (2) Assure prompt assistance to victims;
- (3) Achieve rapid and effective recovery.

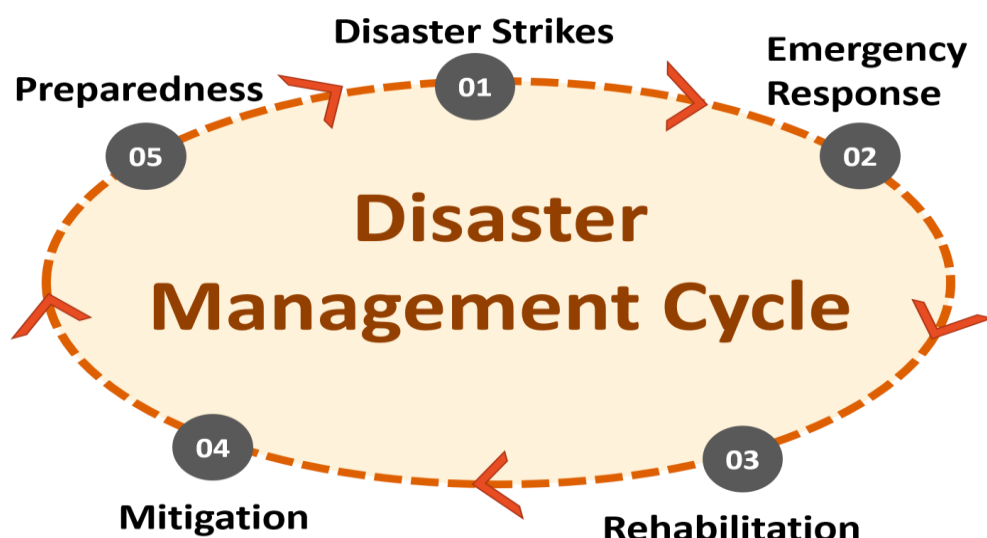
Source: [http://www.gdrc.org/uem/disasters/1-dm\\_cycle.html](http://www.gdrc.org/uem/disasters/1-dm_cycle.html)

## Phases of Disaster Management cycle

Since World War II emergency management has focused primarily on preparedness. Often this involved preparing for enemy attack. Community preparedness for all disasters requires identifying resources and expertise in advance and planning how these can be used in a disaster. However, preparedness is only one phase of emergency management.<sup>6</sup>

The Disaster management cycle illustrates the ongoing process by which governments, businesses, and civil society plan for and reduce the impact of disasters, react during and immediately following a disaster, and take steps to recover after a disaster has occurred.

Current thinking defines five phases of disaster management cycle:



## Disaster Management Cycle

<p><b><u>Disaster Strikes</u></b> A sudden calamitous event bringing great damage, loss, or destruction</p>	<p>In November 1977, the South Indian state of Andhra Pradesh was hit by a devastating cyclone with a wind speed of over 200 kmph. The accompanying storm surge wiped out over 90 villages lying along the coastal belt. It left behind over 10,000 dead, many more injured and total economic loss of 378 crore rupees. Andhra Pradesh, situated on the east coast of India has a 1,030 km coastline, which is highly vulnerable to cyclones. Situated along the coastline are more than 2,500 villages with a population in excess of 6 million.</p>
<p><b><u>Emergency Response</u></b> Actions taken to save lives and prevent further property damage in an emergency.</p>	<p>Immediately after the cyclone, as an immediate response, the government and NGOs extended relief to the affected people. This included search &amp; rescue, water, medicines, food and temporary shelter in relief camps and tents</p>
<p><b><u>Rehabilitation</u></b> Actions taken to return to a normal or an even safer situation following an emergency.</p>	<p>Soon after the initial relief phase, rehabilitation initiatives were taken up by Government and NGOs. Roads, permanent houses, and water, power and communication networks were restored. This also included economic rehabilitation through livelihood support. The union government provided 3.11 crore rupees to small and marginal farmers and workers for their recovery. Over 1.1 crore rupees were sanctioned for irrigation, municipal development and Panchayat Raj.</p>
<p><b><u>Mitigation</u></b> Activities that prevent an emergency, reduce the chance of an emergency happening, or reduce the damaging effects of unavoidable emergencies.</p>	<p>If effective prevention and preparedness measures are implemented, disasters can be avoided by limiting the adverse impact of inevitable natural phenomenon. The development phase that followed the rehabilitation incorporated measures to reduce the impact of future cyclones. Villagers were relocated to safer lands; plantation was promoted, and cyclone resistant construction technologies were practised.</p>
<p><b><u>Preparedness</u></b> Plans or preparations made to save lives and to help response and rescue operations.</p>	<p>After the cyclone, more emphasis was given on community preparedness measures by the government and NGOs. Village Task Forces were formed and trained, and cyclone shelters constructed. By 1990, 740 cyclone shelters were built in strategic locations. An additional 1,100 relief camps had the capacity to accommodate 650,000 people on short notice.</p>

## Kerala State Profile

Kerala, the Gods own country, it is popularly known, is a land blessed with natural resources. It is home to 3.44% of India's population. Kerala 's rate of population growth is India's lowest, and Kerala's population as per Census 2001 was 318.41 lakh consisting of 154.69 lakh males and 163.72 lakh females. Kerala's human development indices— primary level education, health care and elimination of poverty—are among the best in India. Kerala has one of the highest literacy rates (97.0%) among Indian states and life expectancy (73 years) was among the highest in India.<sup>7</sup>

Kerala State is vulnerable to a multitude of disasters and is categorized as a multi-hazard prone state. The state experiences various kinds of disasters of recurrent nature which result in loss of life, livelihood and property (public and private), and disruption of economic activity, besides causing immense misery and hardship to the affected population. The state experiences heavy rainfall and flood during the southwest monsoon, with subsequent damage to life and property. Drought conditions have also become more frequent during the pre-monsoon period.

Coastal erosion along the coastal areas is very severe, necessitating frequent evacuation and rehabilitation of the coastal people. Incidences of biological disasters such as epidemics, pest attack are also on the rise. Landslide or landslip is another hazard of the hilly regions of the state. The tsunami that struck Kerala Coast in 2004 has added a new dimension to the disaster scenario of the state.

The State is also vulnerable to cyclone and experiences high winds due to the westward movement of cyclonic storms. Kerala falls under earthquake Zone III makes the state vulnerable to earthquakes of magnitude of 6.5 or more. Possibilities of chemical and industrial disasters and disasters like dam burst also cannot be ruled out. The threat of Global Warming and its resultant climatic variations such as inter seasonal variations in rainfall, environmental issues and rise in sea level increase the vulnerability of the state.<sup>8</sup>

## **Need for Disaster Management Policy**

While disasters cannot be completely avoided, the vulnerability to various hazards can be sustainably and substantially reduced by planned prevention, mitigation and preparedness measures. With this in view, the Kerala State Disaster Management Authority has formulated the 'Kerala State Disaster Management Policy'. The Disaster Management Policy calls for mechanism for coherence and alignment with existing policies of the government and future legislations.



# POLICY LEGAL FRAMEWORK FOR DISASTER MANAGEMENT POLICY

## Disaster Management Act, 2005

- The State Government, in line with National Disaster Management Act, 2005, has notified Kerala State Disaster Management Rules, 2007

## Kerala State Disaster Management Policy

- Aims to establish an optimum system for dealing with disasters, avoiding disruption of economic activity and ensuring continuity in developmental activities

## Kerala State Disaster Management Authority

- Apex decision-making body and facilitate, co-ordinate, review and monitor all disaster related activities in the state including capacity building.

## State Nodal Departments and Crisis Management Groups

- Management of all types of natural disasters that include water and climate related disasters and geological disasters.
- Management of manmade and human induced disasters including air and rail accidents

## Techno – Legal Frameworks

- The state government will follow national building codes. A Techno – Financial Framework consists of Disaster Risk Insurance through appropriate insurance instruments governed by effective regulatory frameworks.

## Climate change and Disaster Risk Reduction

Climate change and climate-sensitive disasters, such as those resulting from hydrological, meteorological, biological and climatological hazards have significant and increasing impacts on human health. Climate change and climate-sensitive disasters impact health through common direct and indirect pathways potentially resulting in increased risk of death, disease and injury<sup>9</sup>

The recent disasters demonstrated the link between environment and disaster risk. While the floods cannot be exclusively attributed to climate change impact, climate change predictions do indeed forecast increases in rainfall intensity in Kerala in the years to come. Furthermore, coastal cities in Kerala are prone to waterlogging and flooding due to increased water inflow as well as sea level rise. The agriculture and related activities in Kuttanad, which is a below sea level area, are expected to be severely affected by climate change. So, regardless of whether the present event is linked to climate change, the floods of 2018 and the tropical cyclone Okhi before that serve as warnings about the extreme events which Kerala may

expect more frequently in a world with changing climate. Therefore, assessment of vulnerabilities and actions in climate change adaptation and mitigation should be integral to the 'New Kerala' being envisaged in the post-disaster setting.<sup>10</sup>

Action that addresses the interlinked challenges of disaster risk, sustainable development and climate change is a core priority given that 90% of recorded major disasters caused by natural hazards from 1995 to 2015 were linked to climate and weather including floods, storms, heatwaves and droughts. The five countries hit by the highest number of disasters were the United States (472), China (441), India (288), Philippines (274), and Indonesia, (163).

UNISDR (United Nations International Strategy for Disaster Reduction) is focused on the following:

- (1) Achieving stronger recognition of disaster risk reduction and climate change adaptation as essential elements of climate risk management and sustainable development.
- (2) Developing specific policies at the international level on the linkages between reducing disaster risk and responding to climate change
- (3) Guiding national and regional action to integrate policies and practices and strengthening capacities to support the integration of disaster reduction and climate change by all actors.
- (4) Enhance knowledge and understanding of comprehensive risk management approaches.<sup>11</sup>

## Chapter 3

# Hazards, Vulnerability Analysis of Kerala

### Kerala State profile

Feature	Description
Area	38,863 km <sup>2</sup>
Location	Graticule 8°18'N & 12°48'N and 74°52'E & 77°22'E
Rivers	44
Forest	11,266 km <sup>2</sup>
Coastline	590 km
Population	3,33,87,677 (Census, 2011)
Male Population	1,60,21,290
Female Population	1,73,66,387
Population density	860 people/km <sup>2</sup>
Population growth rate	4.9%
Districts	14
Taluks	75
Corporations	6
Municipalities	87
Villages	1664* (including group villages)
Lok Sabha Constituencies	20
Rajya Sabha Constituencies	9
Assembly Constituencies	140
Climate	Humid equatorial tropic climate; the dominant climatic phenomena being the monsoons called the South-West (June to September) and the North-East (October to December) monsoons, the former is more significant than the latter with an annual rainfall of 3104 mm mainly contributed by the South West Monsoon

Kerala is geographically bordered on the west by the Arabian Sea and the east by the Western Ghats. In its north is Karnataka State and to the east is Tamil Nadu State.

Kerala is multi-hazard prone. HDI (Human Development Index) being a composite index of consumption rate (proxy to purchasing power), education and health, is an indicator of the socio-economic vulnerability of the population. The higher the HDI, the higher is the coping capacity, but greater is the cumulative loss potential and thus a higher degree of risk.

Thus, Kerala has a higher degree of disaster risks as compared to the rest of the country. The Kerala State Disaster Management Plan (KSDMP) is an ever evolving document formulated under the Disaster Management Act, 2005 (DM Act, 2005) which establishes a multi stakeholder framework for the partnership of governmental entities, non-government agencies, private sector enterprises and individuals for Disaster Risk Reduction in the State.

## Policy

In accordance with Section 18 (2) (a), the Kerala State Disaster Management Authority (KSDMA) has prepared the Kerala State Disaster Management Policy. The policy shall be revisited once in 10 years.

The KSDMP should deal with:

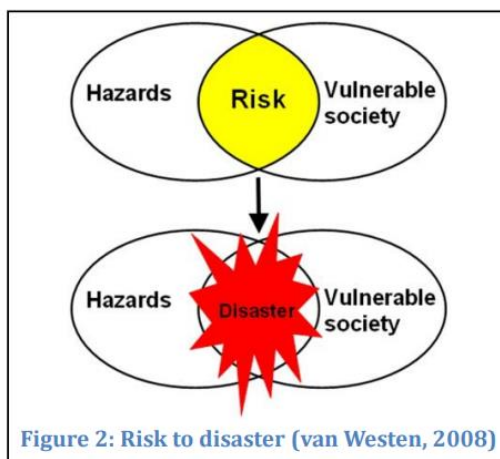
1. The vulnerability of different parts of the State to different forms of disasters
2. The measures to be adopted for prevention and mitigation of disasters
3. The way the mitigation measures shall be integrated with the development plans and projects
4. The capacity-building and preparedness measures to be taken

## VULNERABILITY OF KERALA

### What is HVRA (Hazard, vulnerability and risk assessment)

1. Combined process of quantifying the spatio-temporal return probabilities of various hazards
2. The expected degree of damage that a given element or set of elements-at-risk is exposed to
3. The expected monetary losses when a given area is exposed to hazards within a given period.

**A disaster is when the threat of a hazard becomes reality and impacts a vulnerable society.**



In the context of HVRA, the terms hazard, vulnerability and risk have specific definitions.

**Hazard (H)** is the probability of occurrence of a potentially damaging phenomenon within a specified period, within a given area. (for example, how to calculate the return probability of epidemics, road accidents, lightning strikes etc.)

**Vulnerability (V)** the degree of loss to a given element or set of elements-at-risk resulting from the occurrence of a natural phenomenon of a given

magnitude. Usually expressed on a scale from 0 (no damage) to 1 (total damage).

**Risk (R)** the actual exposure of something of human value to a hazard, often expressed in monetary value/time. (For example, an ancestral temple, a tomb, a pregnant woman, etc.)

**The universally accepted method for conducting HVRA follows the guiding formula:**

$$R = H * V * \text{Amount}$$

**where, Amount is the monetary-value of the element(s)-at-risk**

## Objective of HRVA

The primary objective of undertaking a HVRA is

1. To anticipate the potential hazards and possible mitigation measures to help save lives
2. Protect property, assets, reduce damage and facilitate a speedy recovery.

The HVRA helps the policy makers, administrators and the community to make risk-based choices to address vulnerabilities, mitigate hazards, and prepare for response to and recovery from hazard events. Further, in areas identified as potential hazard hotspots through HVRA, early warning systems that incorporate instrumented monitoring devices, high-end numerical predictive models and communication devices may be developed and deployed such that sufficient time may be made available to authorities for evacuation and implementing contingency measures in the eve of an impending disaster.

The World Bank has identified five key insights in the process of risk management which includes:

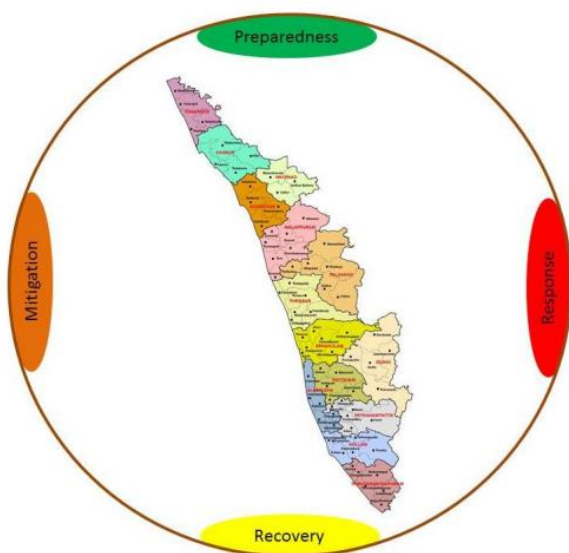
1. Taking on risks is necessary to pursue opportunities for development. The risk of inaction may well be the worst option of all
2. To confront risk successfully, it is essential to shift from unplanned and ad-hoc responses when crises occur to proactive, systematic, and integrated risk management
3. Identifying risks is not enough: the trade-offs and obstacles to risk management must also be identified, prioritized and addressed through private and public action
4. For risks beyond the means of individuals to handle alone, risk management requires shared action and responsibility at different levels of society, from the household to the international community
5. Governments have a critical role in managing systemic risks, providing an enabling environment for shared action and responsibility, and channelling direct support to vulnerable people

Thus, it is reiterated that HVRA alone will not ensure a safe society, but it is the first step towards ensuring a disaster sensitive development plan which can ensure coordinated public and private action for disaster risk reduction.

# Hazard profile of Kerala

Kerala state is frequently ravaged by the disastrous consequences of numerous hazards and hence it is a multi-hazard prone State. Natural hazards are part of the natural evolutionary system of the earth which turned into 'hazards' when the human system started interacting with it. The human system itself was subjected to significant transformations over its history. These transformations and their links to the natural system have served as templates of the dynamics of naturally triggered hazards and therefore, of disasters.

Parallel to this societal transformation, the population pressure along the coastline forced the then marginalized sections of the community to migrate from the coastal belt to the relatively inhospitable terrain of the Western Ghats (George and Chattopadhyay, 2001). A study conducted on migration suggested that in the past 80 years the coastal plains recorded a population growth of 306%, whereas the highlands, foothills and uplands together experienced a growth of 1342%.



Kerala is prone to high incidence of lightning, especially during the months of April, May, October and November. Apart from floods the mountain regions of the state experience several landslides during the monsoon season. It is known that a total of 65 fatal landslides occurred between 1961 and 2009 causing the death of 257 individuals (Kuriakose, 2010). Between 1871 and 2000, the state experienced 12 moderate drought years. The 570 km long coastline of Kerala is prone to erosion, monsoon storm surges and sea level rise. Land subsidence due to tunnel erosion or soil piping, which is a slow hazard,

is recently noticed to be affecting the hilly areas in the state.

KSDMP identifies thirty nine (39) phenomena with potential to cause disasters requiring L2 attention that the state is susceptible to and they are grouped under two categories based on the major triggering factors, they being Naturally Triggered Hazards (Natural Hazards) and Anthropogenically Triggered Hazards (Anthropogenic Hazards). Not all these hazards turn into disasters that are 'beyond the coping capacity of the community of the affected area'.<sup>12</sup>

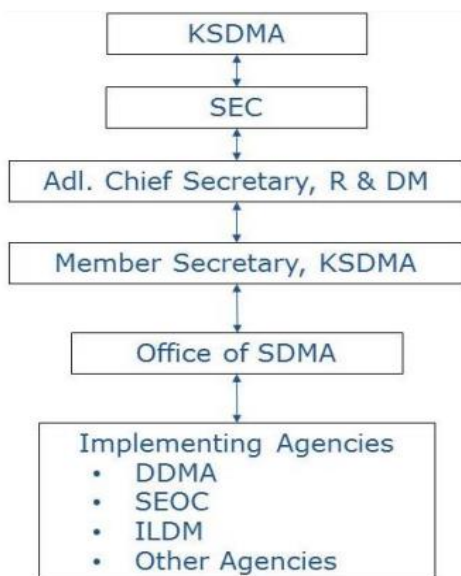
## Role definition aligned with Kerala SDMP 2016

The Kerala State Disaster management Plan (SDMP) 2016 recommends that the State Government shall ensure that there is a professionally trained virtual cadre of officers in all the departments of the State for disaster management. The virtual cadre will principally be 15 selected individuals (one each in each district and one in the State level) with at least 20 years more of service left.

The members of this virtual cadre shall be the departmental nodal officers for disaster management who shall be as individuals responsible for supporting the district and state disaster management authorities in disaster management. The KSDMA will ensure that these individuals are adequately trained in matters related to disaster management. These officers shall be trained in rapid damage assessment and certification in the respective sector. The disaster-specific nodal departments through this virtual cadre will ensure liaison and coordination with KSDMA and DDMA in the smooth implementation of the departmental disaster management plan and with SEOC and DEOCs for ensuring coordinated response to events.

## Role definition aligned with NDMP 2016 and SFDRR

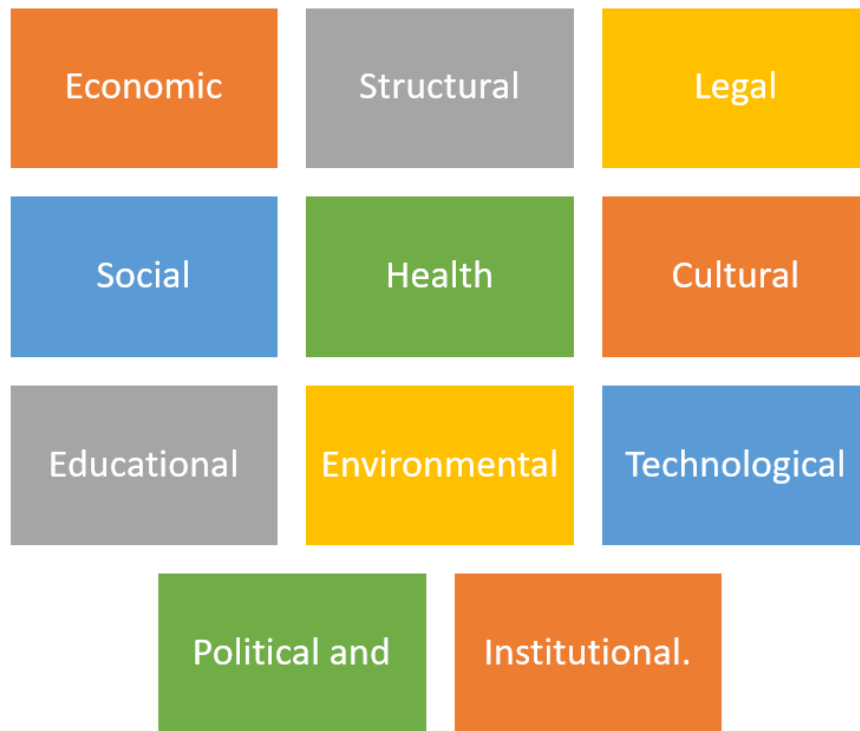
The role of virtual cadre officials are determined through SDMP keeping in mind the Sendai Framework (2015-2030), the Disaster Management Act 2005, the National Disaster Management Policy, 2009, the Kerala State Disaster Management Rules, 2007 and the Kerala State Disaster Management Policy, 2010 and the National Disaster Management Plan, 2016. The National Disaster Management Plan 2016 lays down an excellent planning framework for India by aligning with the Sendai Framework for Disaster Risk Reduction 2015-2030, to which India is a signatory.



The NDMP incorporates substantively the approach enunciated in the Sendai Framework and will help the country to meet the goals set in the framework.

By 2030, the Sendai Framework aims to achieve substantial reduction of disaster risk and losses in lives, livelihoods, and health and in the economic, physical, social, cultural, and environmental assets of persons, businesses, communities, and countries. The NDMP has been aligned broadly with the goals and priorities set out in the Sendai Framework for DRR. The framework states that to realize this outcome, it is necessary to prevent new and reduce existing disaster risk through the implementation of integrated and inclusive measures that prevent and reduce hazard exposure and vulnerability to disaster, increase preparedness for

response and recovery, and thus strengthen resilience. These measures must cover various sectors such as:



The plan includes measures that will be implemented over the short, medium, and long-term over the time horizon of the Sendai Framework ending in 2030.

## **Department - wise Disaster management planning**

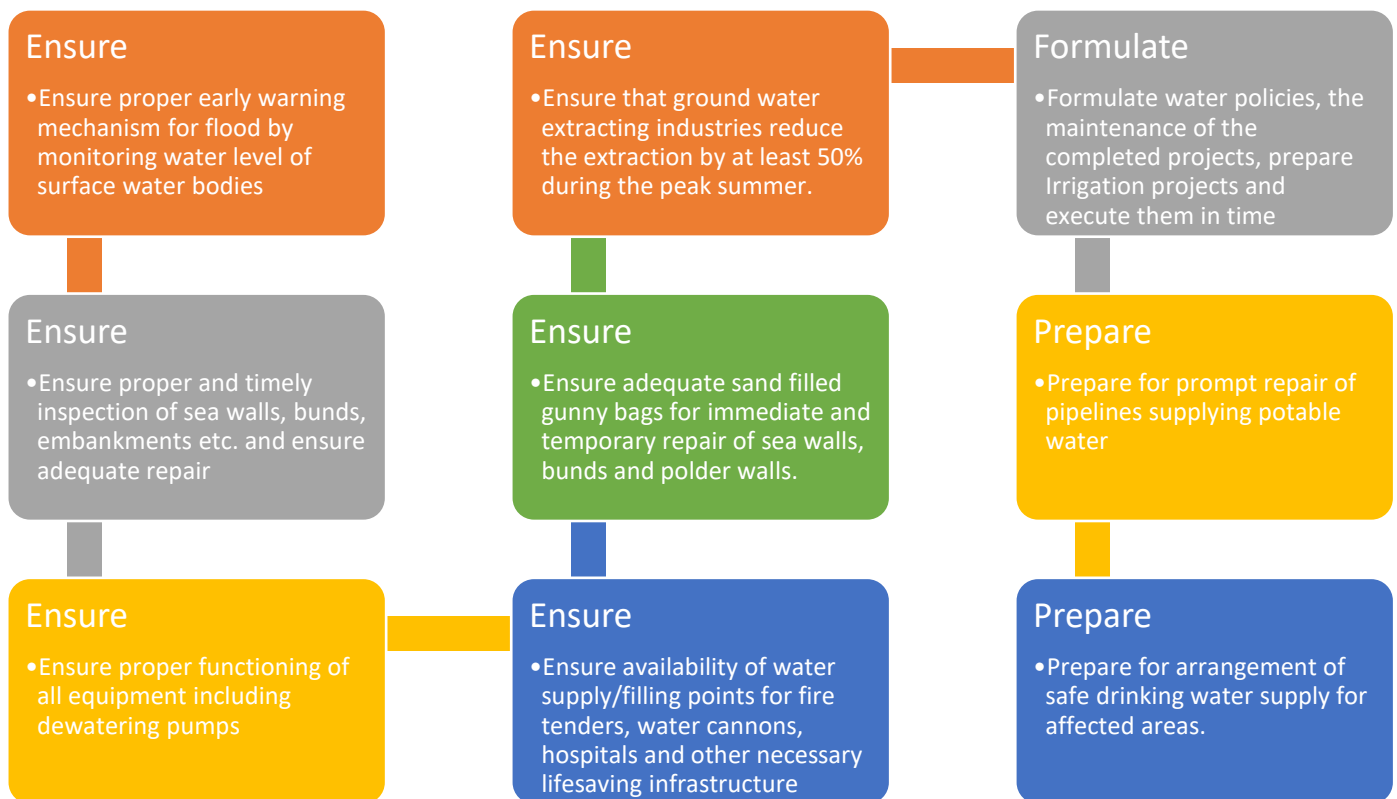
### Water Resources

Brief Profile of the Department

The Kerala Water Authority (KWA) is the primary institution for the development and regulation of water supply and wastewater collection and disposal in Kerala. There are 1,081 schemes under Kerala Water Authority in total and have a total installed capacity of 3,468 MLD. The per capita availability through the KWA schemes is 176 LPCD.



## Role of Department as given in SDMP



## Preparation of Departmental Disaster Management Plans

### Introduction

The departmental disaster management plan should be comprehensive and spell out the roles of the departments that are responsible to manage the disasters related to them in each phase of the disaster (during normal times, pre-disaster, during and post-disaster phase).

**Pre-disaster Phase:** Pre-disaster prevention and mitigation activities should be carried out with the normal staff while post-disaster rescue, relief and recovery will need outside resources. Normally in disaster management plans pre-disaster activities are ignored or given less importance. A brief outline of the activities to be undertaken are provided without clearly providing for funds or spelling out the responsibilities. The mitigation plan should consist of the objectives and goals and the necessary strategy to be adopted along with a realistic time frame. The sub-activities and the agencies responsible should also be mentioned in the plan. The plan should also identify the necessary policy and legal framework, which provides the agency the mandate to carry out such activities. If they need a new policy or a legal framework it should also be identified and the time frame with in which such a framework will be provided should also be worked out and mentioned in the plan. It is administrative orders wherever required should be issued.

The most important aspect of the mitigation plan should be provision of funds for the activity and how it will be provided. Disaster mitigation plan cannot be a stand-alone activity. The plan should also mention how mitigation will be integrated with the normal working of the ministry and the special programs or projects undertaken will be integrated with the normal activity of the ministry and made sustainable.

The plan should also provide for a monitoring mechanism and monitoring indicators. The plan should also have a provision for evaluation and mid-term correction.

**Preparedness and post-disaster response:** The second part of the plan should focus on the preparedness and emergency response. Preparedness is simply keeping the manpower and equipment required for response in a state of readiness. This manpower and equipment resource base should contain what is readily available with government and what should be requested from outside.

As part of the preparedness measure the existing resources should be identified and augmentation of the same if required should also be worked out. Training, capacity building and maintenance and responsible agencies should also be mentioned. The budget for the same should also be provided in the plan.

The sources outside the government will include non-governmental agencies, private industrial houses, neighbouring states, volunteers and international community. The database of what is available in private within the country; the list of NGOs with their expertise and details about mobilization of volunteers should also be part of the plan.

Disasters are of two types, those that have a warning such as floods, cyclones etc., and those, which strike without warning such as earthquakes and flash floods etc. Many disasters are of seasonal nature such as floods, cyclone etc. Depending on whether a disaster is seasonal or not, the role and duties of the department should be worked out for pre-disaster stage. If the disaster has a prior – warning stage the various activities to be undertaken should be mentioned. For example, cleaning of drains or water channels before the rainy season or vaccination or immunization before rainy or flood season etc.

If the disaster has a warning stage then the method of altering the administrative machinery, volunteers and the communities should be mentioned in the plan along with an evacuation plan if necessary. The method of moving or shifting the response teams etc near to the area where rescue is needed should be pre identified.

The main thrust area of the response portion of the plan is post-disaster search, rescue and relief. What should be done, who will do it, when and how it will be done should be clearly covered in the plan. (If necessary one can use a matrix). Though this portion varies from ministry to ministry there are certain general details, which should be covered in every plan such as mobilization of resources, co-ordination with the EOC, reporting system etc. for the purposes of emergency response a SOP should be evolved which should become part of the plan. A matrix which spells out what should be done up to 72 hours starting from zero hour (the time of receipt of information about the disaster) with increasing time intervals starting from 15 mins will be of help.

Some of the annexure required are

- The hazard, vulnerability and risk map
- Contact numbers
- Details of outside resources

### **Mock-drills and testing and revision and updating the plan:**

Periodic mock drills should be conducted, and the plan should be tested. The plan should be revised after each mock drill taking in to account the lessons learnt from the drill. Apart from the revision done the plan should also be updated on a periodic basis. An ideal plan should also contain details about when and how this plan will be tested and updated.

### **Contents required in Departmental Disaster Management Plans as per National Guidelines.**

#### Chapter 1: Prevention, Mitigation and Preparedness Plan

1. Brief profile of the department
2. Measures necessary for prevention of disasters, mitigation, preparedness and capacity-building in accordance with the guidelines laid down by the National Authority and the State Authority.
3. Integration into its development plans and projects, the measures for prevention of disaster and mitigation in the departmental annual plan.
4. Provision of funds for prevention of disaster, mitigation, capacity- building and preparedness from the respective departmental budget head
5. Drawing up mitigation, preparedness and response plans, capacity-building, data collection and identification and training of personal in relation to disaster management
6. Review the enactments administered by it, its policies, rules and regulations with a view to incorporate therein the provisions necessary for prevention of disasters, mitigation or preparedness
7. Provision of emergency communication in the affected areas for the department
8. Such other actions as may be necessary for disaster management

#### Chapter 2: Response plan

1. Mechanism for early warning and dissemination thereof based on warnings issued by IMD, State Emergency Operations Centre or the District Control Rooms
2. Trigger Mechanism for response – who in the department will alert the concerned officers in the department and if alerted what triggers are to be initiated by the concerned officer
3. Response plan for responding effectively and promptly to any threatening disaster situation or disaster in accordance with the State plan, and in accordance with the guidelines or directions of the National Executive Committee and the State Executive Committee and the State Government and the SDMA
4. Appointment of Nodal Officers to perform Emergency Support Functions (ESFs)/roles in emergency in the format already circulated by the State Government V. Constitution of the incident Response Teams (IRTs) at all levels with provision of delegation of authority

5. Reporting procedures and formats
6. Role of NGOs and Voluntary Sector and coordination thereof
7. System of assessing the damage from any disaster
8. Roles and responsibilities and coordination mechanism for the department
9. Disaster Specific response Plan – Response plan for major disasters such as earthquake, flash flood/cloud burst, snow avalanche, landslide etc in which State level response would be needed
10. Identification of suppliers for departmental supplies and pre-contracting for supplies in case of emergencies

#### Chapter 3: Relief, Rehabilitation and Reconstruction

1. Norms of relief if applicable
2. Minimum Standards of relief
3. Rehabilitation Plan
4. Financial mechanism
5. Action plan for reconstruction – ‘Building back better’
6. Please mention schemes of insurance and relief packages available in the department. Norms of the National /State Disaster Response Fund may be mentioned separately

#### Chapter 4: Knowledge Management

1. Documentation of losses in the animal husbandry & dairy sector for every department
2. Documentation of lessons learnt
3. Documentation of best practices and uploading of the same in the departmental websites

#### Chapter 5: Review, updating and Dissemination of Plan

1. DM Plan is a “living document” – would require regular improvement and updating – at least once a year
2. System of updating – who, when and how?
3. Dissemination of Plan to stakeholders – how? – Printing of document, uploading in departmental website, meetings, seminars etc

#### Annexures

1. Important contact details – National, State, local level of the department etc
2. Resource list (available with Department) with contact persons details (kindly follow IDRN Format) [www.idrn.gov.in](http://www.idrn.gov.in)
3. Resources available with National Govt. level
4. Detailed Standard Operating Procedures (SOPs) for all phases of disasters – before, during and after
5. List of NGOs/INGOs/CBOs working in the field of the department
6. List of suppliers relevant for the department
7. Damage Assessment Formats
8. Reporting formats

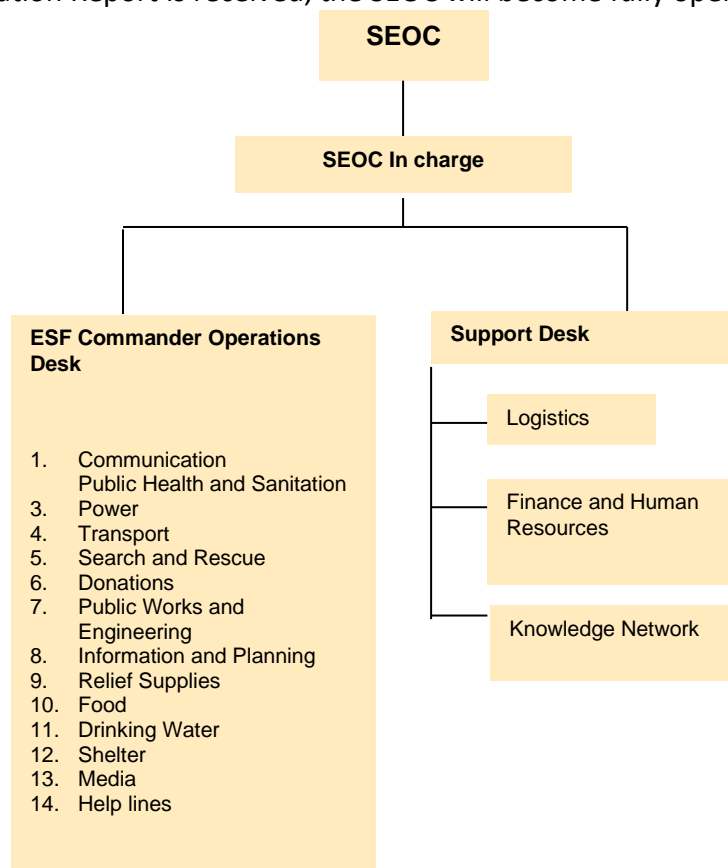
## Emergency Operation Centre

The State Emergency operation Centre (SEOC) will be hub of all the activities related with disaster response in the state. The primary function of the SEOC is to implement the State Disaster Management Plan, which includes coordination, data collection, operation management, record keeping, public information, and resource management.

For the effective management of resources, disaster supplies and other response activities, focal points or centres will have to be established. These points will have to be well networked starting from the State to the District and finally leading to the disaster site.

Emergency Operations Centres at the State (SEOC) and the District (DEOC) and Incident Command Post (ICP) at the disaster site are the designated focal points that will coordinate overall activities and the flow of relief supplies from the State.

The State Emergency Operations Centre (SEOC) will be maintained and run round the clock which will expand to undertake and coordinate activities during a disaster. Once a warning or a First Information Report is received, the SEOC will become fully operational.



During a disaster situation, the SEOC will be under direct command of the Chief Secretary or the designated person by him as the Chief of Operations.

During non-disaster times, the State Emergency Operations Centre stays operational throughout the year in preparedness mode, working during day time in order to take care of the extended preparedness activities of data management, staff awareness and training, which is essential for the smooth functioning of the SEOC during crisis situations and handling

of emergency Toll Free Contact Lines. During an emergency, the SEOC will get upgraded and will have all emergency stakeholders manning it round the clock.

The aim of the EOC will be to provide centralized direction and control of all the following functions:

- Emergency operations
- Communications and warning, which includes handling of 24 hrs emergency toll free numbers.
- Centralised state level disaster resource database
- Requesting additional resources during the disaster phase from neighbouring districts of the affected area
- Coordinating overseas support and aid.
- Issuing emergency information and instructions specific to departments, consolidation, analysis, and dissemination of Damage Assessment data and preparation of consolidated reports.

## Organizational Setup of SEOC

The EOC will comprise the following:

### SEOC In-charge

- During non-disaster times, the SEOC will work under the supervision of the relief commissioner.
- In a disaster situation, the SEOC will come under direct control of the Chief Secretary or the person designated by him as the Chief of Operations. He is the primary role player in the EOC and is responsible for the overall coordination and decision-making. He will also report the status of the SEOC operations and the disaster situation to the Chief Secretary.

### Operations Section

The Operations Section will ensure smooth and planned functioning of the SEOC. It will fulfil the following functions:

- Handle requests for emergency personnel, equipment and other resources
- Designate responsibilities and duties for management of the SEOC
- Manage storage, handling and set-up of incoming equipment and personnel
- Ensure medical care, feeding and housing for SEOC personnel
- Maintain documentation of resource inventories, allocation and availability.
- Manage finances for SEOC operations

### Representatives in SEOC

Representatives of State Departments of the following departments will be present at the SEOC to take part in the operations and facilitate quick coordination between the SEOC

command and their parent departments towards ensuring quick information availability and decision-making:

- Department of Public Works
- Department of Irrigation
- Department of Energy
- Department of Home
- Department of Revenue
- Department of Health
- Department of Agriculture
- Department of Industries

Emergency Support Functions (ESF) have been established, to support the SEOC functions. Each ESF is headed by a lead department for coordinating the delivery of goods and services to the disaster area, and it's supported by various departments and agencies.

During a disaster, the ESFs will be an integral part to carry out response activities.

After a major disaster or emergency requiring State response, primary agencies, when directed by the EOC will take actions to identify requirements and mobilize and deploy resources to the affected area and assist the State in its response actions under fourteen ESFs

#### Location of SEOC

The SEOC is established in the Department of Revenue. The layout of the SEOC is given below.

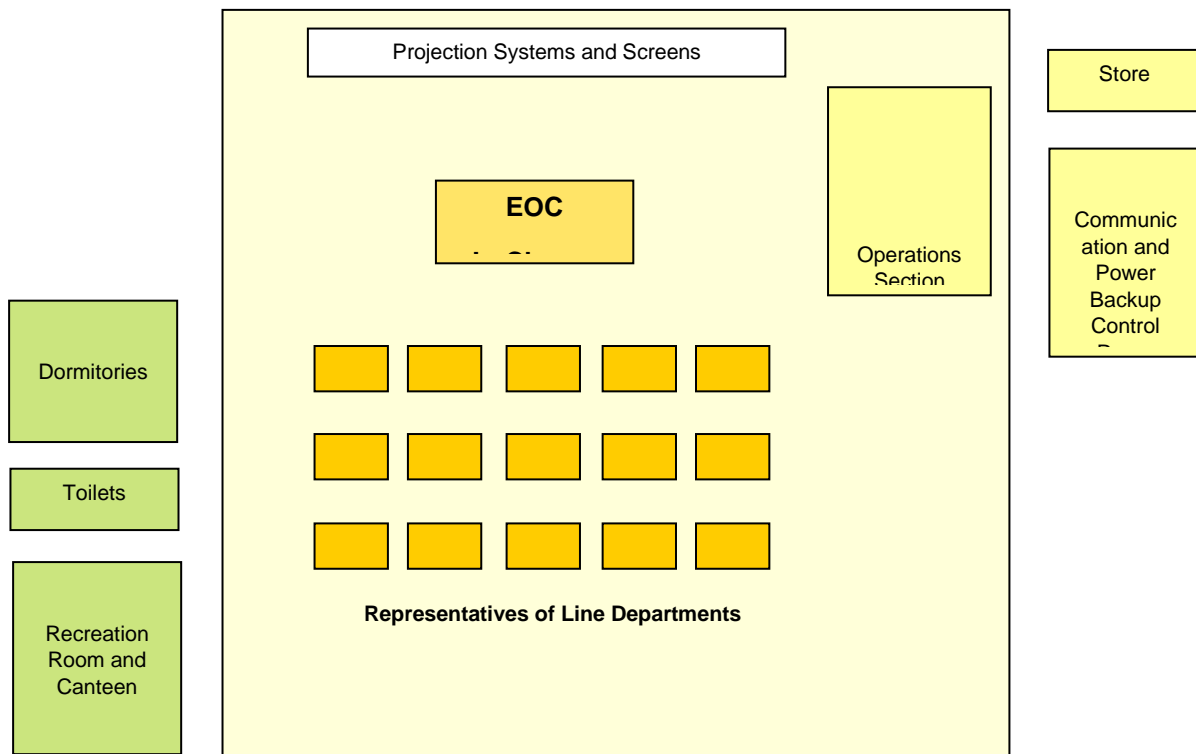
- The Chief of Operations will initiate the activation of emergency services of the SEOC.
- Activation of the SEOC should immediately follow the declaration of a State Level Emergency.
- The Individuals staffing the SEOC are responsible for establishing communications with their respective departments through radio and telephone etc.
- The SEOC Chief or designee will determine what staff he/she deems necessary to effectively operate the SEOC apart from the prescribed staff.
- The designated officers of the Police will provide security at the SEOC.

#### Back-up SEOC

It is recommended that an alternate SEOC must also be established. It is suggested to setup the backup SEOC within the secretariat building, as most of the departmental heads sits there.

#### SEOC Layout

A conceptual layout of SEOC is given below.



### Equipment Requirements

The SEOC will need to operate round the clock and may itself be subjected to adverse conditions due to the impact of disaster. It needs to be equipped with the following hardware and software for its efficient functioning:

- Resource Inventories and databank of maps and plans at block, district and state level on a GIS platform for quick retrieval and analysis.
- State-of-art communication equipment for staying linked with the Chief Secretary’s office, headquarters of line departments, district collectors, field teams, media, and national and international support agencies.
- A mobile command vehicle with communication equipment.
- Workstations and communication lines for all representatives of the line ministries.
- Radios and television sets tuned to different news channels and coverage.
- Video conferencing facility.
- Projection equipment and screens.
- Emergency power backup.
- Stock of drinking water, food, medicines, bedding and essential items required for personnel manning the SEOC for long time durations.

### Resource Inventories

Resource inventories are useful in quick retrieval of vital information regarding availability and sources of rescue and relief material and personnel during times of emergency. Resource inventories are essential elements of EOC operations. Such inventories will be prepared and

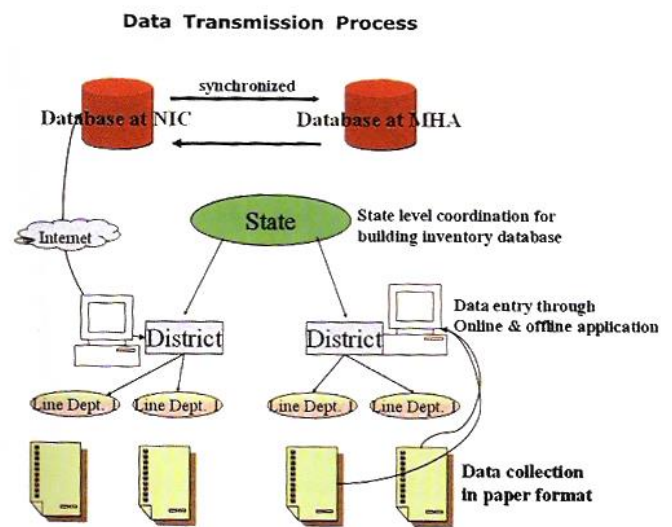


maintained through regular updating at the State and District levels. Inventories will include the following basic elements, and other locally relevant information:

- Contact details of all personnel and organisations concerned with emergency management
- List, with specifications and availability procedures, of all equipment that may be useful for responding to an emergency. This will include communication equipment, transport vehicles, earth moving equipment, cranes, and tools etc. that are available with agencies within the jurisdiction.
- List, with specifications and rate schedules, of relief material that can be sourced from local aid agencies and markets. This will include dry rations, tents and bedding, clothing, utensils, first-aid items and other basic necessity items

### India Disaster Resource Network (IDRN)

When disasters strike, the disaster managers at the district/ State level respond with the resources at their command. The difficulty is that while the Disaster Manager (District Magistrate/ Collector) is generally aware of the resources at his command in the district, he is not aware of the resources available in the neighbouring districts within the State or in the neighbouring States. The disaster manager at the State level [the Relief Commissioner] does not have an inventory of resources available within the State. Therefore, all the resources available within the State are not brought to bear for saving lives, and when some specialist equipment is required, there is a lack of knowledge as to the whereabouts of the equipment either in the neighbouring district or in the neighbouring State. Lives can be lost because of such delays/ lack of required resources. The IDRN addresses this lacuna in our disaster management system.



India Disaster Resource Network (IDRN) is one of the initiatives under the GOI-UNDP Disaster Risk Management Programme for disaster reduction. It is a nation-wide electronic inventories of essential and specialist resources for disaster response both specialist equipment and specialist manpower resources. The IDRN lists out the equipment and the resources by type and by the functions it performs, and it gives the contact address and telephone numbers of the controlling officers in-charge of the said resources so that the equipment can be promptly mobilized. The IDRN is a live system providing for updating of inventory every year. Entries into the inventory are made at two levels – district and State level. The Objectives of IDRN are:

- To collect and collate information on resources available in the country for emergency response.

- To enhance the decision-making capabilities of Government functionaries in quick response to emergencies.

IDRN is accessible to the Emergency officers, District Collectors, Relief Commissioners and other disaster managers at various levels of Government.

**Activities of SEOC**

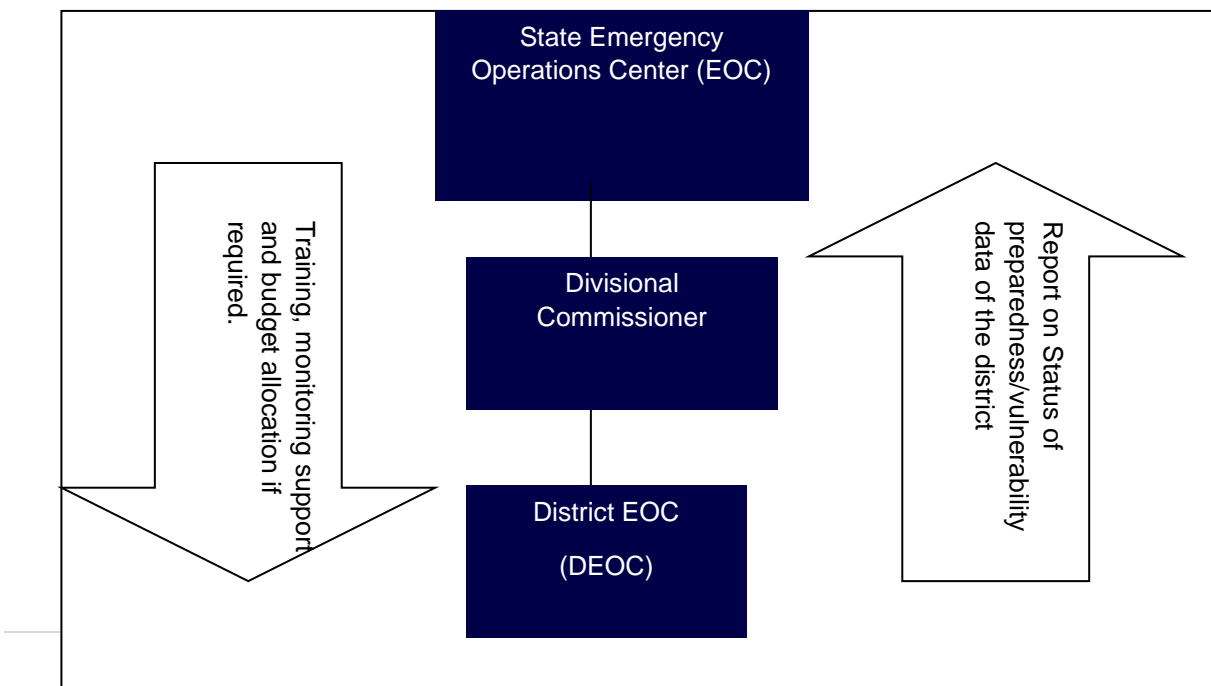
The responsibilities of SEOC at the state level shall be to provide centralized direction and control of the following activities:

**Non-disaster time**

During non-disaster times, the activities of the EOC will be under the supervision of the relief commissioner. Following are the activities during non-disaster times.

- Ensure that all districts prepare and regularly update the District Disaster Management Plans.
- Encourage districts to prepare area-specific plans for areas prone to specific disasters.
- Monitor training imparted to state level officials, private sector and NGOs in coordination with the HIDM.
- Keep record of the State and district disaster management plans.
- Disseminate information about the State DMP to other departments.
- Ensure that the warning and communication systems and instruments in the SEOC are in working conditions round the clock.
- Keep and update state level disaster resource inventory
- Establish functional facility of Toll free emergency numbers.

Flow of Information between SEOC and DEOC during normal conditions



## Activation Procedure of the EOC

Once the Sub-Divisional officer/SDM deems a disaster to be beyond the management capacity of local authorities, the District Disaster Management Authority (DDMA) will declare it as a District Level Disaster and activate the DEOC. Once the DDMA deems a disaster magnitude to be beyond its management capability, it will forward the report to the SEOC for deliberation at the SDMA and subsequent appropriate State intervention. On verification of the magnitude of the disaster, and the scale of response required, the State Emergency Operations Centre will get activated and after declaring a State Disaster, will take control.

- **Step 1:** The State EOC is activated on orders from the SDMA. On receipt of a disaster warning or a FIR, the Chief Minister, after verification that the situation merits declaration of a State Disaster, will convene a meeting of the State Disaster Management Authority. Based on the ratification of the Authority, the Chief Minister, will declare a State Disaster.
- **Step 2:** SEOC is upgraded to emergency mode. The SEOC, till then operating in the preparedness mode, will be upgraded to the emergency mode. Concerned line departments will be informed to post their representatives at the SEOC on round the clock basis with immediate effect. SEOC will be activated and all community preparedness measures will be put into operation and the ESF to be on full alert and activate their SOPs. The activation of the SEOC should be followed when DDMA declares a major disaster.
- **Step 3:** Field Assessment Reports. The Chief Secretary/Relief Commissioner will assume the role of the Chief of Operations for Disaster Management. The Chief of Operations of the EOC will coordinate for setting up the ESFs and are asked to prepare and send the Field Assessment Report to the SEOC. The Chief of Operations of the SEOC will spell out the priorities coordinate services of the ESFs, including national and aid agencies.

Quick response teams of specialized personnel will have to be sent for effective management of disaster. Depending on the magnitude of the disaster, two different types of teams will be fielded by the SEOC: (i) Rapid Assessment Teams; (ii) Quick Response Teams

### Rapid Assessment Teams

The Rapid Assessment Teams will be multi-disciplinary teams comprising four or five members. They will mainly comprise senior level specialized officers from the field of health, engineering, search and rescue, communication and one who have knowledge of disaster affected area, physical characteristic of the region, language etc. These officials should share a common interest and commitment. There should be a clear allocation of responsibilities among team members. To make a first / preliminary assessment of damage, the assessment report will contain the following basic elements or activities:

- Human and material damage
- Resource availability and local response capacity
- Options for relief assistance and recovery
- Needs for national / international assistance

### Quick Response Teams / Rapid Response Teams

Deployment of search and rescue teams can help in reducing the numbers of deaths. A quick response to urgent needs must never be delayed because a comprehensive assessment has yet to be completed. The following teams must be sent to disaster site or disaster affected area as early as possible, even prior to First Information Report.

- First Aid Team
- Search and Rescue team
- Communication Teams
- Power Team
- Relief Teams
- Rehabilitation teams
- Transport Team

All other focal departments will keep ready their response teams, which may be deployed after receiving the first information report.

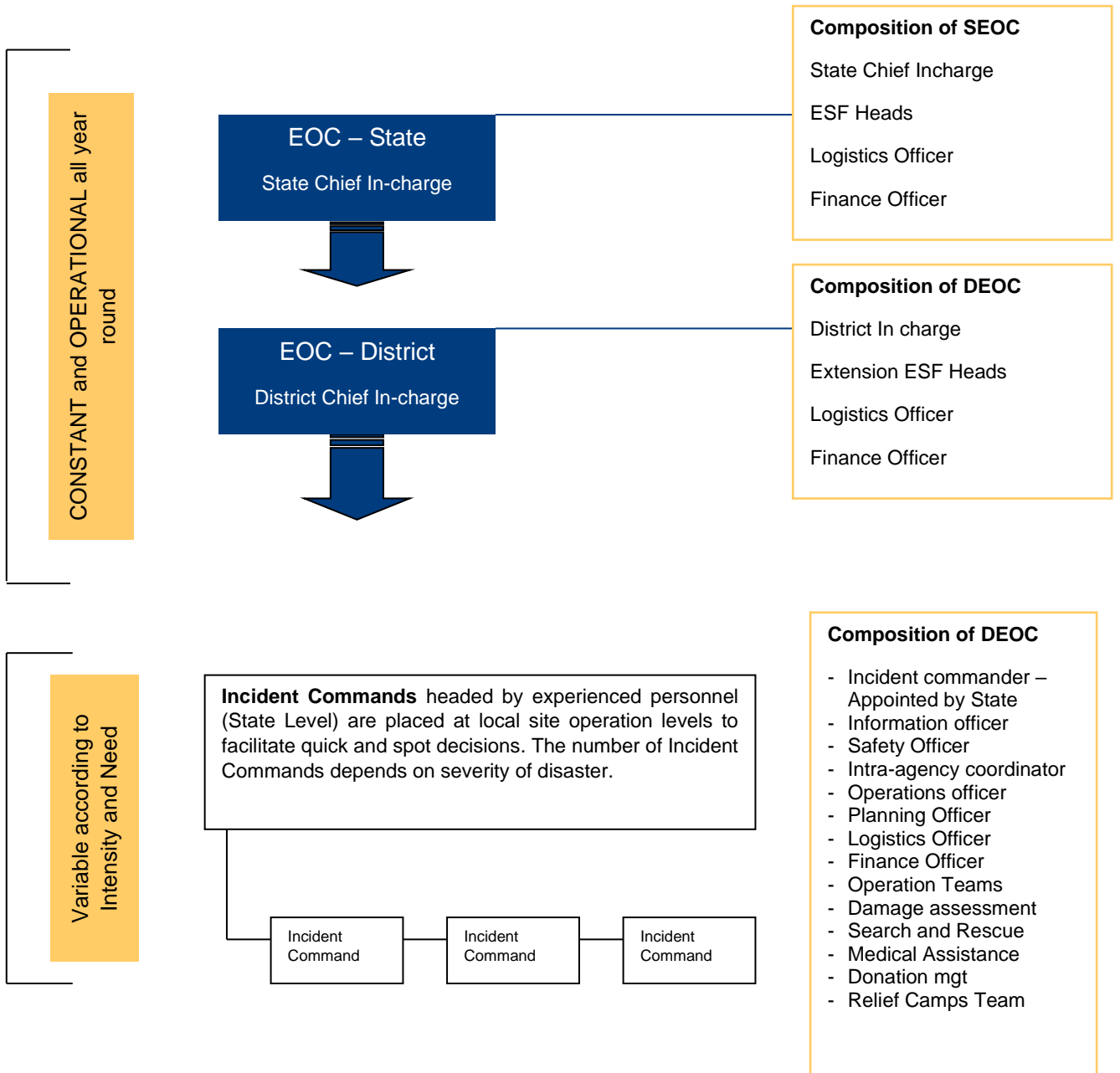
### Incident Command System

The SEOC will need to field its own field teams and through them establish an Incident Command System. The system will comprise:

- Field command
- Field information collection
- Inter-agency coordination at field level
- Management of field operations, planning, logistics, finance and administration

Rapid Assessment Teams and Quick Response Teams described below will be fielded by the SEC through the SEOC as part of the Incident Command System.

# OVERALL COMMAND FLOW CHART (EOC and ICS)



## Institutional arrangement of SEOC

## Chapter 4

# Departmental Plan – Water Resources Department

### Water resources department – Brief Profile

The Kerala Water Authority (KWA) is the primary institution for the development and regulation of water supply and wastewater collection and disposal in Kerala. There are 1081 schemes under Kerala Water Authority in total and have a total installed capacity of 3468 MLD. The per capita availability through the KWA schemes is 176 LPCD. Role of Department as given in SDMP

- ♣ Ensure proper early warning mechanism for flood by monitoring water level of surface water bodies
- ♣ Ensure proper and timely inspection of conditions of sea walls, bunds, embankments, inlet and outlets of lakes, drains, channels and pump houses and ensure adequate repair
- ♣ Ensure proper functioning of all equipment including dewatering pumps
- ♣ Prepare for arrangement of safe drinking water supply for community in the affected areas, relief camps and shelters
- ♣ Prepare for prompt repair of pipelines supplying potable water
- ♣ Ensure availability of adequate number of water tankers, drums, jerry cans or identify their private suppliers to prepare for supply of water, in scarcity period and in emergency
- ♣ Ensure availability of water supply/filling points for fire tenders, water cannons, hospitals and other necessary lifesaving infrastructure
- ♣ Ensure adequate sand filled gunny bags for immediate and temporary repair of sea walls, bunds and polder walls
- ♣ Ensure that ground water extracting industries reduce the extraction by at least 50% during the peak summer months of March, April and May
- ♣ Ensure that No Objection Certificate of Ground Water Department is obtained for landfilling, waste treatment plants and cemetery to ensure that ground water is not contaminated by such activities.

## Key Observations

- The main purpose of the Department is to formulate water policies, the maintenance of the completed projects, prepare Irrigation projects and execute them in time within the prevailing rules and regulations for the benefit of the people of the state.
- The Department is having plan schemes and Non-plan schemes. Plan schemes are either centrally sponsored or externally aided schemes.
- The Water Resources Department is the agency that investigates, designs, constructs, operates and maintains, Minor, Medium and Major Irrigation Projects, Flood control works on riverbanks, coastal protection works, inland navigation, hydrological information system collection, drainage works, salinity extrusion and land reclamation work, engineering research, coastal engineering, field studies etc., based on suitable budget provisions.

## Standard Operating Procedures

### Actions During Normal Times (Mitigation)

- Formulate water policies, maintain completed projects, prepare Irrigation projects and execute them in time within the prevailing rules and regulations for the benefit of the people of the state.
- Carry out investigation, design, construction, operation and maintenance of Minor, Medium and Major Irrigation Projects, Flood control works on riverbanks, coastal protection works, inland navigation, hydrological information system collection, drainage works, salinity extrusion and land reclamation work, engineering research, coastal engineering, field studies etc., based on suitable budget provisions.
- Develop Disaster Management Plan for the department
- Appoint NODAL OFFICERS for disaster management in the department
- Provide disaster management training to the Nodal Officers
- Ensure proper early warning mechanism for flood by monitoring water level of surface water bodies
- Ensure proper and timely inspection of conditions of sea walls, bunds, embankments, inlet and outlets of lakes, drains, channels and pump houses and ensure adequate repair
- Ensure proper functioning of all equipment including dewatering pumps
- Ensure that ground water extracting industries reduce the extraction by at least 50% during the peak summer months of March, April and May
- Ensure that No Objection Certificate of Ground Water Department is obtained for landfilling, waste treatment plants and cemetery to ensure that ground water is not contaminated by such activities
- Support government and other authorities in implementing water mitigation schemes
- Training on implementing key mitigation activities like transportation of drinking water through tankers, boats or silt removal from infiltration wells etc.
- Minimise disaster losses such as transfer the cost of loss doing insurance.
- Prepare a long-term action plan for meeting requirements of local people in vulnerable areas such as water etc.

## **Actions Before Disaster (Preparedness)**

- Coordination with department and agencies to respond to potential damage zones in a prompt & coordinated manner
- Training on how to plan and equip the Distts. to have latest technologies to assess the continuation of water supply, with reference to probable disaster.
- Ensure that regular feedback is taken indicating seriousness of disaster, level of distress, condition of hand pumps & platforms.
- Create awareness among local people on various kinds of threats.
- Prepare for arrangement of safe drinking water supply for community in the affected areas, relief camps and shelters
- Prepare for prompt repair of pipelines supplying potable water
- Ensure availability of adequate number of water tankers, drums, jerry cans or identify their private suppliers to prepare for supply of water, in scarcity period and in emergency
- Ensure availability of water supply/filling points for fire tenders, water cannons, hospitals and other necessary lifesaving infrastructure
- Ensure adequate sand filled gunny bags for immediate and temporary repair of sea walls, bunds and polder walls

## **Actions During Disaster (Response)**

- Implement Incident Response System for Disaster response for organizing the human and material resource
- Facilitate in planning of the water supply related functions (such as provisioning of safe drinking water)

## **Actions After Disaster (Recovery)**

- Coordination with concerned depts and agencies for the reconstruction of damage infrastructure related to water supply functions and to restore provision of safe drinking water.
- Supervise and scrutinize the enumeration work and list of beneficiaries prepared by the village officials.

# **Action Plan for Water Resources Department**

## **Mitigation Action Plan (During Normal Times)**

- Formulate water policies, maintain completed projects, prepare Irrigation projects and execute them in time within the prevailing rules and regulations for the benefit of the people of the state.
- Carry out investigation, design, construction, operation and maintenance of Minor, Medium and Major Irrigation Projects, Flood control works on riverbanks, coastal protection works, inland navigation, hydrological information system collection, drainage works, salinity extrusion and land reclamation work, engineering research, coastal engineering, field studies etc., based on suitable budget provisions.
- Develop Disaster Management Plan for the department
- Appoint NODAL OFFICERS for disaster management in the department



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- Support government and other authorities in implementing water mitigation schemes
- Training on implementing key mitigation activities like transportation of drinking water through tankers, boats or silt removal from infiltration wells etc.
- Minimise disaster losses such as transfer the cost of loss doing insurance.
- Prepare a long-term action plan for meeting requirements of local people in vulnerable areas such as water etc.

District	Facility to build/ repair/ retrofit/ upgrade/ non-structural mitigation work	Location	Size and requirements	Cost estimates

### Equipment & Vehicles

District	Equipment required	Purpose	Where is it to be given	Cost	To be procured	To be hired	To be requisitioned from private

### Manpower

District	Type of personnel required	Number	To be recruited	To be made available from private	Volunteers	Estimated expenditure

### Manuals & Guidelines

District	Type of manual required	For whom	How many to be printed	How to distribute	Estimated cost

### Awareness Materials

District	Target population						Cost
	Community	Students	General public	Government employees	Women	Children	
Type of material							

Pamphlets							
Booklets							
Video							
Audio							

### Capacity Building

District	Category which needs training	Type of training	Estimated cost

### Budget

District	Type of activity undertaken in mitigation	Estimated cost	Source	Additional funding requirement

## Preparedness Action Plan (Before Disaster)

- Coordination with department and agencies to respond to potential damage zones in a prompt & coordinated manner
- Training on how to plan and equip the Distts. to have latest technologies to assess the continuation of water supply, with reference to probable disaster.
- Ensure that regular feedback is taken indicating seriousness of disaster, level of distress, condition of hand pumps & platforms.
- Create awareness among local people on various kinds of threats.
- Prepare for arrangement of safe drinking water supply for community in the affected areas, relief camps and shelters
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- Ensure availability of water supply/filling points for fire tenders, water cannons, hospitals and other necessary lifesaving infrastructure
- Ensure adequate sand filled gunny bags for immediate and temporary repair of sea walls, bunds and polder walls

District	Type of equipment	Location	Checking and certifying authority	Time of testing	Requirement of repair	Estimated cost	Source of funds

## Response Action Plan (During Disaster)

- Implement Incident Response System for Disaster response for organizing the human and material resource
- Facilitate in planning of the water supply related functions (such as provisioning of safe drinking water)

District	Type of activity undertaken in response	Estimated cost	Source	Additional funding requirement


## Recovery Action Plan (After Disaster)

- Coordination with concerned depts and agencies for the reconstruction of damage infrastructure related to water supply functions and to restore provision of safe drinking water.
- Supervise and scrutinize the enumeration work and list of beneficiaries prepared by the village officials.

District	Type of activity undertaken in recovery	Estimated cost	Source	Additional funding requirement



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