

**State: ANDHRA PRADESH**

**Agriculture Contingency Plan for District: CHITTOOR**

1.0 District Agriculture profile				
<b>1.1</b>	<b>Agro-Climatic/Ecological Zone</b>			
	Agro Ecological Region /Sub Region (ICAR)	Deccan Plateau, hot arid eco region (8.3)		
	Agro-Climatic Region (Planning Commission)	Southern Plateau and Hills Region (X)		
	Agro Climatic Zone (NARP)	Southern zone of Andhra Pradesh (AP-3)		
	List the zones or part thereof falling under the NARP Zone	<b>Chittoor,Dr Y.S.R Kadapa</b>		
	Geographic coordinates of district	Latitude	Longitude	Altitude
		12 <sup>0</sup> 37' N	78 <sup>0</sup> 33' E	183 m
	Name and address of the concerned ZRS/ ZARS/ RARS/ RRS/ RRTTS	RARS, Tirupati 517502		
	Mention the KVK located in the district	RASS – ARKVK, Karakambadi post, Renigunta mandal chittor district -517001		
<b>1.2</b>	<b>Rainfall</b>	Average (mm)	Normal Onset ( specify week and month)	Normal Cessation (specify week and month)
	SW monsoon (June-Sep):	438	1 <sup>st</sup> week of June	3 <sup>rd</sup> week September
	NE Monsoon(Oct-Dec):	396	1 <sup>st</sup> week of October	Last week of December
	Winter (Jan- Feb)	12		
	Summer (March-May)	88		
	<b>Annual</b>	<b>934</b>	-	-

<b>1.3</b>	<b>Land use pattern of the district</b> (latest statistics)	Geographical area	Forest area	Land under non-agricultural use	Permanent pastures	Cultivable wasteland	Land under Misc. tree crops and groves	Barren and uncultivable land	Current fallows	Other fallows
	<b>Area ('000 ha)</b>	1515.1	452.0	146.4	33.9	42.1	28.6	154.4	174.3	118.2

<b>1.4</b>	<b>Major Soils</b>	Area ('000 ha)	Percent (%) of total
	1. Red loams	232	57
	2. Red sandy	138	34
	3. Clay soils	12	3
	4. Balck loamy	4	1
	5. Black loamy	8	2
	6. Red Clay	12	3

<b>1.5</b>	<b>Agricultural land use</b>	Area ('000 ha)	Cropping intensity %
	Net sown area	318.7	108.7 %
	Area sown more than once	27.7	
	Gross cropped area	346.4	

<b>1.6</b>	<b>Irrigation</b>	Area ('000 ha)	Percent (%)	
	Net irrigated area	157.4		
	Gross irrigated area	184.5		
	Rainfed area	161.2		
	<b>Sources of Irrigation</b>	Number	Area (ha)	% area
	Canals		0.3	0.2
	Tanks	8152	22.9	15.1
	Tube wells & filter points	165000	128.8	84.7
	Lift irrigation	-		
	Dug wells	38000		
	Other sources		0.041	0.02
	<b>Total</b>		152.0	100.0
	Pumpsets	223007		
	Micro-irrigation		30335	
	<b>Groundwater availability and use</b>	No. of blocks	% area	Quality of water
	Over exploited	10		TDS is more than 2000PPM
	Critical	13		
	Semi- critical	15		
	Safe	37		
	Wastewater availability and use			

\*Over exploited: groundwater utilization >100%; critical:90-100%; semi-critical: 70-90%; safe: <70%

**Area under major field crops & horticulture etc.**

\*If break-up data (irrigated, rainfed) is not available, give total area

1.7		Major Field Crops cultivated	Area ('000 ha)*					
			<i>Kharif</i>		<i>Rabi</i>		Summer	Total
			<i>Irrigated</i>	<i>Rainfed</i>	<i>Irrigated</i>	<i>Rainfed</i>		
1	Groundnut	7.5	113.5	16.6	-	-	137.5	
2	Rice	14.5	-	34.6	-	-	49	
3	Sugarcane	25.8	-	-	-	-	25.7	
4	Redgram	-	8.1	0.5	---	-	8.6	
5	Sunflower	0.4	-	3.1	-	-	3.4	
	<b>Horticulture crops - Fruits</b>	<b>Total area</b>						
1	Mango	59.3						
2	Banana	1.2						
	<b>Horticultural crops - Vegetables</b>	<b>Total area</b>						
1	Tomato	13.9						
2	Chillies	3.14						
3	Brinjal	1.9						
4	Potato	1.8						
5	Beans	1.5						

		Spices and Plantation crops	Total area			
1	Coconut	4.54				
2	tamarind	2.50				

<b>1.8</b>	<b>Livestock</b>	<b>Male ('000)</b>	<b>Female ('000)</b>	<b>Total ('000)</b>		
	Non descriptive Cattle (local low yielding)	154.3	201.4	355.7		
	Crossbred cattle	91.6	656.9	748.5		
	Non descriptive Buffaloes (local low yielding)	21.9	117.8	139.7		
	Graded Buffaloes					
	Goat			490.9		
	Sheep			1116.6		
	Others (Camel, Pig, Yak etc.)			11.9		
	Commercial dairy farms (Number)					
<b>1.9</b>	<b>Poultry</b>	<b>No. of farms</b>	<b>Total No. of birds (number)</b>			
	Commercial		214150			
	Backyard		1418692			
<b>1.10</b>	<b>Fisheries</b> (Data source: Chief Planning Officer)					
	<b>A. Capture</b>					
	<b>i) Marine</b> (Data Source: Fisheries Department)	<b>No. of fishermen</b>	<b>Boats</b>		<b>Nets</b>	<b>Storage facilities (Ice plants etc.)</b>
			Mechanized	Non-mechanized		
		<b>20016</b>	<b>nil</b>			
	<b>ii) Inland</b> (Data Source: Fisheries Department)	<b>No. Farmer owned ponds</b>		<b>No. of Reservoirs</b>	<b>No. of village tanks</b>	
		17		-	-	
	<b>B. Culture</b>					
		<b>Water Spread Area (ha)</b>	<b>Yield (t/ha)</b>		<b>Production ('000 tons)</b>	
	<b>i) Brackish water</b> (Data Source: MPEDA/ Fisheries Department)		-		-	
	<b>ii) Fresh water</b> (Data Source: Fisheries Department)	16	-		-	
	<b>Others</b>		-		0.5	

1.11	Production and Productivity of major crops (Average of last 5 years: 2004, 05,06, 07, 08)	Kharif		Rabi		Summer		Total	
		Production ('000 t)	Productivity (kg/ha)	Production ('000 t)	Productivity (kg/ha)	Production ('000 t)	Productivity (kg/ha)	Production ('000 t)	Productivity (kg/ha)
	Groundnut	98.6	681	45.2	2561	-	-	143.8	1621
	Sugarcane	2410	84795	-	-	-	-	2410	84795
	Paddy	47.4	2713	102.8	2770			150.2	2742
	<b>Major Horticultural crops</b>								
	Tomato							263.4	19000
	Chillies							2.75	3070
	Brinjal							35.3	18667
	Potato							34.2	19000
	Beans							16.3	10333
	<b>Spices and Plantation crops</b>								
	Coconut								
	tamarind							24.2	9700

1.12	Sowing window for 5 major crops (start and end of sowing period)	Groundnut	Paddy	Sugarcane	Redgram	Sunflower
	Kharif- Rainfed	June 1 <sup>st</sup> FN to July 2 <sup>nd</sup> FN	---	---	June 1 <sup>st</sup> FN to August 1 <sup>st</sup> FN	July 2 <sup>nd</sup> FN to August 1 <sup>st</sup> FN
	Kharif-Irrigated	May 1 <sup>st</sup> FN to June 1 <sup>st</sup> FN	May 2 <sup>nd</sup> FN to July 2 <sup>nd</sup> FN	---	---	---
	Rabi- Rainfed	---	---	---	September 2 <sup>nd</sup> FN to October 1 <sup>st</sup> FN	---
	Rabi-Irrigated	Nov 15 <sup>th</sup> – Dec 30 <sup>th</sup>	Nov 1 <sup>st</sup> FN – Dec 30 <sup>th</sup>	December 1 <sup>st</sup> FN to March	---	Nov 1 <sup>st</sup> FN – Dec 30 <sup>th</sup>

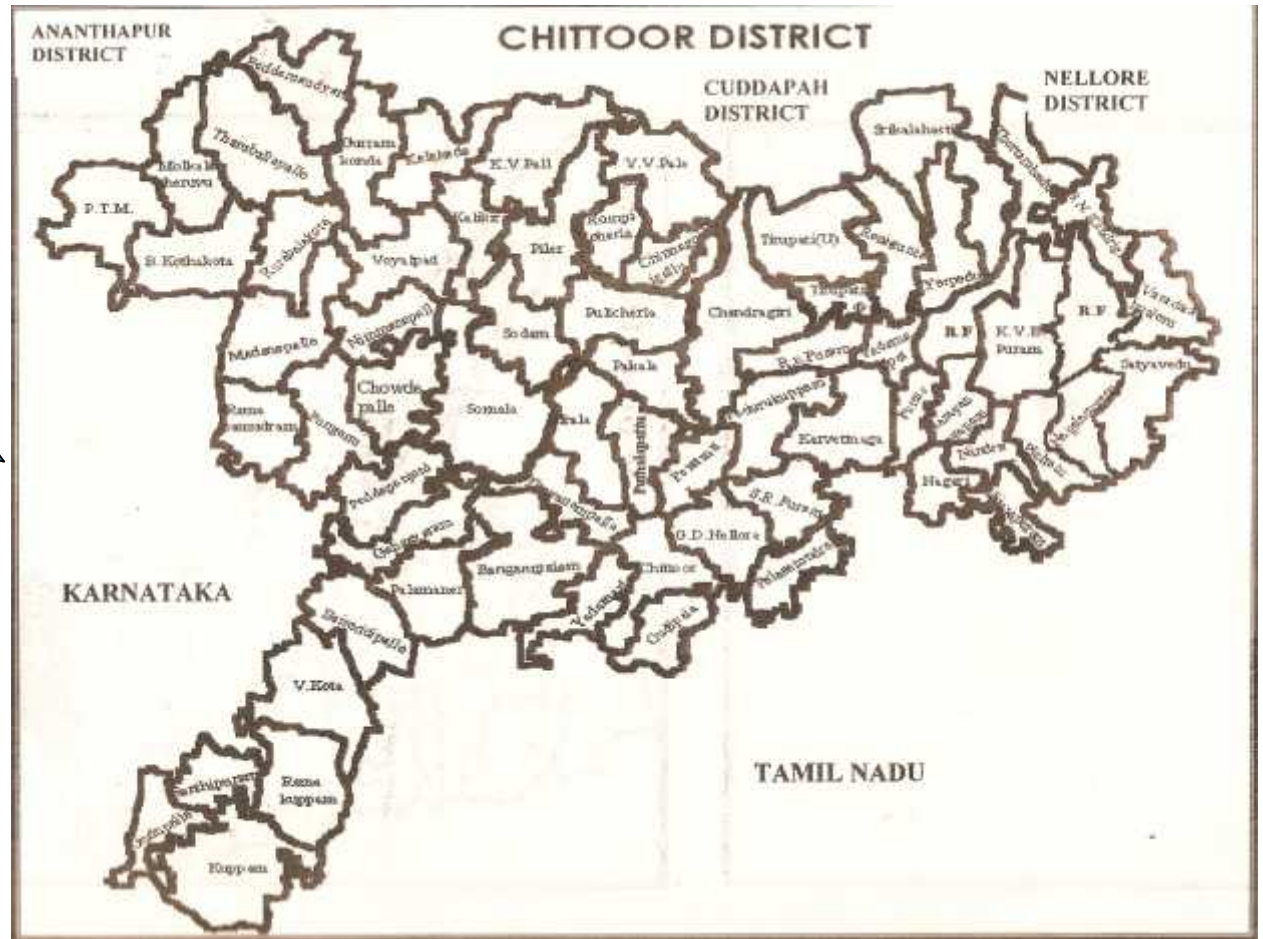
1.13	What is the major contingency the district is prone to? (Tick mark and mention years if known during the last 10 year period)			
		Regular	Occasional	None
	Drought			
	Flood			
	High intense storms			
	Cyclone			
	Hail storm			
	Heat wave			
	Cold wave			
	Frost			
	Sea water inundation			
	Pests and diseases (Red hairy caterpillar, Leaf webber and Spodoptera in Groundnut, Blast, stem borer and leaf folder in Paddy and Early shoot borer in Sugarcane)	Peanut bud necrosis disease in Groundnut	Red hairy caterpillar in Groundnut	

1.14	Include Digital maps of the district for	Location map of district within State as Annexure I	Enclosed: Yes
		Mean annual rainfall as Annexure 2	Enclosed: No
		Soil map as Annexure 3	Enclosed: Yes

Chittoor District in Andhra Pradesh

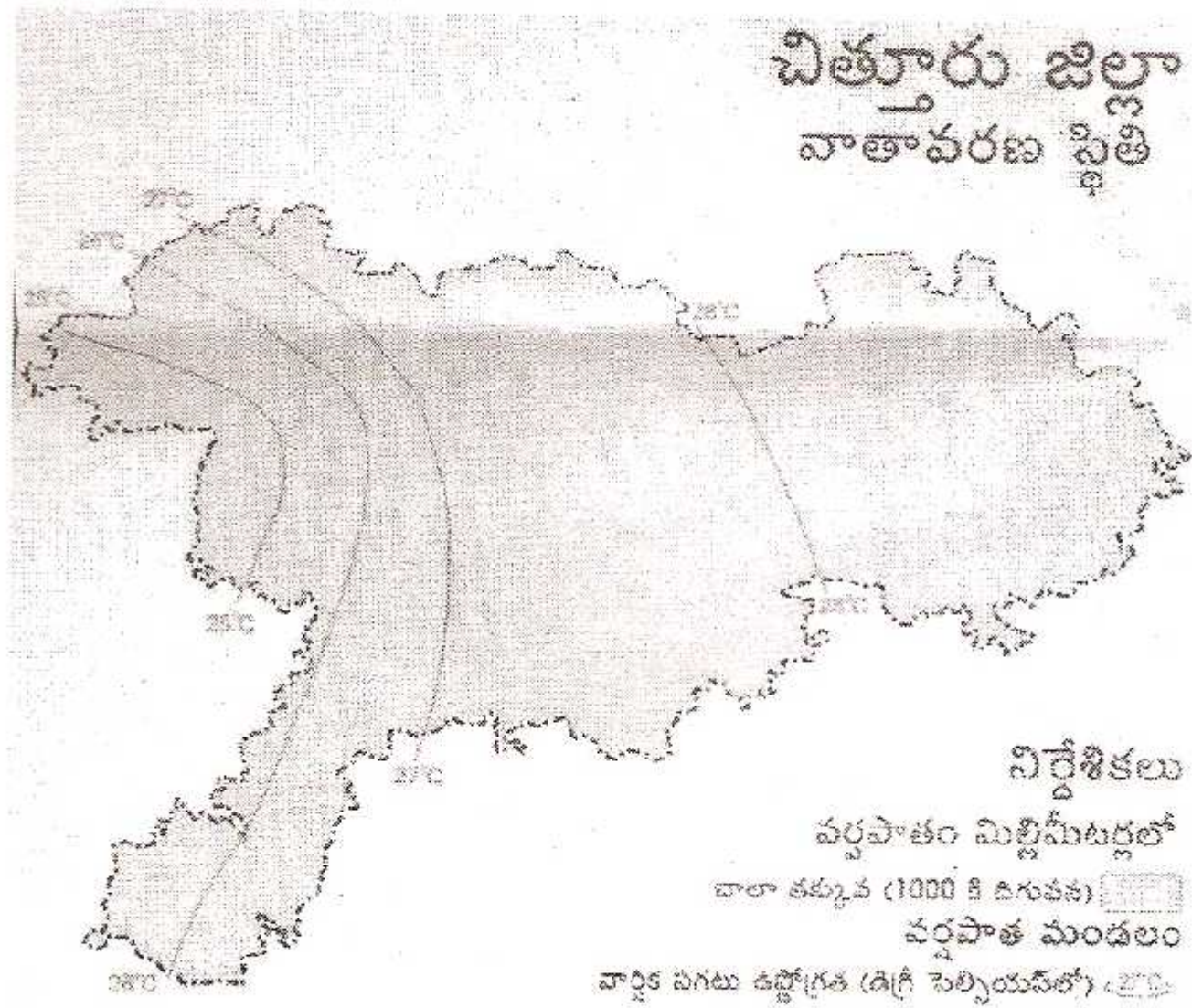


**Chittoor district**





Rainfall pattern in Chittoor district



## 2.0 Strategies for weather related contingencies

### 2.1 Drought

#### 2.1.1 Rainfed situation

Condition 1	Major Farming situation <sup>a</sup>	Crop normal /cropping system <sup>b</sup>	Suggested Contingency measures		
			Change in crop/cropping system <sup>c</sup>	Agronomic measures <sup>d</sup>	Remarks on Implementation <sup>e</sup>
Delay by 2 weeks June 2 <sup>nd</sup> FN	1 Rainfed - shallow Red soil	Groundnut, + Redgram intercropping (7:1) or (11:1)	No change	Mechanical sowing with tractor drawn seed drills as the sowing window is narrow.	
Delay by 4 weeks July 1 <sup>st</sup> FN	Rainfed - shallow Red soil	Groundnut, + Redgram intercropping (7:1) or (11:1)	No change	Sowing with tractor drawn seed drill	
Delay by 6 weeks July 2 <sup>nd</sup> FN	Rainfed - shallow Red soil	Groundnut, + Redgram (7:1) or 11:1	Redgram (LRG-30,41) Jowar (CSH-5,ASH-1) Redgram + Tomato Field bean (TFB-5) Maize (30V92) Green gram (LGG-407,420) Black gram (LBG-20,T-9,PBG-1)	Sowing with tractor drawn seed drill	Seed source from APSSDC AND NSP

Condition 1		Suggested Contingency measures			
Early season drought (delayed onset)	Major Farming situation <sup>a</sup>	Crop normal /cropping system <sup>b</sup>	Change in crop/cropping system <sup>c</sup>	Agronomic measures <sup>d</sup>	Remarks on Implementation <sup>e</sup>
Delay by 8 weeks August	Rainfed - shallow Red soil	Groundnut, + Redgram (7:1) or 11:1	Red gram (LRG-30,41) Jowar (CSH-5,ASH-1) Black gram (LBG-17,20) Green gram (LGG-407,460)	Protect against Shoot fly in Jowar  Use higher seed rate (30 % more)	

Condition 1		Suggested Contingency measures			
Early season drought (Normal onset)	Major Farming situation <sup>a</sup>	Crop/cropping system <sup>b</sup>	Crop management <sup>c</sup>	Soil management <sup>d</sup>	Remarks on Implementation <sup>e</sup>
15-20 days dry spell after sowing	Rainfed – shallow Red soil	Groundnut + Redgram (7:1 or 11:1)	-	Take up hoeing to suppress weeds and to create dust mulch	

Condition 1			Suggested Contingency measures		
Mid season drought (long dry spell, > 2 consecutive weeks)	Major Farming situation <sup>a</sup>	Crop/cropping system <sup>b</sup>	Crop management <sup>c</sup>	Soil management <sup>d</sup>	Remarks on Implementation <sup>e</sup>
At vegetative stage	Rainfed - shallow Red soil	Groundnut + Redgram (7:1 or 11:1)	1. Life saving irrigation with harvested rain water in farm ponds (10 mm depth.) using sprinkler  2. Foliar spray of urea @ 2%	Take up hoeing to suppress weeds and to create dust mulch  2. Open dead furrow to retain the rain water	Encourage farm ponds under NREGA

At reproductive stage	Rainfed - shallow red soils	Groundnut + Redgram intercropping system	1. Life saving irrigation with harvested rain water in farm ponds (10 mm depth.) using sprinkler  2. Foliar spray of 2% urea	As above	-do-
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			Suggested Contingency measures		
Terminal drought	Major Farming situation <sup>a</sup>	Crop/cropping system <sup>b</sup>	Crop management <sup>c</sup>	Rabi Crop planning <sup>d</sup>	Remarks on Implementation <sup>e</sup>
	Rainfed - shallow red soils	Groundnut + Redgram intercropping system	1. Life saving irrigation using run off harvesting water in farm ponds with micro irrigation  2. Harvesting the crop with mechanical harvesters at physiological maturity	Horse gram	-do-

### 2.1.2 Irrigated situation

Condition			Suggested Contingency measures		
	Major Farming situation <sup>f</sup>	Normal Crop/cropping system <sup>g</sup>	Change in crop/cropping system <sup>h</sup>	Agronomic measures <sup>i</sup>	Remarks on Implementation <sup>j</sup>
Delayed release of water in canals due to low rainfall	-NA-				

Condition			Suggested Contingency measures		
	Major Farming situation <sup>f</sup>	Normal Crop/cropping system <sup>g</sup>	Change in crop/cropping system <sup>h</sup>	Agronomic measures <sup>i</sup>	Remarks on Implementation <sup>j</sup>
Limited release of water in canals due to low rainfall	Not applicable				

Condition			Suggested Contingency measures		
	Major Farming situation <sup>f</sup>	Normal Crop/cropping system <sup>g</sup>	Change in crop/cropping system <sup>h</sup>	Agronomic measures <sup>i</sup>	Remarks on Implementation <sup>j</sup>
Non release of water in canals under delayed onset of monsoon in catchment	Not applicable (No canals)				

Condition			Suggested Contingency measures		
	Major Farming situation <sup>f</sup>	Normal Crop/cropping system <sup>g</sup>	Change in crop/cropping system <sup>h</sup>	Agronomic measures <sup>i</sup>	Remarks on Implementation <sup>j</sup>
Lack of inflows into tanks due to insufficient /delayed onset of monsoon	Irrigated uplands Wells/bore/ open	Rice-Rice	Rice -Groundnut	<ul style="list-style-type: none"> <li>In paddy alternative wetting and drying</li> <li>Irrigation at critical stages of Groundnut</li> </ul>	
		Paddy-Groundnut	Groundnut-(Narayani, K6) Greengram(LGG-420)		Groundnut seed sources: ARS,

Condition			Suggested Contingency measures		
	Major Farming situation <sup>f</sup>	Normal Crop/cropping system <sup>g</sup>	Change in crop/cropping system <sup>h</sup>	Agronomic measures <sup>i</sup>	Remarks on Implementation <sup>j</sup>
					Utukur and Ananthapur
		Sugarcane	Maize (30V 92) - Tomato		
		Paddy- Tomato	Sunflower (Sunbred) Tomato (Np-5005)		

Condition			Suggested Contingency measures		
	Major Farming situation <sup>f</sup>	Normal Crop/cropping system <sup>g</sup>	Change in crop/cropping system <sup>h</sup>	Agronomic measures <sup>i</sup>	Remarks on Implementation <sup>j</sup>
Insufficient groundwater recharge due to low rainfall	Medium lands (Tube well irrigation)	Paddy-Vegetables	Redgram(LRG-30) Groundnut(K6)	Supplemental irrigation at critical stage	
		Paddy-Groundnut	Greengram LGG 407, LGG420 Redgram (LRG-30)	Supplemental irrigation at critical stage	
		Sugarcane	Tomato (NP5005)	Supplemental irrigation	
	Uplands (Tube well / well irrigation)	Paddy	Groundnut + Redgram		
Any other condition (specify)	Problematic soils	Paddy	Salt tolerant Varieties NLR 145 (135 days), NLR 33641 (150 days)	Soil reclamation methods (gypsum application , FYM application, raising Green manure crop and intercropping)	

## 2.2 Unusual rains (untimely, unseasonal etc) (for both rainfed and irrigated situations)

Condition 1	Suggested contingency measure			
	Vegetative stage	Flowering stage	Crop maturity stage	Post harvest
<b>Continuous high rainfall in a short span leading to water logging</b>				
Groundnut	<ul style="list-style-type: none"> <li>• Provide drainage</li> <li>• Resowing of the crop</li> <li>• Suitable control measures to prevent disease outbreak</li> <li>• Booster dose of 50Kg N/ ha</li> </ul>	<ul style="list-style-type: none"> <li>• Drain excess water</li> </ul>	<ul style="list-style-type: none"> <li>• Suitable control measures to prevent disease outbreak</li> </ul>	<ul style="list-style-type: none"> <li>• Shifting of produce immediately after drying</li> <li>• Threshing immediately after harvest of groundnut crop.</li> </ul>
Paddy	<ul style="list-style-type: none"> <li>• Provide drainage</li> </ul>	-	<ul style="list-style-type: none"> <li>• Precautionary measures to be taken to avoid <i>insitu</i> germination</li> </ul>	<ul style="list-style-type: none"> <li>• Spray 5% salt solution</li> </ul>
Sugarcane	<ul style="list-style-type: none"> <li>• Planting on the ridges</li> <li>• Draining excess water</li> </ul>	-	<ul style="list-style-type: none"> <li>• Wrapping and propping and earthing-up to prevent lodging</li> <li>• Early harvesting</li> </ul>	-
<b>Horticulture fruits</b>				
<b>Mango</b>	<ul style="list-style-type: none"> <li>• Drain the excess water as soon as possible</li> <li>• Spray 1% KNO<sub>3</sub> or Urea 2% solution 2-3 times.</li> </ul>	<ul style="list-style-type: none"> <li>• Drain the excess water as soon as possible</li> <li>• Spray 1% KNO<sub>3</sub> or Urea 2% solution 2-3 times.</li> </ul>	<ul style="list-style-type: none"> <li>• Drain the excess water as soon as possible</li> <li>• Harvest the mature produce in a clear sunny day'</li> </ul>	<ul style="list-style-type: none"> <li>• Store the fruits in well ventilated place temporarily before it can be marketed.</li> <li>• Market the fruits as soon as possible.</li> </ul>
<b>Banana</b>	<ul style="list-style-type: none"> <li>• Drain the excess water as soon as possible</li> <li>• Inter-cultivate the soil with gorru for aeration.</li> <li>• Spray 0.5 % KNO<sub>3</sub> or Urea 2% solution 2-3 times.</li> <li>• Topdressing of booster dose of 80 g MOP + 100 g Urea per plant at two to three times intervals.</li> <li>• Gap filling may be taken up if the</li> </ul>	<ul style="list-style-type: none"> <li>• Drain the excess water as soon as possible</li> <li>• Spray 0.5 % KNO<sub>3</sub> or Urea 2% solution 2-3 times.</li> <li>• Topdressing of booster dose of 80 g MOP + 100 g Urea per plant at two to three times intervals.</li> </ul>	<ul style="list-style-type: none"> <li>• Drain the excess water as soon as possible</li> <li>• Harvest the marketable bunches in a clear sunny day.</li> <li>• Spray 0.5 % KNO<sub>3</sub> or Urea 2% solution 2-3 times for quick development of immature bunches.</li> <li>• Staking with bamboos to</li> </ul>	<ul style="list-style-type: none"> <li>• Use ripening chambers for quick ripening</li> <li>• Market the produce as soon as possible.</li> </ul>

	<p>plants are two weeks old and sowing window is still available for the crop.</p> <ul style="list-style-type: none"> <li>• If the age of the plant is less than three months and submergence up to three feet better to replant the garden.</li> </ul>	<ul style="list-style-type: none"> <li>• If the age the plant is more than three months and less than seven months allow one sword sucker for ratoon and take up fertilization at monthly intervals for four months.</li> <li>• Staking with bamboos to prevent further lodging.</li> </ul>	prevent further lodging.	
<b>Horticultural Crops - Vegetables</b>				
<b>Tomato</b>	<ul style="list-style-type: none"> <li>• Drain the excess water as soon as possible</li> <li>• Spray Urea 2% solution 2-3 times.</li> <li>• Topdressing of booster dose of 12 kg MOP + 30 kg Urea per acre as soon as possible.</li> <li>• Gap filling may be taken up if the plants are two weeks old and sowing window is still available for the crop.</li> <li>• In case of severe damage (considered as complete economical loss), and the contingency period is between June to August, sowing of best alternative crop must be taken up.</li> </ul>	<ul style="list-style-type: none"> <li>• Drain the excess water as soon as possible</li> <li>• Spray Urea 2% solution 2-3 times.</li> <li>• Topdressing of booster dose of 10 kg MOP + 30 kg Urea per acre as soon as possible.</li> </ul>	<ul style="list-style-type: none"> <li>• Drain the excess water as soon as possible</li> <li>• Harvest the marketable fruits in a clear sunny day'</li> </ul>	<ul style="list-style-type: none"> <li>• Store the harvested fruits in well ventilated place temporarily before it can be marketed.</li> <li>• Market the fruits as soon as possible.</li> </ul>
<b>Brinjal</b>	-do-	-do-	-do-	-do-
<b>Chillies</b>	<ul style="list-style-type: none"> <li>• Drain the excess water as soon as possible</li> <li>• Spray Urea 2% solution 2-3 times.</li> <li>• Topdressing of booster dose of 15 kg MOP + 30 kg Urea per acre as</li> </ul>	<ul style="list-style-type: none"> <li>• Drain the excess water as soon as possible</li> <li>• Spray Urea 2% solution 2-3 times.</li> <li>• Topdressing of booster dose of 15 kg MOP + 30 kg Urea per acre as</li> </ul>	<ul style="list-style-type: none"> <li>• Drain the excess water as soon as possible</li> <li>• Harvest the matured fruits in a clear sunny day.</li> </ul>	<ul style="list-style-type: none"> <li>• Dry the pods on concrete floor immediately after the appearance of sunlight (or).</li> <li>• Use poly house solar driers for quick drying</li> <li>• Grade the pods and market as</li> </ul>



	<p>soon as possible.</p> <ul style="list-style-type: none"> <li>• Gap filling may be taken up if the plants are two weeks old and sowing window is still available for the crop.</li> <li>• In case of severe damage (considered as complete economical loss), and the contingency period is between June to August, sowing of best alternative crop must be taken up.</li> </ul>	soon as possible.		<p>soon as possible.</p> <ul style="list-style-type: none"> <li>• Do not store such produce for long periods.</li> </ul>
<b>Potato</b>	-do-	-do-	-do-	-do-
<b>Beans</b>	<ul style="list-style-type: none"> <li>• Drain the excess water as soon as possible</li> <li>• Spray Urea 2% solution 2-3 times.</li> <li>• Topdressing of booster dose of 12 kg MOP + 30 kg Urea per acre as soon as possible.</li> <li>• Gap filling may be taken up if the plants are two weeks old and sowing window is still available for the crop.</li> <li>• In case of severe damage (considered as complete economical loss), go for resowing of same crop or best alternative crop must be taken up.</li> </ul>	<ul style="list-style-type: none"> <li>• Drain the excess water as soon as possible</li> <li>• Spray KNO<sub>3</sub> 1% or Urea 2% solution 2-3 times.</li> <li>• Topdressing of booster dose of 10 kg MOP + 30 kg Urea per acre as soon as possible.</li> </ul>	<ul style="list-style-type: none"> <li>• Drain the excess water as soon as possible</li> <li>• Spray KNO<sub>3</sub> 1% or Urea 2% solution 2-3 times.</li> <li>• Harvest the mature produce as soon as possible.</li> </ul>	<ul style="list-style-type: none"> <li>• Store the produce in well ventilated place temporarily before it can be marketed.</li> <li>• Market the produce as soon as possible.</li> </ul>

**2.3 Floods**

**: Not applicable**

## 2.4 Extreme events: Heat wave / Cold wave/Frost/ Hailstorm /Cyclone

Extreme event type	Suggested contingency measure <sup>r</sup>			
	Seedling / nursery stage	Vegetative stage	Reproductive stage	At harvest
<b>Cyclone</b>				
<b>Horticulture Fruits</b>				
<b>Mango</b>	<ul style="list-style-type: none"> <li>If the damage is severe, go for resowing</li> </ul>	<ul style="list-style-type: none"> <li>Trees fallen on ground may be lifted and earthed up</li> <li>Broken and damaged branches may be pruned and applied with Bordeaux paste</li> </ul>	<ul style="list-style-type: none"> <li>Tress fallen on ground may be lifted and earthed up</li> <li>Broken and damaged branches may be pruned and applied with Bordeaux paste</li> </ul>	<ul style="list-style-type: none"> <li>Drain the excess water as soon as possible.</li> <li>Harvest the mature fruits as soon as possible.</li> <li>Collect the fallen fruits and sell immediately or go for preparation of processed products.</li> <li>If to store, store the produce in well ventilated place temporarily before it can be marketed.</li> </ul>
<b>Banana</b>		<ul style="list-style-type: none"> <li>Wind damaged plants should be pruned using disinfected secateurs and cut ends must be smeared with Bordeaux paste</li> <li>Drain the excess water as soon as possible</li> <li>The fallen tress may be cut leaving two suckers</li> <li>Inter-cultivate the soil with gorru for aeration.</li> <li>Spray 0.5 % KNO<sub>3</sub> or Urea 2% solution 2-3 times.</li> <li>Topdressing of booster dose of 80 g MOP + 100 g Urea per plant at two to three times intervals.</li> <li>Gap filling may be taken up if the plants are two weeks old and sowing window is still available for the crop.</li> </ul>	<ul style="list-style-type: none"> <li>Wind damaged plants should be pruned using disinfected secateurs and cut ends must be smeared with Bordeaux paste</li> <li>Drain the excess water as soon as possible</li> <li>The fallen tress may be cut leaving two suckers</li> <li>Topdressing of booster dose of 80 g MOP + 100 g Urea per plant at two to three times intervals</li> <li>Mature bunches on the completely damaged plants be covered with Leaves and harvested with in 15-20days</li> </ul>	<ul style="list-style-type: none"> <li>Wind damaged plants should be pruned using disinfected secateurs and cut ends must be smeared with Bordeaux paste</li> <li>Drain the excess water as soon as possible.</li> <li>Harvest the mature bunches as soon as possible. use ripening chambers for quick and uniform ripening</li> <li>Store the harvested bunches in well ventilated place temporarily before it can be marketed.</li> <li>Market the produce as soon as possible.</li> <li>3-4 foliar application of KNO<sub>3</sub> on immature/developing bunches and leaves at weekly intervals.</li> <li>Staking with bamboo for support</li> </ul>

		<ul style="list-style-type: none"> <li>If the age of the plant is less than three months and submergence up to three feet better to replant the garden.</li> </ul>		
<b>Horticulture Vegetables</b>				
<b>Tomato</b>	<ul style="list-style-type: none"> <li>Grow nursery on raised beds.</li> <li>Drench the nursery beds with COC 3 g per litre to prevent damping off.</li> <li>If damage is more go for re sowing</li> </ul>	<ul style="list-style-type: none"> <li>Uprooted plants may be lifted and earthed up</li> <li>Drain the excess water as soon as possible</li> <li>Gap filling must be done immediately</li> <li>Spray Urea 2% solution 2-3 times.</li> <li>Topdressing of booster dose of 15 kg MOP + 30 kg Urea per acre as soon as possible.</li> <li>If damage is more ,go for replanting</li> </ul>	<ul style="list-style-type: none"> <li>Uprooted plants may be lifted and earthed up</li> <li>Drain the excess water as soon as possible</li> <li>Spray Urea 2% solution 2-3 times.</li> <li>Topdressing of booster dose of 15 kg MOP + 30 kg Urea per acre as soon as possible.</li> </ul>	<ul style="list-style-type: none"> <li>Drain the excess water as soon as possible.</li> <li>Harvest the mature produce as soon as possible.</li> <li>Store the produce in well ventilated place temporarily before it can be marketed.</li> <li>Market the produce as soon as possible.</li> </ul>
<b>Chilies</b>	<ul style="list-style-type: none"> <li>Grow nursery on raised beds.</li> </ul>	<ul style="list-style-type: none"> <li>Uprooted plants may be lifted and earthed up</li> <li>Drain the excess water as soon as possible</li> <li>Gap filling must be done immediately</li> <li>If damage is more go for replanting Spray Urea 2% solution 2-3 times.</li> <li>Topdressing of booster dose of 15 kg MOP + 30 kg Urea per acre as soon as possible.</li> </ul>	<ul style="list-style-type: none"> <li>Uprooted plants may be lifted and earthed up</li> <li>Drain the excess water as soon as possible</li> <li>Spray Urea 2% solution 2-3 times.</li> <li>Topdressing of booster dose of 15 kg MOP + 30 kg Urea per acre as soon as possible.</li> </ul>	<ul style="list-style-type: none"> <li>Drain the excess water as soon as possible.</li> <li>Dry the pods on concrete floor/ tarpaulins immediately</li> <li>use poly house solar driers for quick drying</li> <li>Remove the pest and disease infected pods.</li> </ul>
<b>Brinjal</b>	<ul style="list-style-type: none"> <li>Grow nursery on raised beds.</li> <li>Drench the nursery beds with COC 3 g per litre to prevent damping off</li> <li>If damage is more go for replanting</li> </ul>	<ul style="list-style-type: none"> <li>Uprooted plants may be lifted and earthed up</li> <li>Drain the excess water as soon as possible</li> </ul>	<ul style="list-style-type: none"> <li>Uprooted plants may be lifted and earthed up</li> <li>Drain the excess water as soon as possible</li> </ul>	<ul style="list-style-type: none"> <li>Drain the excess water as soon as possible.</li> <li>Harvest the mature produce as soon as possible.</li> </ul>

		<ul style="list-style-type: none"> <li>• Gap filling must be done immediately</li> <li>• Spray Urea 2% solution 2-3 times.</li> <li>• Topdressing of booster dose of 12 kg MOP + 30 kg Urea per acre as soon as possible.</li> <li>• If damage is more go for replanting</li> </ul>	<ul style="list-style-type: none"> <li>• Gap filling must be done immediately</li> <li>• Spray Urea 2% solution 2-3 times.</li> <li>• Topdressing of booster dose of 12 kg MOP + 30 kg Urea per acre as soon as possible.</li> <li>• Spray COC 30 g in 10 liters of water, 2-3 times against leaf spots.</li> </ul>	<ul style="list-style-type: none"> <li>• Store the produce in well ventilated place temporarily before it can be marketed.</li> <li>• Market the produce as soon as possible.</li> <li>• Collect the fruits and sell immediately or go for preparation of processed products.</li> </ul>
<b>Potato</b>	<ul style="list-style-type: none"> <li>• Grow nursery on raised beds.</li> </ul>	<ul style="list-style-type: none"> <li>• Drain the excess water as soon as possible</li> <li>• Spray Urea 2% solution once.</li> </ul>	<ul style="list-style-type: none"> <li>• Drain the excess water as soon as possible</li> <li>• Spray Urea 2% solution once.</li> </ul>	<ul style="list-style-type: none"> <li>• Drain the excess water as soon as possible.</li> <li>• Harvest the mature produce as soon as possible.</li> <li>• Store the produce in well ventilated place temporarily before it can be marketed.</li> <li>• Market the produce as soon as possible.</li> </ul>
<b>Beans</b>		<ul style="list-style-type: none"> <li>• Drain the excess water as soon as possible</li> <li>• Spray Urea 2% solution 2-3 times.</li> <li>• Topdressing of booster dose of 12 kg MOP + 30 kg Urea per acre as soon as possible.</li> <li>• Gap filling must be done immediately</li> <li>• If damage is more, go for resowing with the same crop or grow alternate crops.</li> </ul>	<ul style="list-style-type: none"> <li>• Uprooted plants may be lifted and earthed up</li> <li>• Drain the excess water as soon as possible</li> <li>• Spray Urea 2% solution 2-3 times.</li> <li>• Topdressing of booster dose of 12 kg MOP + 30 kg Urea per acre as soon as possible.</li> <li>• If damage is more, go for replanting</li> </ul>	<ul style="list-style-type: none"> <li>• Drain the excess water as soon as possible.</li> <li>• Harvest the mature pods as soon as possible.</li> <li>• Store the pods in well ventilated place temporarily before it can be marketed.</li> <li>• Market the pods as soon as possible.</li> </ul>

## Contingent strategies for Livestock, Poultry & Fisheries

### 2.5.1 Livestock

#### Detailed contingent strategies for Livestock, Poultry & Fisheries

	Suggested contingency measures		
	Before the event	During the event	After the event
<b>Drought</b>			
Feed and Fodder availability	<ul style="list-style-type: none"> <li>• Establishment of silvi-pastoral system in CPRs with <i>Stylosanthus hamata</i> and <i>Cenchrus ciliaris</i> as grass with <i>Leucaena leucocephala</i> as tree component (or suggest suitable similar system to your district)</li> <li>• Top dressing of N in 2-3 split doses @ 20-25 kg N/ha in common property resources (CPRs) like temple lands, panchayat lands or private property resources (PPRs) like waste and degraded lands with the monsoon pattern for higher biomass production</li> <li>• In chronically drought prone districts promote cultivation of short duration fodder crops of sorghum/bajra/maize (UP chari, MP chari, HC-136, HD-2, GAIN T BAJRA, L-74, K-677, Ananad/African Tall, Kisan composite, Moti, Manjari, B1-7)</li> <li>• Chopping of fodder should be made as mandatory in every village through supply and establishment of good quality chaff cutters.</li> <li>• Avoid burning of maize stover</li> <li>• Harvesting and collection of perennial vegetation particularly grasses which grow during monsoon</li> <li>• Proper drying, bailing and densification of harvested grass from previous season</li> </ul>	<ul style="list-style-type: none"> <li>• Harvest and use biomass of dried up crops (Groundnut, Sorghum, Bajra, Maize, Rice, Horse gram) material as fodder.</li> <li>• Harvest the tree fodder (Neem, Subabul, Acacia, Pipal etc) and unconventional feeds resources available and use as fodder for livestock (LS).</li> <li>• Available feed and fodder should be cut from CPRs and stall fed in order to reduce the energy requirements of the animals</li> <li>• UMMB, hay, concentrates and vitamin &amp; mineral mixture should be transported to the needy areas from the reserves at the district level initially and latter stages from the near by districts. Educate the farmers about mixing groundnut haulms and paddy straw (1:3) before feeding the animals. All the hay should be enriched with 2% Urea molasses solution or 1% common salt solution and fed to LS</li> <li>• Herd should be split and supplementation should be given only to the highly productive and breeding animals</li> <li>• Provision of emergency grazing/feeding (Cow-calf camps or other special arrangements to protect high productive &amp; breeding stock)</li> <li>• Available kitchen waste should be mixed with dry fodder while feeding</li> <li>• Arrangements should be made for mobilization of</li> </ul>	<ul style="list-style-type: none"> <li>• Concentrates supplementation should be provided to all the animals.</li> <li>• The farmers may be advised to practice “flushing the stock” to recoup</li> <li>• Short duration fodder crops should be sown in unsown and crop failed areas where no further routine crop sowing is not possible</li> <li>• Supply of quality seeds of fodder varieties and motivating the farmers to cultivate at least 10% of their land holding for fodder production</li> </ul>

	<ul style="list-style-type: none"> <li>• Creation of permanent fodder, feed and fodder seed banks in all drought prone areas</li> </ul>	<p>small ruminants across the districts where no drought exits with subsidized road/rail transportation and temporary shelter provision for the shepherds</p> <ul style="list-style-type: none"> <li>• Unproductive livestock should to be culled during severe drought</li> <li>• Create transportation and marketing facilities for the culled and unproductive animals</li> <li>• Supply silage and or hay on subsidized rates to the farmers having high productive stock</li> <li>• Subsidized loans should be provided to the livestock keepers</li> </ul>	
<b>Heat wave</b>	<p>As the district being chronically prone to heat waves the following permanent measures are suggested</p> <ol style="list-style-type: none"> <li>Plantation of trees like Neem, Pipal, Subabul around the shed</li> <li>Spreading of husk/straw/coconut leaves over the roof top of the shed</li> <li>Water sprinklers / foggers in the animal shed</li> <li>Application of white reflector paint on the roof to reduce thermal radiation effect</li> </ol>	<ul style="list-style-type: none"> <li>• Allow the animals preferably early in the morning or late in the evening for grazing during heat waves</li> <li>• Feed green fodder/silage / concentrates during day time and roughages / hay during night time in case of heat waves</li> <li>• Put on the foggers / sprinklers during heat waves in case of high productive animals</li> <li>• In severe cases, vitamin 'C' (5-10ml per litre) and electrolytes (Electral powder @ 20g per litre) should be added in water during severe heat waves.</li> </ul>	<ul style="list-style-type: none"> <li>• Feed the animals as per routine schedule</li> <li>• Allow the animals for grazing (normal timings)</li> </ul>
<b>Health and Disease management</b>	<ul style="list-style-type: none"> <li>• Timely vaccination (as per enclosed vaccination schedule) against all endemic diseases</li> <li>• Procurement of emergency medicines and medical kits</li> <li>• Surveillance and disease monitoring network to be established at Joint Director (Animal Husbandry) office in the district</li> </ul>	<ul style="list-style-type: none"> <li>• Carryout deworming to all animals entering into relief camps</li> <li>• Identification and quarantine of sick animals</li> <li>• Constitution of Rapid Action Veterinary Force</li> <li>• Performing ring vaccination (8 km radius) in case of any outbreak</li> <li>• Restricting movement of livestock in case of any epidemic</li> <li>• Rescue of sick and injured animals and their treatment</li> </ul>	<ul style="list-style-type: none"> <li>• Conducting mass animal health camps</li> <li>• Conducting fertility camps</li> <li>• Mass deworming camps</li> <li>• Farmers should be advised to breed their milch animals during July-September so that the peak milk production does not coincide with mid summer</li> <li>• Keeping vigil on disease outbreak</li> </ul>

<b>Insurance</b>	<ul style="list-style-type: none"> <li>• Encouraging insurance of livestock</li> </ul>	<ul style="list-style-type: none"> <li>• Listing out the details of the dead animals</li> </ul>	<ul style="list-style-type: none"> <li>• Submission for insurance claim and availing insurance benefit</li> <li>• Purchase of new productive animals</li> </ul>
<b>Drinking water</b>	<ul style="list-style-type: none"> <li>• Identification of water resources</li> <li>• Rain water harvesting and create water bodies/watering points (when water is scarce use only as drinking water for animals)</li> <li>• Construction of drinking water tanks in herding places/village junctions/relief camp locations</li> </ul>	<ul style="list-style-type: none"> <li>• Restrict wallowing of animals in water bodies/resources</li> </ul>	<ul style="list-style-type: none"> <li>• Bleach (0.1%) drinking water / water sources</li> <li>• Provide clean drinking water</li> </ul>

#### **Vaccination programme for cattle and buffalo**

<b>Disease</b>	<b>Age and season at vaccination</b>
Anthrax	In endemic areas only, Feb to May
Haemorrhagic septicaemia (HS)	May to June
Black quarter (BQ)	May to June
Foot and mouth disease (FMD)	July/August and November/December

#### **Vaccination schedule in small ruminants (Sheep & Goat)**

<b>Disease</b>	<b>Season</b>
Foot and mouth disease (FMD)	Preferably in winter / autumn
Peste des Petits Ruminants (PPR)	Preferably in January
Black quarter (BQ)	May / June
Enterotoxaemia (ET)	May
Haemorrhagic septicaemia (HS)	March / June
Sheep pox (SP)	November

## 2.5.2 Poultry

	Suggested contingency measures		
	Before the event <sup>a</sup>	During the event	After the event
<b>Drought</b>			
Shortage of feed ingredients	Storing of house hold grain like maize, broken rice, bajra etc, in to use as feed in case of severe drought	<ul style="list-style-type: none"> <li>• Supplementation only for productive birds with house hold grain</li> <li>• Supplementation of shell grit (calcium) for laying birds</li> <li>• Culling of weak birds</li> </ul>	Supplementation to all survived birds
Drinking water		Use water sanitizers or offer cool drinking water	
Health and disease management	Culling of sick birds. Deworming and vaccination against RD and fowl pox	Mixing of Vit. A,D,E, K and B-complex including vit C in drinking water (5ml in one litre water)	<ul style="list-style-type: none"> <li>• Hygiene and sanitation of poultry house</li> <li>• Disposal of dead birds by burning / burying with lime powder in pit</li> </ul>
<b>Heat wave</b>			
Shelter/environment management	Provision of proper shelter with good ventilation	<ul style="list-style-type: none"> <li>• In severe cases, foggers/water sprinklers/wetting of hanged gunny bags should be arranged</li> <li>• Don't allow for scavenging during mid day</li> </ul>	Routine practices are followed
Health and disease management	Deworming and vaccination against RD and fowl pox	<ul style="list-style-type: none"> <li>• Supplementation of house hold grain</li> <li>• Provide cool and clean drinking water with electrolytes and vit. C (5-10 ml per litre)</li> <li>• In hot summer, add anti-stress probiotics in drinking water or feed (Reestobal etc., 10-20ml per litre)</li> </ul>	Routine practices are followed



### 2.5.3 Fisheries/ Aquaculture

	Suggested contingency measures		
	Before the event <sup>a</sup>	During the event	After the event
<b>1) Drought</b>			
<b>A. Capture</b>			
Inland			
(i) Shallow water depth due to insufficient rains/inflow	Stocking of advanced fingerlings in half or even less than the normal stocking density or stocking of common carp seed	Immediate harvesting or decreasing the density commensurate with the water quantity.	De weeding and deepening of tank to ensure retention of water for a longer period and provision of employment under MGNREGP
(ii) Changes in water quality	Regular monitoring of water quality parameters and application of geolites, soil probiotics, etc to maintain water quality	Immediate harvesting or changing the water quality by application of sanitisers.	Removal of top layer, deep ploughing of tank and application of lime
(iii) Any other			
<b>B. Aquaculture</b>			
(i) Shallow water in ponds due to insufficient rains/inflow	Crop holiday or going for stocking of yearlings by reducing the density according to availability of water	Harvesting of fish and leaving the pond fallow till next season	Removal of top layer, deep ploughing of tank and application of lime
(ii) Impact of salt load build up in ponds / change in water quality	Stocking of salinity tolerant fish / shrimp, application of geolites and other buffers	Frequent change of water with fresh water	Frequent draining of the pond with fresh water, removal of top layers
(iii) Any other			
<b>2) Floods</b>			
<b>A. Capture</b>			
Inland			
(i) Average compensation paid due to loss of human life	Shifting the people from low lying areas to relief camps	Deployment of specially trained persons for rescue operations by providing life bouys, jackets, ropes, boats, etc	Payment sufficient ex-gratia to the families
(ii) No. of boats / nets/damaged	Shifting and relocating boats and nets to safer places when warnings are issued, to avoid fishing, etc	Shifting and relocating boats and nets to safer places	Assessment of damages to boats and nets and provision of boats and nets for restoration of livelihoods

(iii) No.of houses damaged	Avoidance of construction of houses in flood prone ares, construction of pucca houses at elevated places,	Shifting of people by relief boats to the relief camps	Assessment of damages to houses and provision of compensation in case of partial damage and sanction house under existing schemes
(iv) Loss of stock	Avoidance of surface species like catla, silver carp since they are vulnerable in tanks prone to floods, erection of nets across the spill way or just beyond it	Erection of nets at spill ways	Taking up compensatory stocking
(v) Changes in water quality		When dissolved oxygen levels go down, aerators, recirculation of water, etc are to be attempted to maintain DO levels, going for partial harvest, etc	
(vi) Health and diseases	Sometimes there may be heavy accumulation of nutrients and organic matter.	There may be break out of Hemorrhagic septicemia. Addition of antibiotics like Chloro Tetra Cycline or Oxy Tetra Cycline to the feed to control the disease	Removal of weeds, top layer of soil, deep ploughing of tank and application of lime, exposing to sun light
<b>B. Aquaculture</b>			
(i) Inundation with flood water	Raising and rivetting the bunds, construction of spill way to release excess water, erection of nets to avoid escape of fish	Continuous pumping of excess water, erection of nets low lying areas	Strengthening of bunds, excavating channels along the sides of the ponds for free escape of water
(ii) Water continuation and changes in water quality		When dissolved oxygen levels go down, aerators, recirculation of water, etc are to be attempted to maintain DO levels, going for partial harvest, etc	
(iii) Health and diseases	Sometimes there may be heavy accumulation of nutrients and organic matter.	There may be break out of Hemorrhagic septicemia. Addition of antibiotics like Chloro Tetra Cycline or Oxy Tetra Cycline to the feed to control the disease	Removal of weeds, top layer of soil, deep ploughing of tank and application of lime, exposing to sun light
(iv) Loss of stock and inputs (feed, chemicals etc)	Advance erection of nets, strengthening of bunds harvesting or reducing the density	Suspension of feeding, application of organic manures	Compensatory stocking, assessment of values and payment of subsidy on inputs

(v) Infrastructure damage (pumps, aerators, huts etc)	Insuring pond, accessories, etc., Shifting of aerators, pumps soon after warnings are issued	Relocating pumps, aerators to elevated places	Assessment of damages and provision of them on subsidy
<b>3. Cyclone / Tsunami</b>			
<b>A. Capture</b>			
Inland	Erection of protective nets across the surplus weir to prevent fish loss due to overflows	Continuous monitoring to prevent or minimise escape of fish along with surplus water	Compensatory stocking of seed
<b>B. Aquaculture</b>			
(i) Overflow / flooding of ponds	The design of the pond must be in such a manner as to bail out surplus water and to prevent loss of standing crop	Continuous monitoring to prevent or minimise escape of fish along with surplus water	Compensatory stocking of seed
(ii) Changes in water quality (fresh water / brackish water ratio)	Recirculation water to replenish and ensure sufficient dissolved oxygen levels in the pond. Maintenance of salinity levels by pumping in water from creeks.	Continuation of the same process.	Restoration of physical and chemical parameters
(iii) Health and diseases	Removal of stress causing factors to maintain the health of the animal	Removal of stress causing factors to maintain the health of the animal	Restoration of physical and chemical parameters
(iv) Loss of stock and inputs (feed, chemicals etc)	Preventive nets must be erected to minimise loss of stock	Continuation of the same process.	Compensatory stocking of seed
(v) Infrastructure damage (pumps, aerators, shelters/huts etc)	Pumps, aerators, etc must be protected by moving them to safe locations	To avoid use of aerators, pumps and other appliances	Overhauling of the equipment to prevent from being damaged
<b>4. Heat wave and cold wave</b>			
<b>A. Capture Inland</b>			
	Monitoring dissolved oxygen levels	Monitoring dissolved oxygen levels	No intervention
<b>B. Aquaculture</b>			
(i) Changes in pond environment (water quality)	Reduction of biomass by partial harvest in the event of heat as the DO levels will be very low.	Avoidance of fishing	Compensatory stocking of seed and restoration of all physical and chemical parameters
(ii) Health and Disease management	Removal of stress causing factors to maintain the health of the animal	Removal of stress causing factors to maintain the health of the animal	Compensatory stocking of seed and restoration of all physical and chemical parameters