DRAFT DEPARTMENTAL DISASTER MANAGEMENT PLAN FOR IRRIGATION DEPARTMENT

Prepared by
Irrigation Department, Govt. of Andhra Pradesh

Supported by
United Nations Development Programme, India
Disaster Management Plan for Irrigation Department, Andhra Pradesh

Prepared by
Municipal Administration & Urban Development Department,
Government of Andhra Pradesh

Supported by
Govt. of Andhra Pradesh and UNDP, India
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**CHAPTERS OF DMP (PLAN)**
- Introduction
- Hazard Vulnerability Risk & Capacity Assessment
- Prevention and Mitigation Measures
- Preparedness Measures
- Capacity Building and Training
- Response Measures
- Recovery, Rehab & Reconstruction
- Knowledge Management
- Financial Arrangements
- Dissemination and Review
- Standard Operating Procedures (SOPs)

**PURPOSE OF DMP CHAPTERS**
- Setting the tone of DMP linking Profile & Scope
- Identify applicable Hazard, Vul,Capacity to assess Risk
- Identify proactive measures to be taken by Deptt
- To protect lives, assets & efficiently utilize resources
- To develop capacities & skills to handle disasters
- To take actions to ensure scalable & quick response
- Provide seamless transition from response to settlement
- Institutionalize mechanism of knowledge sharing
- Funds provisioning for DM Plan Activities
- Communicate plan to stakeholders & review
- Bring clarity on roles in varied disaster scenarios

**OUTCOMES OF CHAPTERS**
- Better understanding of DM functions & linkages
- Comp. Risk Assessment based on HVC mapping
- Selection of Preventive & Mit. steps to reduce risks
- Improvement of capabilities to strengthen preparedness
- Strengthening capacities of stakeholders thro’ trg, drills
- Readiness of system, role clarity during response
- Restoration of infrastructure and sustainable livelihood
- Creation of knowledge networks, Document cases
- Ensure funds allocation, utilization for DM & DRR
- Ensure plan dissemination & periodic review system
- Make sure responsibilities disaster phase wise
1. **Introduction**

1.1 **Profile of the Department**

The Department caters to the irrigation needs of the state of Andhra Pradesh and thus helps address one of the basic needs of the humankind, i.e., food, by providing water to the crops through its system comprising Reservoirs, Canals and other related infrastructure.

The main objective of irrigation Department in Andhra Pradesh is to create irrigation potential in the draught prone areas, upland areas and upkeep of the existing projects to enhance the agriculture productivity per unit of water.

The Department of Irrigation provides irrigation facilities to small and marginal farmers and other weaker sections of the society with the funds provided by Government under various programmes.

**Key functions of the Department:**

1. Hydrological assessment of availability of water in the river basins including water allocation to the Irrigation and other purposes duly assessing the availability in the basin.
2. Planning & design of Irrigation systems.
3. Operations & Maintenance of reservoirs and canal systems
4. Construction of new projects to create irrigation potential for economic development of the state.
5. Monitoring ground water levels and quality through a network of observation wells
7. Improve water management, efficiency by integrated and coordinated, and implementation of operation and maintenance plans for existing Irrigation projects.
8. Flood management.
9. Restoration and maintenance of flood banks.
10. Irrigated area assessment and assessment of water royalty charges for industrial and other utilization.
11. Presentation of data & analysis on water availability, utilization of Interstate river basins.
12. Creating awareness on groundwater management at the grass root level, and so.
1.2 Objective and Scope

1.2.1 Objective of the Plan

a. To mitigate the impact of natural and man-made disasters through preparedness at various levels
b. The Disaster Management Plan (DMP) helps to bring together the information related to equipment, skilled manpower and critical supplies available in the affected area
c. It helps to know the standard operating procedures of the department at the time of disaster. The role and responsibility of each and every officer can be detected at the time of disaster
d. It helps the Department to assess its own capacity in terms of available resources and get ready to mitigate any unexpected disaster effectively and to prevent the loss of human lives and property through preparedness, prevention & mitigation of disasters
e. To assist the line departments, block administration, communities in developing compatible skills for disaster preparedness and management
f. To disseminate factual information in a timely, accurate and tactful manner while maintaining necessary confidentiality.
g. To develop immediate and long-term support plans for vulnerable people in/during disasters
h. To have response system in place to face any eventuality.

1.2.2 Scope of Plan (DMP)

The disaster management plan of the Department shall lay down the following details:

i) Types of disasters to which different parts of State are hazard prone and vulnerable,

ii) Assess the existing capacities and comprehensiveness of Department, in terms of multi hazard risk management, operational efficiency and appropriateness in the aftermath of disaster,

iii) Integration of strategies for prevention and mitigation of disasters, its interlinking with development plans and programmes by the department,

iv) Roles & responsibilities of Department in the event of any disaster or threatening situation and the emergency support functions in response,

v) Capacity building and preparedness measures proposed to be put into effect for disaster risk reduction, its financial provisioning, implementation & periodic review.
2. Hazard, Vulnerability and Risk Analysis

1.1 Multi Hazards Profile:

Andhra Pradesh (A.P.) is highly prone to natural disasters. **Cyclones, floods and drought** are a recurrent phenomenon in Andhra Pradesh. Susceptibility to disasters is compounded by frequent occurrences of manmade disasters such as fire, industrial accidents, oil spills etc. Frequent disasters lead to erosion of development gains and restricted options for the disaster victims. Physical safety, especially of the vulnerable groups, is routinely threatened by natural hazards. The state has 9 coastal districts and also has the 2nd longest coastline in the country (aprox 974 kms). Cyclones in recent years (Phailin – 2013, Hudhud – 2014 and Vardah – 2016) in A.P. have very clearly illustrated the need for multi-hazard prevention, response and recovery plans for natural hazards so that threat to human life and property is minimized. The State is primarily responsible for the management of natural and human-caused disasters identified above at the state level and has a shared responsibility with the Government of India for preparedness and for identified catastrophic disasters.

**Seasonality Calendar:**

<table>
<thead>
<tr>
<th>Hazards Vs Months</th>
<th>January</th>
<th>February</th>
<th>March</th>
<th>April</th>
<th>May</th>
<th>June</th>
<th>July</th>
<th>August</th>
<th>Septemb</th>
<th>October</th>
<th>Novemb</th>
<th>Decembe</th>
<th>Intensity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cyclone</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Very High</td>
</tr>
<tr>
<td>Flood</td>
<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td>High</td>
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<tr>
<td>Earth Quake</td>
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<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Medium</td>
</tr>
<tr>
<td>Drought</td>
<td></td>
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<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
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<td></td>
<td></td>
<td>High</td>
</tr>
<tr>
<td>Chem. Industrial</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>High</td>
</tr>
<tr>
<td>Heat Wave</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Very High</td>
</tr>
<tr>
<td>Fire</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>High</td>
</tr>
<tr>
<td>Epidemics</td>
<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Medium</td>
</tr>
</tbody>
</table>

*Irrigation Deptt will assess and review the impact of different hazards (including floods, droughts and cyclones which have direct impact on farmers), carry out surveillance and devise risk mapping methodology and institutionalize appropriate hazard specific control strategies.*
### Basin Details of Andhra Pradesh

#### District Area Lies in the River Basins and Geographical Area

<table>
<thead>
<tr>
<th>Sl.No</th>
<th>District</th>
<th>River Basin</th>
<th>Geographical area in Lakh, acres</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Srikakulam</td>
<td>Bahud, Mahedratanaya, Poondi Minor Drain, Naupada Minor Drain, Vamsadhara and Nagavali.</td>
<td>14.43</td>
</tr>
<tr>
<td>2</td>
<td>Vishakhapatnam</td>
<td>Gostani, Mathuravada, and anakapalli minor drain, Sarada, Varaha, Thandava, Godavari and Yeleru</td>
<td>28.02</td>
</tr>
<tr>
<td>3</td>
<td>East Godavari and West Godavari</td>
<td>Thandava (1.3%), Pampa (4.3%), Suddagedda (6.6%), Yeleru (20.4%), and Godavari (67.4%). Godavari (20.2%) of district area, Yerracaluva (48.1%), Thammileru (26.8%), Ramileru (1.4%), and Kolleru (3.5%).</td>
<td>26.74</td>
</tr>
<tr>
<td>4</td>
<td>Krishna</td>
<td>Krishna River Basin (45%), Budameru Basin (48.7%), Tammileru basin (3.3%), and Ramileru basin (3%).</td>
<td>21.74</td>
</tr>
<tr>
<td>5</td>
<td>Guntur</td>
<td>The district lies in Krishna basin (51.4%), Romperu basin (32.8%) and Gundla Kamma basin (15.8%).</td>
<td>28.00</td>
</tr>
<tr>
<td>6</td>
<td>Praksham</td>
<td>Gundla kamma, Musi, Paleru, Manneru, Krishns, Romperu and Kandaleru basins, Major portion (36.1%) lies in Gundlakamma river basin</td>
<td>42.35</td>
</tr>
<tr>
<td>7</td>
<td>Nellore</td>
<td>Pennar basin (41%), Upputeru basin (23.8%), Manneru basin (13%) and balance in Kandaleru, Swarnsmuki, Kalangi and Araniar river basin.</td>
<td>32.52</td>
</tr>
<tr>
<td>8</td>
<td>Kurnnol</td>
<td>Krishna basin (58.6%) and Pennr basin (41.4%).</td>
<td>43.49</td>
</tr>
<tr>
<td>9</td>
<td>Kadapa</td>
<td>Pennar river basin.</td>
<td>38.00</td>
</tr>
<tr>
<td>10</td>
<td>Chittoor</td>
<td>Swarnamukhi river basin (14%)</td>
<td>37.04</td>
</tr>
<tr>
<td>11</td>
<td>Ananthapur</td>
<td>Partly in Krishna basin (23.6%), and partly in the Pennar basin (76.4%).</td>
<td>42.47</td>
</tr>
<tr>
<td>12</td>
<td>Vizinagaram</td>
<td>Nagavali, Chamavathi, Gosthanadi, Peddagedda</td>
<td>15.57</td>
</tr>
</tbody>
</table>

*Source: Irrigation Department*

### 1.2 Vulnerability Profile

The Andhra Pradesh is exposed to cyclones, storm surges, floods and droughts. Every two to three years, Andhra Pradesh experiences a moderate to severe intensity cyclone or landfall. Similarly, drought is recognized as one of the most crippling hazards that impact the state. The
Departments of Agriculture and Disaster Management of Government of Andhra Pradesh have detailed procedures of declaring droughts based on several factors.

Andhra Pradesh has 84 Major Accident Hazard Units and thousands of minor industries mostly spread in and around urban conglomerations such as Visakhapatnam, Vijayawada and Tirupati. The vulnerability due to industrial hazards, fires and accidents is high due to higher density of population in urban areas.

a) Cyclone vulnerability

The Bay of Bengal accounts for seven percent of the annual tropical cyclone activity worldwide; the recorded frequency of cyclones per year along the Bay of Bengal is four and inevitably one of the four transforms into a severe cyclone causing human and property losses. Although the percentage of cyclonic activity along the coast is relatively low, the level of human and property loss that cyclones cause around the Bay is very high. Cyclonic landfall usually leads to very heavy rains accompanied with high speed winds and eventually translates into floods. While the entire coast of Andhra Pradesh is vulnerable to Cyclones, nine coastal districts are most vulnerable and have recorded ample amount of landfall in the last century. When cyclones and resulting floods occur, the loss of crops, irrigation infrastructure due to severe inundation and cyclonic damages is significant in the coastal districts of Andhra Pradesh.

Past History

Table 1. Cyclones crossed Andhra Pradesh Coast in 50 yrs (1954-2007)

<table>
<thead>
<tr>
<th>Sl.No</th>
<th>Districts</th>
<th>Name of Cyclone</th>
<th>Severe Cyclonic Storm (SCS)</th>
<th>Cyclonic Storm (CS)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Nellore</td>
<td></td>
<td>5</td>
<td>5</td>
</tr>
<tr>
<td>2</td>
<td>Prakasam</td>
<td></td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>3</td>
<td>Guntur</td>
<td></td>
<td>4</td>
<td>1</td>
</tr>
<tr>
<td>4</td>
<td>Krishna</td>
<td></td>
<td>5</td>
<td>1</td>
</tr>
<tr>
<td>5</td>
<td>West Godavari</td>
<td></td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>6</td>
<td>East Godavari</td>
<td></td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>7</td>
<td>Vishakhapatnam</td>
<td></td>
<td>1</td>
<td>4</td>
</tr>
<tr>
<td>8</td>
<td>Vizinagaram</td>
<td></td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>9</td>
<td>Srikakulam</td>
<td></td>
<td>4</td>
<td>2</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
<td></td>
<td><strong>24</strong></td>
<td><strong>19</strong></td>
</tr>
</tbody>
</table>
b) Flood vulnerability

Floods in Andhra Pradesh have caused widespread loss to the human lives, livestock, damaged homes and caused crop destruction over the decades. Infrastructure damage due floods is well recorded. The Godavari and the Krishna rivers have well-defined stable courses; their natural and manmade banks are capable of carrying flood discharges with the exception of their delta areas. Because of lackluster attitude of the community, unplanned growth, lack of maintenance of natural tanks and improper upkeep of drainage systems, floods have been construed as natural although in reality they are human-caused. Traditionally, flood problem in AP had been confined to the spilling of smaller rivers and the submersion of marginal areas surrounding Kolleru Lake. However, the drainage problem in the delta zones of coastal districts has deteriorated in the last couple of decades, thereby multiplying the destructive potential of cyclones and increasing flood hazards. Finally, a critical additional factor affecting the flood management and the irrigation systems is the lack of maintenance. On several occasions, most of the deaths were occasioned by breaches to the chains of tanks and canals, and over-flooding due in part to the choking of drains by silting and growth of weeds.
### Table 2. District Wise Normal Rainfall – Andhra Pradesh

<table>
<thead>
<tr>
<th>Sl. No</th>
<th>District</th>
<th>Normal rain fall in mm</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Srikakulam</td>
<td>1,162</td>
</tr>
<tr>
<td>2</td>
<td>Vizianagaram</td>
<td>1,132</td>
</tr>
<tr>
<td>3</td>
<td>Visakhapatnamam</td>
<td>1,202</td>
</tr>
<tr>
<td>4</td>
<td>East Godavari</td>
<td>1,218</td>
</tr>
<tr>
<td>5</td>
<td>West Godavari</td>
<td>1,153</td>
</tr>
<tr>
<td>6</td>
<td>Krishna</td>
<td>1,033</td>
</tr>
<tr>
<td>7</td>
<td>Guntur</td>
<td>852</td>
</tr>
<tr>
<td>8</td>
<td>Prakasam</td>
<td>871</td>
</tr>
<tr>
<td>9</td>
<td>Nellore</td>
<td>1,081</td>
</tr>
<tr>
<td>10</td>
<td>Kurnool</td>
<td>670</td>
</tr>
<tr>
<td>11</td>
<td>Kadapa</td>
<td>700</td>
</tr>
<tr>
<td>12</td>
<td>Chittoor</td>
<td>935</td>
</tr>
<tr>
<td>13</td>
<td>Ananthapur</td>
<td>553</td>
</tr>
</tbody>
</table>

c) Fire vulnerability

Fire Service Department of Andhra Pradesh is a statutory department in the fire fighting with jurisdiction all over the state and is bound by the AP Fire Service Act of 1999. The Fire Service Department provides following main services:

**Community fire safety:** This service covers a range of initiatives that are aimed at reducing the number of fires and the number of deaths and injuries caused by fire.

**Legislative fire safety:** This service makes sure that the people are not put at risk from fires in the workplace and fire hazardous buildings. It is mandatory of Fire Department to make sure constructed buildings comply with fire safety legislation and are issued ‘No Objection Certificate’ from Fire Service Department.

**Special services:** This service responds to other types of incident, for example vehicle accidents, trapped people and animals, storms and floods.

**Emergency planning:** Services that plan and prepare for large-scale emergencies, for example large rail and road accidents, aircraft crashes, cyclones, severe floods and earthquakes.

d) Industrial (chemical) vulnerability

Accidents and fatalities that occur on the premises of an industrial establishment is a very common occurrence; government regulations in labor safety, safety guidelines issued by Chief Inspector of Broilers and Commissioner of Industries would cover on-site industrial incidents. However, industrial catastrophe of the magnitude of Union Carbide Industry’s in Bhopal would lead to mass casualties and the impact is beyond industry’s location. Fortunately, Andhra Pradesh has not encountered a major tragedy of the magnitude of Bhopal. However, casual attitude and negligence to follow industrial safety regulations could prove catastrophe. Andhra
Pradesh Fire Services department maintains a list of hazardous industries that has to meet the fire code as per AP Fire Act.

e) Earthquake vulnerability

Andhra Pradesh lies in the central part of the Peninsular Indian Shield; and is considered not very prone to earthquakes. However, the Koyna earthquake in 1967, Latur earthquake in 1993 and Jabalpur earthquake in 1997, which also fall in Peninsular Indian Shield completely changed the perspective. As a result a few zones of weakness in the crystal layers in the Peninsular Region have been identified within which reactivation along some faults may have taken place causing tremors and minor earthquakes.

f) Tsunami vulnerability

Tsunami of December 26, 2004 affected 9 coastal districts of Andhra Pradesh (Nellore, Prakasam, Guntur, Krishna, East Godavari, West Godavari, Visakhapatnam, Vizianagaram and Srikakulam). A total of 301 coastal villages and 2,11,670 people from these districts were affected due to the December 2004 tsunami. While 107 people were reported to have lost lives due to tsunami, 1,554 houses were damaged; predominantly fishermen community was the worst affected in Andhra Pradesh due to tsunami. A total of 2,418 boats were completely lost; 8,976 traditional boats and 180 mechanized boats were damaged. It was reported that 47,370 fishing nets that are crucial to livelihood of fishermen were lost due to tsunami.

g) Drought vulnerability

Drought is a normal, recurrent feature of climate. It occurs in virtually all climatic zones, but its characteristics vary significantly from one region to another. Drought is a temporary aberration; it differs from aridity, which is restricted to low rainfall regions and is a permanent feature of climate. While drought is an insidious hazard of nature, it originates from a deficiency of the precipitation that persists long enough to produce a serious hydrologic imbalance. Drought should be considered relative to some long-term average condition of balance between precipitation and evapo-transpiration (i.e., evaporation and transpiration) in a particular area. Drought differs in three essential characteristics: intensity, duration and spatial coverage. Because of these reasons, although it adversely affects people dependent on subsistence agriculture, drought ought not be classified along with other hazards that are short-duration and sudden in nature. Andhra Pradesh has historically been prone to drought like conditions specially in Rayalaseema and other parts of Andhra region. Departments of Agriculture and Revenue along with other departments of Government of Andhra Pradesh tackle drought as a recurring phenomenon.

h) Urban areas vulnerability

Urban growth in Andhra Pradesh has accelerated alongside its rapid economic growth. The road accidents due to congestion and increased ratio of vehicle to roads; water-borne diseases; health related vulnerability in the event of disasters such as floods or earthquakes are result of unplanned urban growth in the state.
Urban flooding is largely human-caused; water logging due to clogged up storm drainage systems, expansion in urban settlements without proper planning of storm and sewer drainage systems lead to waterlogged roads. Years of siltation of tanks; encroachment of nalas, river beds choke the streams and reduce water storage capacity.

i) **Heat waves vulnerability**

A heat wave is a climatological extremity involving abnormally higher temperature relative to the normal during months of April-June. In recent years (especially between May and June) heatwave conditions in Andhra Pradesh claimed thousands of lives. Several hundreds more suffered from heat stroke and related ailments. Large number of poultry, damages to sweet orange, mango, acid lime crops in larger areas were reported. Historically, frequency of severe heat waves and the duration of heat wave spells have increased noticeably since 1994. Heat waves have deleterious impacts on both plants and animals. The high temperature and low relative humidity experienced in state during summer have caused total depletion of moisture from leaves and led to the drying of leaves, branches and finally the whole trees which led to complete loss, especially in sweet orange and mango crops.

j) **Other Composite Vulnerabilities of new risks, inclusion & dis-aggregation of gender data:**

However the State is prone to various natural vulnerabilities such as cyclone, flood etc apart from drought. These are currently being addressed partially with the help of prevention and mitigation measures, which are being taken by the Depts.

In addition there are certain limitation of the State to address the issues pertaining to the physical vulnerabilities such as water supply and other existing infrastructure constraints. It is also important to keep track of development activities as it should not hamper the traditional agriculture and farming practices, on which large number of farmers of the State are depended directly.

The other pertinent elements are the inclusion and gender dis-aggregation of data. The inclusive approach is very crucial in disaster risk management, as it is important to take the people with disability (PWD), old age persons and especially women and children, on board.

As gender considerations vary, depending on social-economic conditions and cultural beliefs, dis-aggregation data is required at all levels and sectors in Andhra Pradesh, including the irrigation. Data dis-aggregation also helps in some way to better analyze and involve women in disaster planning, it’s execution and usage on the ground.

### 1.3 Risk Analysis

Considering the potential multiple hazards and existing composite vulnerabilities applicable to the State of Andhra Pradesh, the comprehensive resource mapping of the Department will be carried out, to evaluate the actual risk assessment.
The mapping of resources will help in analyzing the capacity of the Irrigation Department in an extensive manner. The resources may include technically skilled manpower as well as equipments such as early warning devices, repository of rescue & relief supplement tools, including cutting & grinding machines, emergency search lights, temporary shelters, emergency first aiders, rained swimmers & divers, hydra cranes & JCBs with operators, boats, emergency transport vehicles with drivers, fully equipped fire tenders etc.

The capacity gaps of Irrigation Deptt, will be identified, reviewed and addressed periodically, especially prior to the flood and cyclone season.

The comprehensive risk analysis, including the hazards, vulnerabilities and capacities of the Irrigation Department, will be carried out on a yearly basis.
3. Prevention and Mitigation

3.1 Prevention & Mitigation Measures

Following are the key prevention and mitigation measures being taken by the Water Resource Department:

- Identify flood prone rivers and areas and activate flood monitoring mechanisms
- Provide water level gauge at critical points along the rivers, dams and tanks
- Identify and maintain materials/tool kits required for emergency response
- Prepare protection plan of irrigation canals, tanks and other infrastructure.
- Inspect bunds of dams, irrigation canals/channels, bridges, culverts, control gates and overflow channels for proper functioning
- Drainage channel improvement; drainage development; undertaking flood proofing operations on priority terms
- Taking up measures to arrest erosion especially around irrigation bunds and other vulnerable areas.
- Stock-pile of sand bags and other necessary items for breach closure

*It is recommended to go for the equal participation of gender, for all the prevention & mitigation related initiatives by Deptt.*

3.2 Provision of funds for disaster mitigation and related interventions

Irrigation Deptt of Andhra Pradesh will actively contribute in the associated disaster related preparedness, mitigation and relief measures at the State level.

The Deptt will make budgetary provisions for disaster mitigation and related interventions, through the integration with the ongoing or proposed development/support programs associated with Irrigation sector.

i) Schemes:
The key aspects for mainstreaming DRR & CCA under key schemes of Irrigation are as follow:

<table>
<thead>
<tr>
<th>Sr. No.</th>
<th>Schemes</th>
<th>Key components</th>
<th>Key aspects for mainstreaming DRR &amp; CCA</th>
</tr>
</thead>
</table>
| 1.      | Pradhan mantra Krishi Sinchayee Yojana1           | • Improving water use efficiency  
• Enhancing industrial water use efficiency  
• Expand cultivable area under assured irrigation  
• Improve on farm water use efficiency to reduce wastage of water  
• Adoption of precision irrigation and other water saving technologies (more crop per drop)  
• Reusing of treated municipal waste water for water saving irrigation contributes to climate change resilience |

1 [http://pmksy.gov.in/AboutPMKSY.aspx](http://pmksy.gov.in/AboutPMKSY.aspx)
ii) Action Plan for mainstreaming DRR and CCA

The suggested Action Plan for mainstreaming DRR and CCA the department is as follow.

<table>
<thead>
<tr>
<th>Sl. No.</th>
<th>Activities to be undertaken for mainstreaming DRR &amp; CCA</th>
<th>Responsible Authorities/Agencies</th>
<th>Tentative Timeline</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>• Identify and design location-specific irrigation schemes and technologies to reduce risks (drainage and flood control)</td>
<td>WR Deptt &amp; Other allied institution</td>
<td>Within in one year</td>
</tr>
</tbody>
</table>

and develop and distribute practical and simple irrigation guidelines in drought prone communities

<p>| | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>2.</td>
<td>• Numerical experiments to determine the optimal dates and water quantity for irrigation of for various climate scenarios using computer system for agro technological decision taking DSSAT</td>
<td>WR Department &amp; Agriculture Deptt</td>
</tr>
<tr>
<td>3.</td>
<td>• Permanent canals in irrigation systems must be afforested on sufferance strips to utilize filtered water and to cover them aiming at the reduction of the physical evaporation from water surface in the canals</td>
<td>WR Deptt &amp; other institutions</td>
</tr>
<tr>
<td>4.</td>
<td>• To implement proper educational and training programs with emphasis on major issues on the involvement of users of water and the general public on drought problems</td>
<td>WR Deptt &amp; Deptt of Information &amp; Technology, Deptt of Education</td>
</tr>
<tr>
<td>5.</td>
<td>• Creation and application of mineral fertilization systems and integrated weed fight during cultivation of agricultural crops under irrigation conditions &amp; Application of proper moisture preserving technologies and techniques for soil treatment in irrigated lands</td>
<td>WR Deppt &amp; Agriculture, Hortiiculture Deptt</td>
</tr>
<tr>
<td>6.</td>
<td>• Incorporating climate change considerations into agricultural investment programmes</td>
<td>WR Deptt &amp; Other Departments</td>
</tr>
</tbody>
</table>

### 3.3 Minimize disaster losses:

The overall objective of Sendai Framework is to build resilience of communities to disasters, by achieving substantive reduction of disaster risks and losses in lives, and in social, economic, businesses, and environmental assets of communities and countries.

The prevention, mitigation and preparedness planning measures will certainly help Deptt to reduce direct risks and losses.

Further, Insurance is very useful way to transfer the risk, especially for the agri farmers, as per the disaster management experts. It is a mechanism for spreading the cost of losses over time that are known to impact community. Introduction of disaster linked insurance will be actively pursued and insurance cover will be made available not just for life but also for household goods, livestock, affected farm lands and crops.

### 4. Preparedness Planning

Disaster preparedness planning measures will primarily focus on the preparedness of Irrigation Department of Govt. of Andhra Pradesh, in order to safeguard lives, protection of assets and efficient utilization of resources by taking appropriate actions to face any disaster.
4.1 Coordination with Departments and Agencies

The preparedness plan of the Deptt will further ensure that the all concerned departments and agencies are able to respond to potential damage zones in a prompt & coordinated manner. In most disaster situations the loss of life and property (including farm land etc) could be significantly reduced through appropriate preparedness measures.

Departmental coordination leads to efficient planning, and it also helps in avoiding overlaps. A foolproof system needs to be institutionalized for seamless communication during disaster. In most disaster situations the loss of life and property could be significantly reduced through appropriate preparedness measures and warning system.

It will be necessary that with respect to every disaster, the concerned agencies will be designated to issue warnings. As part of preparedness plan, it will be ensured by Deptt that pre-disaster warning & alerts, preparedness before response and dissemination of warning, and response activities will be carried out in coordination with all the concerned departments.
4.2 Key preparedness steps on the ground

Following are the key preparedness steps being taken at the field level:

- Check the wireless network and ensure that all the flood stations are connected.
- Establish mechanisms for exchange of information with irrigation divisions at State/National/International levels.
- Inspect all the Bundhs, and check their height and slope.
- Check the top of Bundhs, and if they have been cleared of encumbrances/encroachments and if they are motorable.
- Check that all the Bundhs have been repaired/reinforced, in particular those Bundhs which were damaged during the last floods.
- Check the drainage system of the Bundhs and ensure that the seepage and rat holes, etc. have been closed.
- Check that all the materials required for protecting Bundhs have been stored at different places, and a list of these places has been furnished to the district administration/Barh chowkis.
- Check that the Junior engineers and other staff have been assigned their beats, and all the arrangements for continuous vigilance over these Bundhs have been made.
- Check that all rain gauge stations are functional, and arrangements have been made to report the readings.
- Check the regulators and siphons. Check that they have been repaired and cleaned, increasing the flow of water.
- Check all the anti-erosion works, necessary to maintain the Bundhs.

Flood Management in Andhra Pradesh –Preventive Measures

The department has a dedicated flood control room in the Engineer-in-chief (Irrigation) office to monitor the flood. It is operational round the clock in three (3) shifts during flood season i.e., June to December and during non flood season i.e., December to June, in single shift from 8:00 am to 2:00 pm.

Functions of Flood Control Room

To contact Indian Meteorological Department and to receive Rain fall data and Monsoon position and Cyclonic Warnings etc.,

- To contact Central Water Commission, Hyderabad to receive flows of different rivers in correlation to Rain fall occurred.
• To contact Major Reservoirs in State and obtain status of levels, Inflows and Outflows to prepare Reservoir status report.

The coordination strategy mechanism with CWC & IMD.

• IMD Hyderabad office issues daily weather bulletins for Andhra Pradesh State covering synoptic situation, realized rainfall and Quantitative precipitation forecast for 24 hours to Flood Forecasting Divisions of Central water Commission of both Godavari and Krishna.

• Based on the above information the C.W.C Godavari and Krishna will assess the runoff and estimate the flood. Depending upon the flood, forecasts are generally issued with 14 to 26 hours lead time.

• Based on the forecast received in the flood control room operated in Engineer-in-Chief (irrigation), at Jalasoudha, will prepare hourly flood obtained from C.W.C, statements of various stations indicating the 1st Warning level, 2nd warning level and Danger level. The information will be passed to all the higher officials at Secretariat and concerned officials to safe guard the irrigation structures, lives of the villagers and safe passage of the flood, till the flood recede.

• In addition to the above the flood control room will contact Major Reservoirs in the State and obtain status of levels, inflows, outflows and prepare a statement and Fax to all higher officials at Secretariat and other Departmental officials daily.
5. Capacity Building and Training

5.1 Capacity Development Plan of Deptt

It is very important to prepare and follow the capacity development plan of Department. The plan should be reviewed and revised every year. According to the training needs assessment the training calendar will be prepared and followed. **The women participation also needs to be ensured** through the plan.

<table>
<thead>
<tr>
<th>S. No.</th>
<th>Topic</th>
<th>Participants</th>
<th>Duration</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Environmental Impact Assessment of Development Projects</td>
<td>SE to AEE, WIs, Pump Mechanics, Scheme Operators</td>
<td>2-days</td>
</tr>
<tr>
<td>2</td>
<td>Public Health Implications of Climate Change</td>
<td>SE to AEE</td>
<td>3-days</td>
</tr>
<tr>
<td>3</td>
<td>Integrated Water Resource Management in response to Climate change</td>
<td>SE to AEE</td>
<td>3-days</td>
</tr>
<tr>
<td>4</td>
<td>Conservation of Water Bodies and Ground Water Recharge</td>
<td>SE to AEE</td>
<td>2-days</td>
</tr>
<tr>
<td>5</td>
<td>Sustainable Habitat Management</td>
<td>SE to AEE</td>
<td>2-days</td>
</tr>
<tr>
<td>6</td>
<td>Management through GPS-based systems</td>
<td>SE to AEE</td>
<td>2-days</td>
</tr>
</tbody>
</table>

5.1.a Institutional and Community Capacity Building

*The institutional capacity building will primarily cover the disaster management training and capacity building of key Government officials associated with the department related functions.* A number of training possibilities will be explored & selected, including sending key staff outside.

Staff of the Department & technical Institutes would be able to observe the disaster response procedures in a similar environment responding to the emergency. Similar but simpler training workshops will be organized for auxiliary staff. *Departmental Safety Checklists* may be very useful which are to be prepared in a simple and graphic format whereby they can always be carried and can be available for quick reference at the site.

*Community capacity building will exclusively cover the community aligned disaster management aspects. It will also extensively cover the aspects of safety of WATER RESOURCE & related functions and disaster management handling at the community level.*

5.1.b Awareness Generation

Professional communicators and extension experts will be enlisted to help design and carry out awareness and publicity campaigns related to disaster risk reduction issues.

5.2 Status/ Inventory of trained professionals
The status/inventory of trained disaster management professionals will be properly maintained and documented by the Irrigation Deptt.

5.3 Simulation/ Table Top and Mock Exercises

To measure the training effectiveness, and to check the actual disaster preparedness, the mock exercises and simulation drills will be chalked out at regular intervals, by the Deptt. The mock exercise observations will be discussed and documented for the future actions and record purpose.

6. Disaster Response Plan

6.1 Implementation of Incident Response System for Disaster response

A fully understood IRS mechanism shall adapt to address various scale/extent of operations as well as suit individual agency requirements. IRS constitutes an important part of the disaster response at the National, State, District, Sub-division, Tehsil and Block levels.

Disaster response is part of the disaster management process and it relates to actions taken in order to mitigate the consequences of an Disaster / incident. The IRS is essentially a management system which is used for organizing the human and material resource which is pressed in to service while responding to disasters. IRS is guided by a thorough planning ensures that the critical resources which are used while responding to disasters are deployed in its rightful positions, are mobilized & demobilized in a timely manner to avoid wastage, and further emphasis on a detailed documentation of use of resources, actions and decisions.
IRS achieves this by identifying required functions for responding to disasters and organizes them within an organization (as chart is depicted) which is suitable while responding to disaster. The activation of the staffing is done on the scale of the event and the demand for response. As, it is not possible to keep dedicated human resources on stand-by 24x7 waiting for a disaster event, the IRS envisages to draw trained persons and press them in to service to respond to disasters.

As the functional expertise required for responding to disasters are various kinds, the IRS envisages to draw human resource with different expertise from different department or agencies (such as the Rural Water Supply, Health and Medical, Water and Sanitation, Veterinary, food and Civil Supplies etc) and deploy them as a part of the responding team under the IRS framework.

The IRS design acknowledges that the functional expertise required for responding to disasters are available within the functioning environment of the State but they are scattered and they need to brought within an established and known organization chart so that the staff are aware of their positions and function within the team.

One of the primary requisite for implementation of IRS is to get the team members trained in their respective roles and create management structure/arrangement through consultations with respective State agencies traditionally responsible for undertaking response actions/measures. Prior training helps these staff to understand their roles and responsibilities when mobilized. Training helps the staff to take quick action as they are aware of the position and location within the ICS system.

**The important aspects of the IRS are:**

- It is a temporary team and shall handle only ‘response’
- It can be implemented irrespective of size, location, type and complexity of disasters
- Develop a common understanding of the mission
- Develop a common operational picture
- It provides participatory, well structured, fail safe, multi-disciplinary, multi-departmental and systematic approach to guide administrative mechanisms at all levels of the Government
- Appoint persons with appropriate delegation of decision-making
- Create appropriate structures and process for coordinating operational decisions to be taken at lowest possible level, and scale to highest necessary level
- The team members trained in their function, role and IRS operation for maximum effectiveness
- Once the IRS team or the individual members are demobilized they return back to their original job/role & responsibility
Continuous training of the identified staff enhances their role clarity and effectiveness and hence to the performance of the team.

6.2 The response plan - Incident Response Teams - Command Staff and General Staff

IRS organization functions through Incident Response Teams (IRTs) in the field (depicted below). Responsible Officers (ROs) have been designated at the State (Chief Secretary) and District (District Magistrate) Level as overall in-charge of the incident response management. The RO may however delegate responsibilities to Incident Commander (IC), who in turn will manage the incident through IRTs.

![Diagram of Incident Response Teams](image)

IRTs are pre-designated at three levels - State, District, Sub-Division Tehsil and Block. The RO will activate on receipt of early warning. In case of no warning, IRT will respond and contact RO for further support. A Nodal Officer (NO) has to be designated for proper coordination between the District, State and National Level in activating air support for response.

Apart from RO and NO, the IRS has two main components: Command Staff and General Staff.

(i) **Function of Command Staff**
The Command Staff consists of Incident Commander (IC), Information & Media Officer (IMO), Safety Officer (SO) and Liaison Officer (LO). They report directly to the IC and may have assistants. The Command Staff may or may not have supporting organizations under them.

(ii) **Functions of General Staff**
General Staff has three components:

The **Operations Section (OS)** is responsible for directing the required tactical actions to meet incident objectives. Management of disaster may not immediately require activation of Branch, Division and Group. Expansion of the OS depends on the enormity of the situation and number of different types and kinds of functional Groups required in the response management.

The **Planning Section (PS)** is responsible for collection, evaluation and display of incident information, maintaining and tracking resources, preparing the Incident Action Plan (IAP) and other necessary incident related documentation. They will assess the requirement of additional resources, propose from where it can be mobilized and keep IC informed.
Logistics/Finance Section (L/FS) is responsible for providing facilities, services, materials, equipment and other resources in support of the incident response. The Section Chief participates in development and implementation of the IAP, activates and supervises Branches and Units of his section. In order to ensure prompt and smooth procurement and supply of resources as per financial rules, the Finance Branch has been included in the L/FS.

6.3 Formation of IRTs at district level involving Irrigation Deptt (with role):

The Chief Secretary and District Magistrate who is designated as RO will issue a Standing Order for formation of IRT at stat and District headquarters / Sub-Division and Tehsil / Block levels. The RO of the respective jurisdiction will ensure that appropriate and experienced officers are selected for IRTs and trained in their respective roles and responsibilities. The RO will ensure the capacity building of all IRT members in their respective roles & responsibilities. For formation of Incident Response Teams at State, District, Sub-division, Tehsil and Block levels, guidelines on Incident Response System published by NDMA (Annexure - XI) may be followed.

The Deptt representative of Irrigation Office of the affected/ nearby area will be the part of Operations Section. The Irrigation Officer may be the Leader of Water Group, (Resource Unit) at/ near to the affected site depending upon the disaster type.

Apart from the above, It will also be the responsibility of Irrigation Office to analyze the situation as part of situation unit of Planning Section, and then to facilitate in the planning related functions in the region and documenting allied information.

For details, the last chapter on Standard Operating Procedures (SOPs) may be referred.

6.4 Triggering Mechanism for Deployment of IRT

Some of the natural hazards have a well established early warning system. States and Districts also have a functional 24 x 7 EOC / Control Room. On receipt of information regarding the impending disaster, the EOC will inform the RO, who in turn will activate the required IRT and mobilise resources. The scale of their deployment will depend on the magnitude of the incident.

At times the information about an incident may be received only on its occurrence without any warning. In such cases the local IRT (District, Sub-Division, Tehsil / Block) as the case may be, will respond and inform the higher authority and if required seek reinforcement and guidance.

While deployment, all gender participation in IRT also needs to be ensured, to better understand the needs of victims (men and women) during disaster situation.
7. Recovery, Restoration and Rehabilitation

7.1 Detailed damage and needs assessment:

Irrigation Department will play an important role in detection of breaches and assisting the disaster loss & damage assessment at the affected locations. According to the current situation and the loss occurred, the concerned Irrigation Officer will prepare a preliminary damage assessment report of the affected areas.

7.2 Restoration measures to normalcy

- Teams have to be constituted at district level also with senior officials to extend support on the ground, in & around the affected areas.
- Ensure that DRR concerns are considered in design of new facilities/ strengthening of existing facilities
- Liaison with other line departments and concerned agencies for proper coordination.

8 Knowledge Management:

8.1 Introduction

Irrigation is the sector which touches rural livelihood in terms of increased output of agricultural production to irrigation. It was the construction of Krishna Barrage and Godavari Barrage, which has transformed agricultural scenario in the Central Coastal Districts of Andhra Pradesh leading to agricultural prosperity. The importance of irrigation towards transformation of the rural economy, have been have focused on expanding irrigation facilities in the State by the Governments.

Andhra Pradesh is one of the most important agrarian states in the country. Agriculture accounts for nearly 25 per cent of the state’s GDP. Nearly 70 per cent of the population is dependent on agriculture for livelihood. The Department of Irrigation provides irrigation facilities to small and marginal farmers and other weaker sections of the society with the funds provided by Government under various programmes.

The department propagates in reducing disasters by keeping people well informed and motivated towards a practice of disaster prevention and resilience. This in turn requires the collection, compilation and dissemination of relevant knowledge and information on hazards, vulnerabilities and capacities. However, millions of people are getting severely affected by disasters every year due to lack of adequate coping mechanisms. This may be attributed to the fact that the information lying at one place is not getting transformed into the lifesaving knowledge for the communities at risk.

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6 [link to irrigation department white paper](http://Irrigation/White%20Paper%20on%20irrigation%20Department.pdf)
The following mentioned approach\(^7\) for knowledge management can be utilized for the purpose of serving the communities given in Figure-6.

![Knowledge Management Cycle](image)

**Approaches for Knowledge Management**

### 8.2 Creating network of knowledge institutions

The network of knowledge institutions bridges the gap between information coordination and sharing and brings together knowledge and experiences of disaster practitioners to capture, organize and share this knowledge and to create a versatile interface among policy-makers in the Government and disaster managers’ at all administrative level.

The Department will identify competent technical institutions (region wise) in State to institutionalize the mechanism of knowledge sharing. This will establish linkages with the on-going development information systems in establishing network of knowledge institution.

### 8.3 Documentation of lessons learnt & practices

Under the knowledge management initiative, key lessons learnt of past disasters so far and also the best disaster management practices pertaining to the sector will be documented. The same will also be uploaded on the departmental website.

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\(^7\) Adapted from Knowledge Management in Disaster Risk Reduction – The Indian Approach
Review and documentation; sharing experiences and lessons learnt in the form of publications in the journals and as internal communication for the benefit of fellow Engineers, technical staff and support crew team members.

9 Financial Arrangements

9.1 Annual budget for Deppt’s DM plan implementation

As per the National DM Act 2005, Section 40, sub-section (2) concerned State Deptt shall make (annual) provisions for financing the activities specified in the disaster management plan of Deptt and its smooth implementation.

9.2 Provisioning of funds for specific DRR interventions

Deptt will coordinate with other concerned Deptts for provisioning of funds, specific to water resources and irrigation work related DRR interventions. This will include funds for prevention, mitigation and disaster risk insurance. The other financing options will also be explored here.

9.3 Provisioning of funds for Disaster Response and Direct Relief

As per DM Act Section 48, State Disaster Response Fund & District Disaster Response Fund will be established by State Govt. Further, there is a provision for release of National Disaster Response Fund (NDRF) amount as per the specified items and norms of assistance of MHA. This will also cover any type of support required to the farmers/ users for agriculture and horticulture, post disaster, as interim relief against the damaged farm land. According to the type, the assistance will be provided as per norms, through the State Disaster Response Fund (SDRF) with regard to land loss, crop loss etc.

Apart from it, there is a continuous focus by the Govt on the cashless economy and digitalization for easy, safe and prompt transaction, which will surely help in timely delivery to concerned entity associated with Irrigation Department, internally as well as externally.

10 Dissemination, Review and updating of DM Plan:

10.1 Dissemination of DM plan to stakeholders

Disaster Mgmt Plan of the Deptt will be communicated and disseminated to all concerned stakeholders for clarity of roles, pertaining to the affected areas, in case of disasters and specific responsibilities point of view.

10.2 Periodic review of plan, annual updating
As per the DM Act 2005, Section 40(2) the Departmental DM plan will be reviewed and updated annually. Especially the contact list of nodal persons and resources will be checked, verified and updated.

11 Summarized Standard Operating Procedures (SOPs) of Irrigation Deptt

11.1 Introduction
In general, an SOP is a procedure and specific to operation that describes the activities necessary to complete task in accordance with the standards or by laws. It is exigent for the departments prompt response to various schemes and maintains a culture of preparedness, as it clearly outlines responsibility of the office holder.

Benefits of SOP

- **Explanation of performance expectations.** (What is expected – Charter of duties – Objectivity in evaluating operational performance)
- **Standardization of activities.** (Identify planned and agreed upon roles & actions. Promotes coordination and communication amongst personnel. Simplify decision making during potentially stressful conditions)

OTHER BENEFITS OF SOP

- **Training and reference document.** (Drills based on SOPs improve understanding of work requirements and help identify potential problems)
- **Systems analysis and feedback.** (Comparison between the existing and state of art practices and feedback from various sources help in identification of potential problems and innovative solutions)
- **External communication** (Communicates organizational intentions and requirement to outside groups)

The roles and responsibilities of the department (focusing on the ground) shall be:

**Disaster Phase wise**

**11.2. Pre-Disaster and Normal Time**

<table>
<thead>
<tr>
<th>1. Catchments maps are to be ready for all irrigation sources. And all the vulnerable locations in the sources are to be identified along with the Water Users Associations / Distributory Committees / Project Committees.</th>
</tr>
</thead>
<tbody>
<tr>
<td>2. Check and repair the main Irrigation canal system and control structures.</td>
</tr>
<tr>
<td>3. After receipt of first flood warning discharge through dams all lower riparian rights villages downstream of the dam are required to be given the information along with District Collector/ RDO/ MRO of the concerned district.</td>
</tr>
<tr>
<td>4. During the closure period the irrigation staff has to procure required stores i.e. empty gunny bags, sand, bullies of 1m length with 100mm dia, gaslights, bamboo thatties, gamelas, country twine, needles, crow bars, hammer with handles, torch light etc.</td>
</tr>
<tr>
<td>5. One flood store will be maintained under the control of each Dist. Collector. The flood store will keep empty sand bags, dewatering pumps, diesel generators, tarpaulins, tents etc.</td>
</tr>
<tr>
<td>6. The Asst. Engineer should make arrangement to intensify patrolling of river banks round the clock and as soon as the reservoir comes to full tank level and the spillway gates are to be operated to avoid further storage in the reservoir with intimation to Revenue Authorities.</td>
</tr>
<tr>
<td>7. Before cyclone / flood the AEE / DEE will inspect each and every vulnerable points and the areas prone for inundation for taking precautionary temporary measures and the summary of all actions intimated to the higher officers.</td>
</tr>
<tr>
<td>8. Materials such as empty cement bags, sand, metal, stone bellies etc. will be stocked in adequate quantities in all flood stores for immediate use in the event of disaster.</td>
</tr>
<tr>
<td>9. Strengthen the weak bunds of all irrigation sources and arranges for patrolling weaker points to avert breaches.</td>
</tr>
<tr>
<td>10. Ensure that all the irrigation drains are cleared of blockades and obstructions.</td>
</tr>
<tr>
<td>11. Move all emergency duty officers/staff and equipments to vulnerable area.</td>
</tr>
<tr>
<td>12. They should be ready to take up emergency works.</td>
</tr>
</tbody>
</table>

**11.3. During Disaster**

1. Materials such as empty cement bags, sand, metals, stone bellies etc. will be stocked in adequate quantities in all flood stores for immediate use for plugging the breaches.

2. After receiving 1st warning the status of flood is to be intimated to the District Collector, RDO, and NGOs, MRO to address public by in all adjacent villages & it is to be intimated to AIR and for
live telecast channels.

3. Strengthen the weak bunds of all irrigation sources wherever necessary to prevent breaches. Assistance from local people will be used.

4. After receiving cyclone/ flood warning from catchment area to source utilization location the departmental field officers have to inspect all the sources jurisdiction wise including luskers.

5. After flood / cyclone warning, control room are to formed at SE/EE/ offices respectively and required vehicles are to be kept at store sheds to carry the materials to the spot required. Ensure that all the irrigation drains are cleared from obstructions.

6. Continue to clear the mouths of all drains for free flow of flood water.

11.4. Post Disaster

1. After floods recede necessary arrangements have to be made to the farming community to safe guard agriculture by making temporary restoration arrangements to the affected irrigation sources, which include forming ring bunds, close breaches, removing of all shoals and rectifying damages to structures.

2. The officers involve for restoration of post disaster damaged irrigation sources are AEE/ AE, DEE, EE, and SE. and identify the breaches and take up restoration work.

3. Restore the damaged infrastructure. Attempts will be made for farming community to start agriculture within minimum possible time to bring the socio economic life back to normal in the affected areas.

4. Review and request for construction of dams, check dams and new irrigation/drainage canals for long term improvement and for sustained economic growth.

5. Suggest measures for strengthening the river banks and canal bunds to avoid breaches.