

**State: ODISHA**

**Agriculture Contingency Plan for District: GAJAPATI**

<b>1.0 District Agriculture profile</b>				
<b>1.1</b>	<b>Agro-Climatic/Ecological Zone</b>			
	Agro Ecological Sub Region (ICAR)	Sub-Humid to Humid Eastern and South Eastern Upland (12.2)		
	Agro-Climatic Zone (Planning Commission)	East Coast plains and Hill Region (XI)		
	Agro Climatic Zone (NARP)	East And South Eastern Coastal Plain Zone (OR-4)		
	List all the districts falling under the NARP Zone* (*>50% area falling in the zone)	Kandhamal, Rayagada, Gajapati, parts of Ganjam and Koraput.		
	Geographic coordinates of district headquarters	<b>Latitude</b>	<b>Longitude</b>	<b>Altitude</b>
		18 <sup>o</sup> 52'41.57" N	84 <sup>o</sup> 08'26.59" E	1035 m MSL
	Name and address of the concerned ZRS/ ZARS/ RARS/ RRS/ RRTTS	RRS, Ratanpur, Berhampur, Ganjam  RRTTS, G. Udayagiri, Kandhamal		
	Mention the KVK located in the district with address	Krishi Vigyan Kendra, Gajapati, R.Udayagiri, PIN-761016		
Name and address of the nearest Agromet Field Unit (AMFU, IMD) for agro-advisories in the Zone	Gopalpur-on-sea, Dist.: Ganjam			

1.2	Rainfall	Normal RF (mm)	Normal Rainy days (number)	Normal Onset	Normal Cessation
	SW monsoon (June-Sep):	922.1	47	2 <sup>nd</sup> Week of June	4 <sup>th</sup> Week of September
	NE Monsoon(Oct-Dec):	256.1	9		
	Winter (Jan- Feb)	72.4	4	-	-
	Summer (March-May)	173.0	10	-	-
	Annual	1423.6	71	-	-

1.3	Land use pattern of the district (latest statistics)	Geographical area	Cultivated 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
	Area ('000 ha)	433	76.	247	12	12	4	8	68	2	6

Source: Orissa Agriculture Statistics (2008-09)

1.4	Major Soils (common names like red sandy loam deep soils (etc.,))*	Area ('000 ha)	Percent (%) of total
	Red Loamy soils	288	58.1
	Laterite Soils	110	25.4
	Black soils	97	22.4
	Others (specify):		

1.5	Agricultural land use	Area ('000 ha)	Cropping intensity %
	Net sown area	74.00	192
	Area sown more than once	68.0	
	Gross cropped area	142.0	

<b>1.6</b>	<b>Irrigation</b>	Area ('000 ha)		
	Net irrigated area	23.9		
	Gross irrigated area	33.5		
	Rainfed area	50.0		
	<b>Sources of Irrigation</b>	Number	Area ('000 ha)	Percentage of total irrigated area
	Canals			
	Tanks	-	-	-
	Open wells	696	-	-
	Bore wells			
	Lift irrigation schemes	326	9.3	
	Micro-irrigation		23.9	28.74
	Other sources (DW/Check Dam/Farm pond)	83	7.4	
	Total Irrigated Area		40.7	
	Pump sets	265		
	No. of Tractors	31		
	<b>Groundwater availability and use* (Data source: State/Central Ground water Department /Board)</b>	No. of blocks/ Tehsils	(%) area	Quality of water (specify the problem such as high levels of arsenic, fluoride, saline etc)
	Over exploited	Nil	-	-
	Critical	Nil	-	-
	Semi- critical	Nil	-	-
	Safe	7	100	In general the quality of ground water is good except at few locations where fluoride content exceeds the permissible limit (>1.5 ppm)
Wastewater availability and use				
Ground water quality	In general the quality of ground water is good except at few locations where fluoride content exceeds the permissible limit (>1.5 ppm)			
*over-exploited: groundwater utilization > 100%; critical: 90-100%; semi-critical: 70-90%; safe: <70%				

**1.7 Area under major field crops & horticulture (as per latest figures) (2008-09)**

1.7	Major field crops cultivated	Area ('000 ha)							
		<i>Kharif</i>			<i>Rabi</i>			Summer	Grand total
		Irrigated	Rainfed	Total	Irrigated	Rainfed	Total		
Paddy	19.5	16.1	35.7	0.2	--	0.2	--	36.0	
Maize	0.6	7.7	8.3	0.1	--	0.1	--	8.5	
Ragi	0.5	9.8	10.4	1.1	--	1.1	--	11.5	
Arhar	--	5.0	5.0	--	--	--	--	5.0	
Sesamum	--	0.9	0.9	--	5.27	5.2	--	6.2	
Total Fibres	-	0.4	0.4	--	--	--	--	0.4	

S.No.	Horticulture crops - Fruits	Area ('000 ha)
		Total
	Mango	4.7
	Guava	0.3
	Citrus	1.8
	Sapota	0.1
	<b>Horticulture crops - Vegetables</b>	<b>Total</b>
	Sweet Potato	2.4

Onion	0.3
Other Vegetables	15.6
<b>Total</b>	<b>18.4</b>
<b>Condiments and Spices</b>	<b>Total</b>
Chilli	1.8
Coriander	0.1
Garlic	0.0
Turmeric	0.6
Ginger	0.4
<b>Plantation crops</b>	<b>Total</b>
Cashewnut	0.5
<b>Fodder crops</b>	<b>Total</b>
NB-21 (Perennial), Kharif- Bajra, Guinea grass, Hybrid Napier	0.16
<b>Total fodder crop area</b>	<b>0.16</b>
<b>Grazing land</b>	<b>11,990</b>
<b>Sericulture etc</b>	<b>0.12</b>

<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)	131.2	87.2	218.5			
	Improved cattle	-	-	-			
	Crossbred cattle	7.3	7.0	14.3			
	Non descriptive Buffaloes (local low yielding)	14.4	9.4	23.8			
	Descriptive Buffaloes	0.4	0.5	0.9			
	Goat	35.7	72.2	107.9			
	Sheep	5.6	6.2	11.9			
	Others (Pig)	10.7	14.1	24.8			
	Commercial dairy farms (Number)						
<b>1.9</b>	<b>Poultry</b>	<b>No. of farms</b>	<b>Total No. of birds ('000)</b>				
	Commercial	-	359.7				
	Backyard	-	-				
<b>1.10</b>	<b>Fisheries</b> (Data source: Chief Planning Officer)						
	<b>A. Capture</b>						
	i) Marine (Data Source: Fisheries Department)	<b>No. of fishermen</b>	<b>Boats</b>		<b>Storage facilities (Ice plants etc.)</b>		
			Mechanized	Non-mechanized		Mechanized (Trawl nets, Gill nets)	Non-mechanized (Shore Seines, Stake & trap nets)
		8399	81	129	—	129	
	ii) Inland (Data Source: Fisheries Department)	<b>No. Farmer owned ponds</b>		<b>No. of Reservoirs</b>	<b>No. of village tanks</b>		
		2751		97	822		
	<b>B. Culture</b>						
			<b>Water Spread Area (ha)</b>	<b>Yield (t/ha)</b>	<b>Production ('000 tons)</b>		
	i) <b>Brackish water</b> (Data Source: MPEDA/ Fisheries Department)		—	—	—		
ii) <b>Fresh water</b> (Data Source: Fisheries Department)		2318.79	0.7765	1800.73			

### 1.11 Production and Productivity of major crops

1.11	Name of crop	Kharif		Rabi		Summer		Total		Crop residue as fodder ('000 tons)
		Production ('000 t)	Productivity (kg/ha)	Production ('000 t)	Productivity (kg/ha)	Production ('000 t)	Productivity (kg/ha)	Production ('000 t)	Productivity (kg/ha)	
<b>Major Field crops (Crops to be identified based on total acreage)</b>										
	Paddy	64.8	1812	0.28	995	--	--	65.0	1806	--
	Ragi	9.1	872	1.38	1198	--	--	10.4	904	--
	Arhar	3.9	795	--	--	--	--	--	--	--
	Sesamum	0.4	426	1.77	335	--	--	2.1	349	--
	Maize	14.1	1542	0.19	1498	--	--	14.3	1541	--
	Vegetables	109.8	10705	99.95	12189	--	--	209.7	11364	--
<b>Major Horticultural crops (Crops to be identified based on total acreage)</b>										
	Mango	5605	--	--	--	--	--	--	--	--
	Guava	2071	--	--	--	--	--	--	--	--
	Citrus	11750	--	--	--	--	--	--	--	--
	Sapota	613	--	--	--	--	--	--	--	--
	Banana	4814	--	--	--	--	--	--	--	--
	Papaya	399	--	--	--	--	--	--	--	--
	Pineapple	634	--	--	--	--	--	--	--	--
	Litchi	18	--	--	--	--	--	--	--	--

<b>1.12</b>	<b>Sowing window for 5 major field crops</b>	Rice	Ragi	Maize	Blackgram / Greengram	Groundnut/Sunflower
	Kharif- Rainfed	2 <sup>nd</sup> week of June-4 <sup>th</sup> week of July	3 <sup>rd</sup> week of June	4 <sup>th</sup> week of May-4 <sup>th</sup> week of June	1 <sup>st</sup> week of July-2 <sup>nd</sup> week of August	*2 <sup>nd</sup> week of June-2 <sup>nd</sup> week of July
	Kharif-Irrigated	2 <sup>nd</sup> week of June-4 <sup>th</sup> week of July				
	Rabi- Rainfed				1 <sup>st</sup> week of November-3 <sup>rd</sup> week of December	
	Rabi-Irrigated	1 <sup>st</sup> week of December- 1 <sup>st</sup> week of January	1 <sup>st</sup> week of October- 2 <sup>nd</sup> week of November			1st week of November-4 <sup>th</sup> week of December

Source: DAO, Paralakhemundi

<b>1.13</b>	<b>What is the major contingency the district is prone to? (Tick mark)</b>	<b>Regular</b>	<b>Occasional</b>	<b>None</b>
	Drought	--	✓	--
	Flood (Gosani & Kashi nagar)	✓	--	--
	Cyclone	--	✓	--
	Hail storm	--	✓	--
	Heat wave	✓	--	--
	Cold wave	--	--	✓
	Frost	--	--	✓
	Sea water intrusion	--	--	✓
	Pests and disease outbreak (specify) Sheath blight & Blast, Stem Borer(Summer)	✓	--	--

Source: DAO, Paralakhemundi

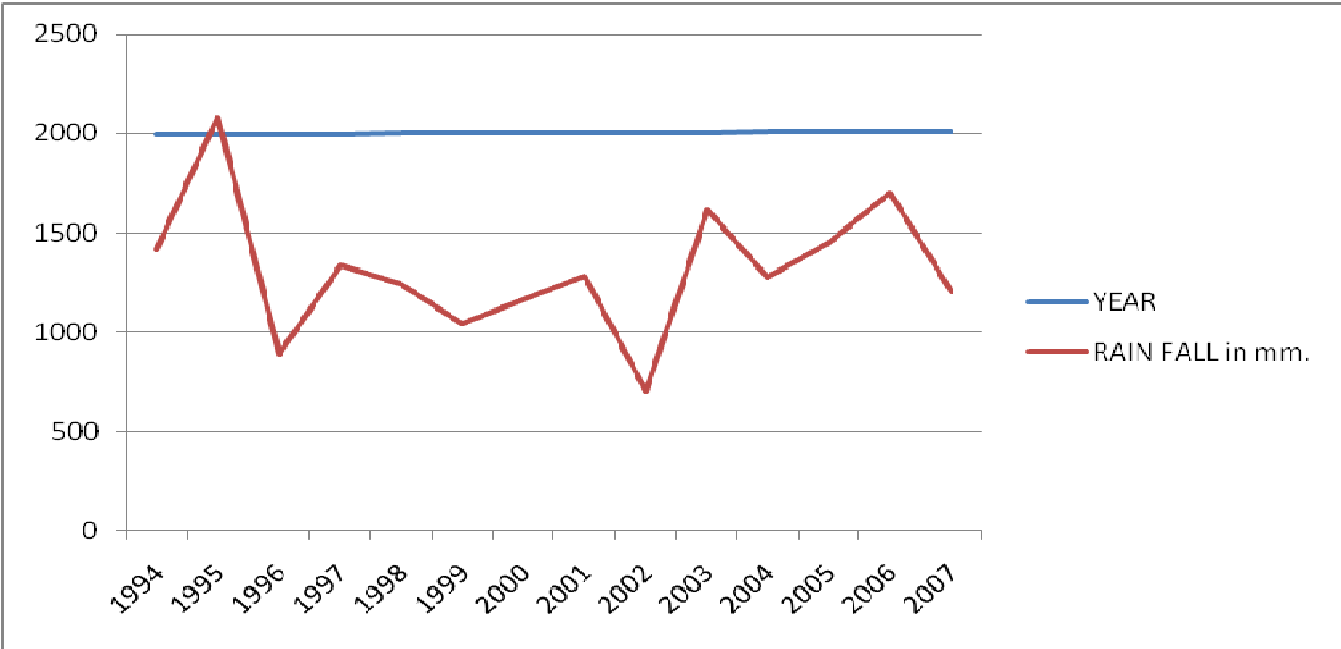
<b>1.14</b>	<b>Include Digital maps of the district for</b>	Location map of district within State as Annexure I	Enclosed: Yes
		Mean annual rainfall as Annexure 2	Enclosed: Yes
		Soil map as Annexure 3	Enclosed: Yes



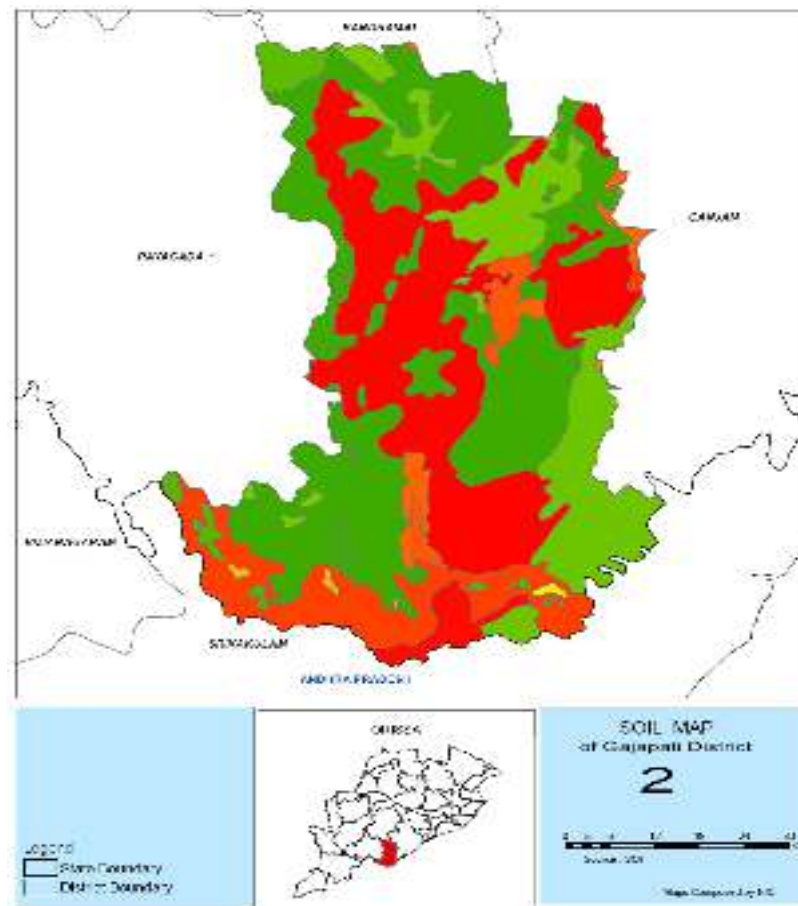


**LOCATION MAP OF GAJAPATI DISTRICT**

Rainfall in Gajpathi



### Soil Map of Gajpathi district



Source: (NBSS & LUP)

## 2.0 Strategies for weather related contingencies

### 2.1 Drought

#### 2.1.1 Rainfed situation

Condition			Suggested Contingency measures		
Early season drought (delayed onset)	Major Farming situation	Normal Crop / Cropping system	Change in crop / cropping system including variety	Agronomic measures	Remarks on Implementation
<b>Delay by 2 weeks</b>  <b>Normal onset: June 2<sup>nd</sup> wk</b>  <b>After 2 weeks delay : June 4<sup>th</sup> wk</b>	Red Loam soils, Low Rainfall, Moderate elevation (300-500mt.)  Rainfed Unbunded Uplands	Sole crops Rice	Varietal substitutions of drought tolerant varieties of the sole crops i.e Parjata, Khandagiri, Vandana, Heera, Adopt intercropping Rice+arhar(5:2), Maize+Cowpea (2:2), Maize+arhar (2:2) Rice+radish (4:2) Rice+Blackgram/Green gram (4:1)	<ul style="list-style-type: none"> <li>• Closer row and plant spacing,</li> <li>• In-situ rain water conservation, summer ploughing, interculture, tillage practices, weed control and unbunded uplands converted to banded uplands.</li> <li>• Apply full P, K and 25% N of recommended dose along with well decomposed organic matter for early seedling vigor.</li> <li>• Conservation furrow, Inter-cultivation and thinning to maintain plant population per unit area of the crop.</li> <li>• Store rain water through on farm water harvesting structures to use as life saving irrigation.</li> </ul>	<ul style="list-style-type: none"> <li>• Seed drill under RKVY</li> <li>• Supply of seeds through ATMA, OSSC and NFSM.</li> </ul>
		Maize	30R77, Hycell, Kargil, Allrounder, DHM 103, Kuji maka (Local), Navjot & 900mgold		
		Groundnut	Devi, Smruti, TG-38, TMV-2, AK-12-24, JL 24 & ICGS 11		
		Sesamum	Nirmala, Uma, Amrit, Vinayak & Prachi		
		Maize+Cowpea	Utkal Manika, SEB-2 & SGL-2.		
		Brinjal	Utkal Anushree, Utkal Madhuri, Utkal Jyoti & Utakal Keshari, Blue star		
		Chilli	Utkal Ava & Utkal Rashmi.		
		Turmeric	Rashmi, Subarna, Sudarshan Surama & Roma.		
		Pineapple	Queen & Kew		
		Sweet Potato	Gauri & Sankar		

Condition	Major Farming situation	Normal Crop / Cropping system	Suggested Contingency measures		
			Change in crop / cropping system including variety	Agronomic measures	Remarks on Implementation
Early season drought (delayed onset)		Cotton	Savita, Bunny, mallika, Sri Tulasi, Bhaskar		
		Yam bean	Rajendra, Mishri Kanda-1		
		Other crop	a. Castor: DCH 177, DCH 5, DCH 32, GCH 5, (Jyoti & Aruna) composite. b. Elephant foot Yam: Gajendra c. Yam: Hatikhoja, Padma, Local Elit. d. Colocasia: Muktakeshari, Sankha saru, Telia. e. Tapioca : Shree Jaya, Shree Lata		
	Black soil, Moderate Rainfall, Rainfed Medium lands	Sole crops: Rice	a. Growing of medium duration rice variety: Lalat, Jajati, Konark, Surendra, Pratikhya, MTU 1001 & Manaswini (120-130) days.	<ul style="list-style-type: none"> <li>• Apply full P, K and 25% N of recommended dose along with well decomposed organic matter for early seedling vigor.</li> <li>• In-situ rain water conservation.</li> </ul>	<ul style="list-style-type: none"> <li>• Supply of seeds through ATMA, OSSC and NFSM.</li> </ul>
		Sugarcane	b. CO-997 (Short duration-10 months) Sugarcane variety.		
		Other crop	<ul style="list-style-type: none"> <li>• Sunflower: KBSH 1 &amp; Modern</li> <li>• Blackgram: OBG 23, OBG 15, PU-30, T-9, Sarala, B-3-8-8.</li> <li>• Greengram: TARM-1, TARM-2</li> </ul>		
	Laterite soils, Moderate rainfall, Rainfed Low lands	Sole crops: Rice	Varieties like Puja, RGL-2537, Mahalaxmi (140-145) days  Green gram: TARM-1, TARM-2	<ul style="list-style-type: none"> <li>• Maintain more plant population for direct seeded rice.</li> <li>• In-situ rain water conservation.</li> </ul>	

Early season drought (delayed onset)	Major Farming situation	Normal Crop/cropping system	Change in crop/cropping system	Agronomic measures	Remarks on Implementation
<p><b>Delay by 4 weeks</b></p> <p><b>Normal onset: June 2<sup>nd</sup> week</b></p> <p><b>After 4 weeks delay : July 2<sup>nd</sup> week</b></p>	<p>Red loam, low rainfall, moderate elevation (300-500 m)</p> <p>Rainfed unbunded Uplands</p>	Sole crops : Rice	Varietal substitutions of drought tolerant varieties of the sole crops i.e Heera, Sneha, Vandana Adopt intercropping Rice+arhar(5:2) Maize+Cowpea (2:2) Maize+arhar (2:2) Rice+radish (4:2) Rice+Blackgram/Green gram (4:1)	<ul style="list-style-type: none"> <li>• If mortality is less than 50% than the crop may be gap filled.</li> <li>• In wide as well as close spaced line sown crops complete hoeing, weeding followed by ridging to the base of the crop rows at 20 days after sowing for <i>in-situ</i> moisture conservation.</li> <li>• <i>In situ</i> soil and water conservation measures like contour farming cover cropping, bunding, trenching, terracing, ridge and furrow method of planting.</li> <li>• Cultivate vegetables like okra, brinjal, tomato.</li> <li>• Complete hoeing, weeding followed by ridging to the base of the root crop at 20 DAS for in-situ moisture Conservation in vegetable and groundnut crop.</li> <li>• Apply life saving irrigation to maintain nursery seedlings.</li> <li>• Apply irrigation to other crops if needed</li> </ul>	
		Maize	30R77, Hycell, Kargil, Allrounder, DHM 103, Kuji maka (Local), Navjot & 900mgold.		
		Groundnut	Devi, Smruti, TG-38, TMV-2, AK-12-24, JL 24 & ICGS 11		
		Sesamum	Nirmala, Uma, Vinayak & Prachi		
		Brinjal	Utkal Anushree, Utkal Madhuri, & Utakal Keshari.		
		Tomato	Utkal Kumari, Utkal Urbashi, Utkal deepthi & Utkal Raja		
		Chilli	Utkal Ava & Utkal Rashmi		
		Turmeric	Roma, Surama, Subarna & Sudarshan		
		Pineapple	Queen & Kew		
		Ginger	Nadia, Vardhan, Suruchi, Suprava & Daringibadi local.		
		Sweet Potato	Gauri, Sankar & Local		
		Niger	Deomali, Utkal Niger-150,		
		Cotton	Savita, Bunny, Sri Tulashi, Bhaskar		
Other crop	<ul style="list-style-type: none"> <li>a. Yam bean: Rajendra, Mishri Kanda-1</li> <li>b. Elephant foot Yam: Gajendra</li> <li>c. Yam: Hatikhoja, Padma, Local Elit.</li> <li>d. Colocassia: Muktakeshi, Sankha saru, Telia.</li> </ul>				

Early season drought (delayed onset)	Major Farming situation	Normal Crop/cropping system	Change in crop/cropping system	Agronomic measures	Remarks on Implementation
			e. Tapioca : Shree Vijaya, Shree Lata Pulse : Blackgram, Greengram & Arhar		
	Black soils Moderate rainfall Rainfed Medium lands:	Sole crops : Rice Rice-Pulse/Oilseed	Medium duration rice variety: Lalat, Swarna, Jajati, Konark, Surendra, MTU 1001 & Manaswini (120-130) days  <ul style="list-style-type: none"> <li>• Sunflower: KBSH 1 &amp; Modern</li> <li>• Blackgram: OBG 23, OBG 15, PU-30, T-9, Sarala, B-3-8-8.</li> <li>• Greengram: OUM 11-5, PDM-139, TARM-1, PDM-11, Dhauri</li> <li>• Early Cauliflower (Kharif), Tomato</li> </ul>	<ul style="list-style-type: none"> <li>• If rice population is more than 50% carryout weeding and maintain the plant population by <i>Khelua</i> operation (removing and distributing the hills)</li> <li>• Raise community nursery of both short duration rice varieties at reliable water source to save further delay of transplanted rice.</li> <li>• Irrigate when needed</li> </ul>	
	Laterite soils, Moderate rainfall Rainfed Low lands	Sole crops: Rice	Varieties like Puja, Moti, Pratikhya, Padmini, RGL-2537, Mahalaxmi (140-145) days.	Emphasis should be given to in-situ rain water conservation, harvesting of excess runoff for recycling and ground water recharge.	

Early season drought (delayed onset)	Major Farming situation	Normal Crop/cropping system	Change in crop/cropping system	Agronomic measures	Remarks on Implementation
<p><b>Delay by 6 weeks</b></p> <p><b>Normal onset: June 2<sup>nd</sup> wk</b></p> <p><b>After 6 weeks delay : July 4<sup>th</sup> wk</b></p>	<p>Red Loam soils, Low Rainfall, Moderate elevation (300-500mt.) Rainfed Unbunded Uplands</p>	Sole crops under Rice	<p>Varietal substitutions of drought tolerant varieties of the non-paddy crops</p> <p>Heera, Saria (local). Sidhanta, Khandagiri &amp; Vandana (90-95) days. Adopt intercropping Rice+arhar(5:2) Maize+Cowpea (2:2) Maize+arhar (2:2) Yam+Maize (1:2) Rice+radish (4:2) Rice+Blackgram/ Greengram (4:1)</p>	<ul style="list-style-type: none"> <li>• If mortality is less than 50% than the crop may be gap filling.</li> <li>• In wide as well as close spaced line sown crops complete hoeing, weeding followed by ridging to the base of the crop rows at 20 days after sowing for <i>in-situ</i> moisture conservation.</li> <li>• <i>In situ</i> soil and water conservation measures like contour farming cover cropping, bunding, trenching, terracing, ridge and furrow method of planting.</li> <li>• Cultivate vegetables like okra, brinjal, tomato.</li> <li>• Complete hoeing, weeding followed by ridging to the base of the root crop at 20 DAS for in-situ moisture Conservation in vegetable and groundnut crop.</li> <li>• Do not top dress nitrogen in nursery</li> <li>• Apply life saving irrigation to maintain nursery seedlings.</li> </ul>	
		Maize	30R77, Hycell, Kargil, Allrounder, DHM 103, Kuji maka (Local), Navjot & 900mgold		
		Groundnut	Devi, Smruti, TG-38, TMV-2, AK-12-24, JL 24 & ICGS 11		
		Sesamum	Nirmala, Uma, Amrit, Vinayak & Prachi		
		Brinjal	Utkal Anushree, utkal Madhuri, & Utakal Keshari. Utkal Kumari, Utkal		
		Tomato	Urbashi, Utkal deepiti & Utkal Raja		
		Chill	Utkal Ava & Utkal Rashmi. Deomali, Utkal		
		Turmeric	Roma, Surama, Suguna, Subarna & Sudarshan		
		Pineapple	Queen & Kew		



Early season drought (delayed onset)	Major Farming situation	Normal Crop/cropping system	Change in crop/cropping system	Agronomic measures	Remarks on Implementation
		Ginger	Nadia, Vardhan, Suruchi, Suprava & Daringibadi local.		
		Sweet Potato	Gauri, Sankar & Local		
		Niger	Deomali, Utkal Niger-150, IGP 76		
		Cotton	Savita, Bunny, Sri Tulashi, Bhaskar		
		Niger	Niger-150		
		Other crop	Yam bean: Rajendra, Mishri Kanda-1 Elephant foot Yam: Gajendra Yam: Hatikhoja, Padma, Local Elit. Colocasia: Muktakeshi, Sankha saru, Telia. Tapioca : Shree Vijaya, Shree Lata Pulse : Blackgram, Greengram & Arhar		
	Black soils, Moderate Rainfall Rainfed Medium lands:	Sole crops: Rice	Growing of medium duration rice variety: Konark, Lalat, MTU 1001 (100-110) days	<ul style="list-style-type: none"> <li>• Close the drainage hole and check the seepage loss in direct sown medium land rice regularly.</li> <li>• Withhold N fertilizer (top dressing) application up to receipt of rainfall.</li> <li>• Transplanting upto 35 days old seedlings at closer spacing.</li> <li>• Spraying of 2% KCl + 0.1% Boron to black gram.</li> <li>• Foliar application of 2% urea at pre-flowering and flowering stage of green gram.</li> </ul>	

Early season drought (delayed onset)	Major Farming situation	Normal Crop/cropping system	Change in crop/cropping system	Agronomic measures	Remarks on Implementation
	Laterite soils, Moderate Rainfall Rainfed Low lands:	Sole crops Rice	MTU 1001, Konarka, Lalata & Kharabela (120-125) days.	<ul style="list-style-type: none"> <li>• Close the drainage hole and check the seepage loss in direct sown medium land rice regularly.</li> <li>• Withhold N fertilizer application till receipt of rainfall</li> <li>• Transplant seedlings up to 35 days old.</li> <li>• Follow need based plant protection measures against steam borer and blast.</li> <li>• Use tractor, power tiller, rotavator for speedy land preparation.</li> <li>• Follow close planting of 4-5 seedlings per hill.</li> <li>• Apply full P, K and 25 % N at the time of transplanting.</li> <li>• Apply life saving irrigation as and when necessary.</li> <li>• Seed treatment and proper plant protection measures should be taken to avoid germination failure and crop loss.</li> </ul>	

Early season drought (delayed onset)	Major Farming situation	Normal Crop/cropping system	Change in crop/cropping system	Agronomic measures	Remarks on Implementation
<p><b>Delay by 8 weeks</b></p> <p><b>Normal onset: June 2<sup>nd</sup> wk</b></p>	Red Loam soils, Low Rainfall, Moderate elevation (300-500mt.) Rainfed Unbunded Uplands	Sole crops under Rice	<p>Varietal substitutions of drought tolerant varieties of the non-paddy crops</p> <p>Heera, Saria (local). Sidhanta, Khandagiri &amp; Vandana (90-95) days. Adopt intercropping Rice+arhar(5:2)</p>	<ul style="list-style-type: none"> <li>• If mortality is less than 50% than the crop may be gap filling.</li> <li>• In wide as well as close spaced line sown crops complete hoeing, weeding followed by ridging to the base of the crop rows at 20 days after sowing for <i>in-situ</i> moisture conservation.</li> <li>• <i>In situ</i> soil and water conservation</li> </ul>	Tractor, power tiller, Rotavator under RKVY

Early season drought (delayed onset)	Major Farming situation	Normal Crop/cropping system	Change in crop/cropping system	Agronomic measures	Remarks on Implementation
After 8 weeks delay : August 2 <sup>nd</sup> wk			Maize+Cowpea (2:2) Maize+arhar (2:2) Yam+Maize (1:2) Rice+radish (4:2) Rice+Blackgram/Green gram (4:1)	measures like contour farming cover cropping, bunding, trenching, terracing, ridge and furrow method of planting. <ul style="list-style-type: none"> <li>• Cultivate vegetables like okra, brinjal, tomato.</li> <li>• Complete hoeing, weeding followed by ridging to the base of the root crop at 20 DAS for in-situ moisture Conservation in vegetable and groundnut crop.</li> <li>• Do not top dress nitrogen in nursery</li> <li>• Apply life saving irrigation to maintain nursery seedlings.</li> </ul>	
		Maize	30R77, Hycell, Kargil, Allrounder, DHM 103, Kuji maka (Local), Navjot & 900mgold		
		Groundnut	Devi, Smruti, TG-38, TMV-2, AK-12-24, JL 24 & ICGS 11		
		Sesamum	Nirmala, Uma, Amrit, Vinayak & Prachi		
		Brinjal	Utkal Anushree, utkal Madhuri, & Utakal Keshari. Utkal Kumari, Utkal		
		Tomato	Urbashi, Utkal deepti & Utkal Raja		
		Chill	Utkal Ava & Utkal Rashmi. Deomali, Utkal		
		Turmeric	Roma, Surama, Suguna, Subarna & Sudarshan		
		Pineapple	Queen & Kew		
		Ginger	Nadia, Vardhan, Suruchi, Suprava & Daringibadi local.		
		Sweet Potato	Gauri, Sankar & Local		
Niger	Deomali, Utkal Niger-150, IGP 76				

Early season drought (delayed onset)	Major Farming situation	Normal Crop/cropping system	Change in crop/cropping system	Agronomic measures	Remarks on Implementation
		Cotton	Savita, Bunny, Sri Tulashi, Bhaskar		
		Niger	Niger-150		
		Other crop	Yam bean: Rajendra, Mishri Kanda-1		
			Elephant foot Yam: Gajendra		
			Yam: Hatikhoja, Padma, Local Elit. Colocassia: Muktakeshi, Sankha saru, Telia. Tapioca : Shree Vijaya, Shree Lata		
			Pulse : Blackgram, greengram & Arhar		
	Black soils Moderate rainfall Rainfed Medium lands:	Sole crops	Black gram: OBG 15, PU-30, T-9, Sarala. Green gram: OUM 11-5, PDM-54, TARM-1, PDM-11, Dhauli.	<ul style="list-style-type: none"> <li>• Provide life saving irrigation.</li> <li>• Spray 2% KCl + 0.1 ppm boron to blackgram to overcome drought situations.</li> <li>• Foliar application of 2% urea at pre-flowering and flowering stage of greengram is helpful to mitigate drought.</li> </ul>	
		Pulses			
	Laterite soils, Moderate rainfall Rainfed Low lands	Brinjal	Utkal Anushree, utkal Madhuri, Utkal Jyoti & Utakal Keshari.		
		Sole crops: Pulses	<ul style="list-style-type: none"> <li>• Blackgram: OBG 15, PU-30, T-9, Sarala.</li> <li>• Greengram: OUM 11-5, PDM-54, TARM-1, PDM-11, Dhauli.</li> </ul>	<ul style="list-style-type: none"> <li>• -do-</li> </ul>	

Condition	Suggested Contingency measures				
Early season drought (Normal onset)	Major Farming situation	Normal Crop/cropping system	Crop management	Soil nutrient & moisture conservation measures	Remarks on Implementation
<b>Normal onset followed by 15-20 days dry spell after sowing leading to poor germination/crop stand etc.</b>	Red Loam soils, Low Rainfall, Moderate elevation (300-500mt.) Rainfed Uplands				
		Sole crops Rice	Varietal substitutions of drought tolerant varieties of the sole crops i.e Parjata, Khandagiri, Udayagiri, Vandana, Heera. Adopt intercropping Rice+arhar(5:2), Maize+Cowpea (2:2), Maize+arhar (2:2) Rice+radish (4:2) Rice+Blackgram/Green gram (4:1)	<ul style="list-style-type: none"> <li>• Thinning and gap filling of the existing crop if mortality is less than 50%.</li> <li>• Resow the crop if the mortality is more than 50%.</li> <li>• Complete hoeing weeding and earthing up at 20 DAS for moisture conservation for groundnut and vegetable crops</li> <li>• Grow vegetables in ridges and allow the furrow to conserve rainwater, application of paper mill sludge (PMS) @ 5 q/ha, potash and boron and FYM during final land preparation for obtaining higher yield</li> <li>• Ridge &amp; furrow methods of sowing may be adopted as in-situ soil moisture conservation practices.</li> <li>• Mulching should be practiced in between crop rows using locally available mulch material in vegetables</li> <li>• Weeding and interculture and ridging in maize, Groundnut and vegetables</li> <li>• Life saving irrigation when needed.</li> </ul>	<ul style="list-style-type: none"> <li>• Farm pond under NREGS, IWMP, and diesel pump sets and KB pumps in tankfed areas under RKVY and NFSM.</li> <li>• Small nursery development under NHM.</li> </ul>
		Maize	Kargil, DHM 103, Navjot & Shakti		
		Groundnut	Devi, Smruti, TMV-2, AK-12-24, JL 24 & ICGS 11.		
		Sesamum	Nirmala, Uma, Amrit, Vinayak & Prachi		
		Cowpea	Utkal Manika, SEB-2		
		Brinjal	Utkal Anushree, Utkal Madhuri, Utkal Jyoti & Utakal Keshari.		
		Tomato	Utkal Kumari, Utkal Urbashi, Utkal deepthi & Utkal Raja		
		Chilli	Utkal Ava & Utkal Rashmi.		
Turmeric	Rashmi, Subarna, Sudarshan, Surama & Roma.				

		Pineapple	Queen & Kew		
		Ginger	Suprava, Suravi, Nadia & China.		
		Sweet Potato	Gauri & Sankar		
		Niger	Deomali, Utkal niger-150,		
		Cotton	Savita, Bunny, Sri Tulashi, Bhaskar		
	Black soils, Moderate rainfall Rainfed Medium lands	Sole crops: Rice	<p>Growing of medium duration rice variety: Lalat, Swarna, Mahsuri, Jajati, Konark, Surendra, MTU 1001 &amp; Manaswini (120-130) days</p> <ul style="list-style-type: none"> <li>• Sunflower: KBSH 1 &amp; Modern</li> <li>• Black gram: OBG 23, OBG 15, PU-30, T-9, Sarala, B-3-8-8.</li> <li>• Green gram: OUM 11-5, PDM-139, TARM-1, PDM-11, Dhauri.</li> </ul>	<ul style="list-style-type: none"> <li>• If rice population is less than 50% resow the crop.</li> <li>• Sprouted seeds may be direct seeded in lines or fresh seedlings may be raised for transplanting</li> <li>• If rice population is more than 50 % carryout weeding and adjust the plant population by redistribution of hills (Khelua), plugging of drainage hole for checking seepage loss and to provide life saving irrigation as and when necessary.</li> </ul>	
	Laterite soils, Moderate rainfall Rainfed Low lands	Sole crops: Rice	Varieties like Swarna, Pratikshya, Ranidhan, Swarna Sub.-1	<ul style="list-style-type: none"> <li>• In situ moisture conservation should be practiced through contour bunding.</li> <li>• Utilize already harvested rainwater as live saving or protective irrigation</li> </ul>	

Mid season drought (long dry spell, consecutive 2 weeks rainless (>2.5 mm)period)	Major Farming situation	Normal Crop/cropping system	Crop management	Soil nutrient & moisture conservation measures	Remarks on Implementation
At vegetative stage	Red Loam soils , Low rainfall, Moderate elevation (300-500mt.) Rainfed Uplands (Unbunded)	Sole crops: Rice	Varietal substitutions of drought tolerant varieties of the sole crops i.e Parjata, Khandagiri, Udayagiri, Vandana, Heera, Sidhanta, Khandagiri & Vandana (90-95) days. Adopt intercropping Rice+arhar(5:2), Maize+Cowpea (2:2), Maize+arhar (2:2) Yam+Maize (1:2) Rice+radish (4:2) Rice+Blackgram/Green gram (4:1)	<ul style="list-style-type: none"> <li>• Thinning and gap filling of the existing crop if mortality is less than 50%.</li> <li>• Resow the crop if the mortality is more than 50%.</li> <li>• Cultivate vegetables like cow pea and tomato.</li> <li>• Complete hoeing weeding and earthing up at 20 DAS for moisture conservation for groundnut and vegetable crops</li> <li>• Grow sweet potato var. Gouri, Shankar in ridges and allow the furrow to conserve rainwater, application of paper mill sludge (PMS) @ 5 q/ha, potash and boron and FYM during final land preparation for obtaining higher yield of sweet potato.</li> <li>• Ridge &amp; furrow methods of sowing may be adopted as in-situ soil moisture practices.</li> <li>• Mulching should be practiced in between crop rows using locally available mulch material.</li> </ul>	
		Maize	30R77, Hycell, Kargil, Allrounder, DHM 103, Kuji maka (Local), Navjot & 900mgold.		
		Groundnut	Devi, Smruti, TG-38, TMV-2, AK-12-24, JL 24 & ICGS 11.		
		Sesamum	Nirmala, Uma, Amrit, Vinayak & Prachi		
		Cowpea	Utkal Manika, SEB-2 & SGL-2		
		Brinjal	Utkal Anushree, utkal Madhuri, Ytkal Jyoti & Utakal Keshari.		
		Tomato	Utkal Kumari, Utkal Urbashi, Utkal deepthi & Utkal Raja		

		Chilli	Utkal Ava & Utkal Rashmi.		
		Turmeric	Rashmi, Subarna, Sudarshan, Surama & Roma.		
		Pineapple	Queen & Kew		
		Ginger	Suprava, Suravi, Nadia & China.		
		Sweet Potato	Gauri & Sankar		
		Niger	Deomali, Utkal niger-150		
		Cotton	Savita, Bunny, Sri Tulashi, Bhaskar		
		Other crop	Castor: DCH 177, DCH 5, DCH 32, GCH 5, (Jyoti & Aruna) composite.		
			Yam bean: Rajendra, Mishri Kanda-1		
			Elephant foot Yam: Gajendra Yam: Hatikhoja, Padma,		
			Local Elite. Colocassia: Muktakeshi, Sankha saru, Telia.		
			Tapioca : Shree Jaya, Shree Lata		



	Black soils, Moderate rainfall Rainfed Medium lands	Sole crops: Rice  Other crop	Growing of medium duration rice variety: Lalat, swarna, Mahsuri, Jajati, Konark, Surendra, MTU 1001 & Manaswini (120-130) days.  <ul style="list-style-type: none"> <li>Sunflower: KBSH 1 &amp; Modern</li> <li>Black gram: OBG 23, OBG 15, PU-30, T-9, Sarala, B-3-8-8.</li> <li>Green gram: OUM 11-5, PDM-139, TARM-1, PDM-11, Dhauli.</li> </ul>	<ul style="list-style-type: none"> <li>If rice population is less than 50% resow the crop.</li> <li>Select early maturing varieties (90d).</li> <li>Sprouted seeds may be direct seeded in lines or fresh seedlings may be raised for transplanting</li> <li>If rice population is more than 50 % carryout weeding and adjust the plant population by redistribution of hills (Khelua), plugging of drainage hole for checking seepage loss and to provide life saving irrigation as and when necessary.</li> </ul>	
	Laterite soils, Moderate rainfall Rainfed Low lands:	Sole crops: Rice	Variets like Padmini, Mahanadi, Upahar, Mahalaxmi (140-145) days.	<ul style="list-style-type: none"> <li>In situ moisture should be practiced through contour bunding.</li> <li>Utilize already harvested rainwater as live saving or protective irrigation.</li> </ul>	

Condition	Major Farming situation	Normal Crop/cropping system	Suggested Contingency measures		
			Crop management	Soil nutrient & moisture conservation measures	Remarks on Implementation
Mid season drought (long dry spell)	Red Loam soils low rainfall, Moderate elevation (300-500mt.) Rainfed Uplands	Sole crops: Rice	Varietal substitutions of drought tolerant varieties of the sole crops i.e  Parijata, Khandagiri, Udayagiri, sidhanta, Vandana, Heera, Saria (local). Sidhanta, Khandagiri & Vandana (90-95) days. Adopt intercropping Rice+arhar (5:2), Maize+Cowpea (2:2),	Spray 1% KCl + 0.1 % boron to non paddy crops to overcome drought. Foliar application of 1.5% DAPS at pre-flowering and flowering stage to pulses and oilseeds is helpful. Remove and destroy pest and disease affected plant. Provide irrigation at critical stages at flowering and grain filling stage. Crops like cow pea, green gram, black	

Condition			Suggested Contingency measures		
Mid season drought (long dry spell)	Major Farming situation	Normal Crop/cropping system	Crop management	Soil nutrient & moisture conservation measures	Remarks on Implementation
			Maize+arhar (2:2) Yam+Maize (1:2) Rice+Radish (4:2) Rice+Blackgram/Green gram (4:1)	gram, maize and vegetables may be harvested. Need based plant protection measures to be taken. Provide life saving irrigation. Weeding and ridging in groundnut, maize Mulching in cotton, maize and vegetable crops.	
		Maize	30R77, Hycell, Kargil, Allrounder, DHM 103, Kuji maka (Local), Navjot & 900mgold		
		Groundnut	Devi, Smruti, TG-38, TMV-2, AK-12-24, JL 24 & ICGS 11.		
		Sesamum	Nirmala, Uma, Amrit, Vinayak & Prachi		
		Cowpea	Utkal Manika, SEB-2 & SGL-2.		
		Brinjal	Utkal Anushree, utkal Madhuri, Ytkal Jyoti & Utakal Keshari.		
		Tomato	Utkal Kumari, Utkal Urbashi, Utkal Deepti & Utkal Raja		
		Chillies	Utkal Ava & Utkal Rashmi		
		Turmeric	Zashmi, Subarna, Sudarshan, Surama & Roma.		
		Pineapple	Queen & Kew		
		Ginger	Suprava, Suravi, Nadia & China.		
		Sweet potato	Gauri & Sankar		
		Niger	Deomali, Utkal niger-150, IGP 76		

Condition	Major Farming situation	Normal Crop/cropping system	Suggested Contingency measures		
			Crop management	Soil nutrient & moisture conservation measures	Remarks on Implementation
Mid season drought (long dry spell)		Cotton	Savita, Bunny, Sri Tulashi, Bhaskar		
	Black soils, Moderate rainfall Rainfed Medium lands	Sole crops: Rice Other crop	Growing of medium duration rice variety: Lalat, swarna, Mahsuri, Jajati, Konark, Surendra, MTU 1001 & Manaswini (120-130) days	Advised to spray Tricyclazole (Beam/Team) 0.06-0.1% at 10-12 days interval to control blast and brown spot diseases in rice during this period. To control stem borer and Gandhi bug, spray methyl Triazophos 2 ml/Liter Provide life saving irrigation.	
			Sunflower: KBSH 1 & Modern		
			Blackgram: OBG 23, OBG 15, PU-30, T-9, Sarala, B-3-8-8.		
Greengram: OUM 11-5, PDM-139, TARM-1, PDM-11, Dhauli					
	Laterite soils, Moderate rainfall	Sole crops under rainfed Low lands: Rice	Varieties like Padmini, Upahar, Mahalaxmi (140-145) days.	For late transplanted rice 2 spraying at 10 days interval with Vardamycin 0.3% to control sheath blight.	

Condition	Major Farming situation	Normal Crop/cropping system	Suggested Contingency measures		
			Crop management	Rabi Crop planning	Remarks on Implementation
Terminal drought (Early withdrawal of monsoon)	Red Loam soils, Low rainfall, Moderate elevation (300-500mt.) Rainfed Uplands	Sole crops: Rice	Varietal substitutions of drought tolerant varieties of the sole crops i.e Parijata, Khandagiri, Udayagiri, sidhanta, Vandana, Heera, Saria (local). Sidhanta, Khandagiri & Vandana (90-95) days. Adopt intercropping Rice+arhar(5:2), Maize+Cowpea (2:2), Maize+arhar (2:2) Yam+Maize (1:2) Rice+radish (4:2) Rice+Blackgram/Green gram (4:1)	Utilization of residual moisture for early sowing of pre-rabi crops like Cow pea (SEB – 2, Utkal Manik), horse gram (Urmi), green gram (Durga), black gram (Ujala), Niger (Deomali) to be sown to conserve soil moisture. And provide life saving irrigation as and when necessary.  Groundnut: Devi, Smruti, TMV-2, JL 24 & ICGS 11.  Sesamum: Nirmala, Uma, Amrit, Vinayak & Prachi Need based plant protection measures	
		Maize	30R77, Hycell, Kargil, Allrounder, DHM 103, Kuji maka (Local), Navjot & 900mgold.		
		Cowpea	Utkal Manika, SEB-2		
		Brinjal	Utkal Anushree, utkal Madhuri, Ytkal Jyoti & Utakal Keshari.		
		Tomato	Utkal Kumari, Utkal Urbashi, Utkal deepti & Utkal Raja		
		Chillies	Utkal Ava & Utkal Rashm		
		Turmeric	Rashmi, Subarna, Sudarshan, Surama & Roma.		
		Pineapple	Queen & Kew		
		Ginger	Suprava, Suravi, Nadia & China.		
		Sweet potato	Gauri & Sankar		
		Niger	Deomali, Utkal niger-150, IGP 76		

Condition	Major Farming situation	Normal Crop/cropping system	Suggested Contingency measures		
			Crop management	Rabi Crop planning	Remarks on Implementation
Terminal drought (Early withdrawal of monsoon)		Cotton	Savita, Bunny, Sri Tulashi, Bhaskar		
		Other crop	a. Castor: DCH 177, DCH 5, DCH 32, GCH 5, (Jyoti & Aruna) composite. b. Yam bean: Rajendra, Mishri Kanda-1 c. Elephant foot Yam: Gajendra d. Yam: Hatikhoja, Padma, Local Elite e. Colocassia : Muktakeshi, Sankha saru, Telia. Tapioca : Shree Jaya, Shree Lata		
	Black soils, Moderate rainfall Medium land	Rice	Growing of medium duration rice variety: Lalat, swarna, Masoori, Jajati, Konark, Surendra, MTU 1001 & Manaswini (120-130) days  <ul style="list-style-type: none"> <li>• Sunflower: KBSH 1 &amp; Modern</li> <li>• Black gram: OBG 23, OBG 15, PU-30, T-9, Sarala, B-3-8-8.</li> <li>• Green gram: OUM 11-5, PDM-139, TARM-1, PDM-11, Dhauli.</li> </ul>	Provide life saving irrigation, from harvested rain water at reproductive stage and conserve soil moisture harvest the crop at physiological maturity stage.	
	Laterite soils, Moderate Rainfall Rainfed Low lands	Sole crops: Rice	Varieties like Padmini, Upahar, Mahalaxmi (140-145) days.	-do-	

## 2.1.2 Drought - Irrigated situation

Condition	Major Farming situation	Normal Crop/cropping system	Suggested Contingency measures		
			Change in crop/cropping system	Agronomic measures	Remarks on Implementation
Delayed release of water in canals due to low rainfall	Black soils, Moderate Rainfall, High Irrigation Upland	Rice-Pulse	Plantation Crop	Irrigate the kharif rice with ground water during dry spell only. In light texture soil conveyance loss should be minimized during irrigation by spreading a polythene sheet in the field channel.	-
	Laterite soil, Moderate rainfall		Only transplanting can be done from previously sown nursery. Low land rice: Moti, Mahalaxmi, Savitri, Padmini & Rajashree. Growing short duration vegetables like cucumber, okra, cowpea, French bean. Groundnut: Devi, Smruti, TG-38, TMV-2, AK-12-24, JL 24 & ICGS 11 Blackgram: OBG 23, OBG 15, PU-30, T-9, Sarala, B-3-8-8. Green gram: OUM 11-5, PDM-139, TARM-1, PDM-11, Dhauri.	Provide life saving irrigation, from harvested rain water at reproductive stage and conserve soil moisture harvest the crop at physiological maturity stage.	-
	Medium land	Rice-Vegetable Rice-Pulse			
	Lowland	Rice-Rice Rice-Oilseed/Pulse			

Condition	Suggested Contingency measures				
	Major Farming situation	Normal Crop/cropping system	Change in crop/cropping system	Agronomic measures	Remarks on Implementation
Limited release of water in canals due to low rainfall	Black soils, Moderate Rainfall, High Irrigation Low land	Rice-rice Rice-Oilseed/Pulse	Growing of medium duration rice variety: Lalat, swarna, Masoori (120-135 days). Adopt intercropping rice+blackgram/greengram (4:1). Groundnut: Smruti, TMV-2, AK-12-24.	Thinning & weeding should be done to minimize water loss. Practice mulching with organics to extend the period of moisture availability.	-
	Laterite soil, Moderate Rainfall Low land	Rice-Vegetable	Only transplanting can be done from previously sown nursery. Low land rice: Mahalaxmi, Padmini & Rajashree. Growing short duration vegetables like cucumber, okra, cowpea, bean.	Practice mulching with organics to extend the period of moisture availability.	-

Condition	Suggested Contingency measures				
	Major Farming situation	Normal Crop/cropping system	Change in crop/cropping system	Agronomic measures	Remarks on Implementation
Non release of water in canals under delayed onset of monsoon in catchment	Black soils, Moderate Rainfall, High Irrigation Medium land	Rice-Oilseed/Pulse	Growing of medium duration rice variety: Lalat, swarna, Masoori (120-135 days). Adopt intercropping rice+blackgram/greengram (4:1). Groundnut: Smruti, TMV-2, AK-12-24.	Irrigate the rice during critical stage only with ground water. Conveyance losses should be minimized.	-
	Laterite soils, Moderate rainfall Low land	Rice-Vegetable	Only transplanting can be done from previously sown nursery. Low land rice: Swarna, Pratikshya Prefer short duration vegetables like cucumber, okra, cowpea, French bean.	Rice should be harvested at physiological maturity to avoid yield loss.	-

Condition	Suggested Contingency measures				
	Major Farming situation	Normal Crop/cropping system	Change in crop/cropping system	Agronomic measures	Remarks on Implementation
Lack of inflows into tanks due to insufficient /delayed onset of monsoon	Black soils, Moderate Rainfall, High Irrigation Medium land	Rice-Oilseed/Pulse	Growing of medium duration rice variety: Lalat, swarna, Masoori (120-135 days). Adopt intercropping Rice + Blackgram /Greengram (4:1). Groundnut: Smruti, TMV-2, AK-12-24.	Irrigate the rice during critical stage only with ground water. Conveyance losses should be minimized.	-
	Laterite soils, Moderate rainfall Low land	Rice-Vegetable	Only transplanting can be done from previously sown nursery. Low land rice: Mahalaxmi, Padmini & Rajashree. Growing short duration vegetables like cucumber, okra, cowpea, French bean.	Rice should be harvested at physiological maturity to avoid yield loss.	-

Condition	Suggested Contingency measures				
	Major Farming situation	Normal Crop/cropping system	Change in crop/cropping system	Agronomic measures	Remarks on Implementation
Insufficient ground water recharge due to low rainfall.	Black soils, Moderate Rainfall, High Irrigation Medium land	Rice-Oilseed/Pulse	Prefer medium duration rice variety: Lalat, Konark (120 days). Blackgram(T9, PU19, PU30) Groundnut (Smruti, TMV-2)	Irrigate the rice during critical stage only with harvest rain water. Conveyance losses should be minimized. Transplant 3-4 seedlings/hill in rice. Conserve moisture by raising bund height in rice.	-



Condition	Suggested Contingency measures			
	Major Farming situation	Normal Crop/cropping system	Change in crop/cropping system	Agronomic measures
Laterite soils, Moderate rainfall Low land	Rice-Vegetable	Only transplanting can be done from previously sown nursery. Low land rice: Moti, Mahalaxmi, Savitri, Padmini & Rajashree. Growing short duration vegetables like cucumber, okra, cowpea, bean.	Rice should be harvested at physiological maturity to avoid yield loss. Mulching in vegetables. Life saving irrigation from harvested rain water. Conserve moisture by raising bund height in rice.	-

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

Condition	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>				
Paddy	Re sow the crop. Grow short Duration var. or grow short duration. Drainage	Drainage, Pest control measure	Early harvest, Paddy seeds should not be used for seed purpose and may be consumed.	Control Store grain pest, measure to be taken for keeping moisture content.
Maize				
<b>Horticulture</b>				
Vegetables	Re sow the crop. Grow short Duration var. or grow short duration. Drainage	Drainage, Pest control measure	Early Harvest	Early Harvested & disposed
<b>Heavy rainfall with high speed winds in a short span</b>				
Paddy	Dwarf variety	Application of potassic fertilizer @5 kg/acre more to the paddy crop. Grow short duration	Early Harvest	

		Pulse like cowpea, B.gram and G. Gram.		
Maize	Resow the crop. Grow short Duration var.or grow short duration Pulse like cowpea, B.gram and G.gram, if the crop damaged.	Application of potassic fertilizer @5 kg/acre more to the Maize crop. Grow short duration Pulse like cowpea, B.gram and G. Gram.		
<b>Horticulture</b>				
Vegetables	Resow the crop. Grow short Duration var. or grow short duration Pulse like cowpea, B.gram and G.gram. Gap filling in the main field.	Application of potassic fertilizer @5 kg/acre. Application of bavistin + strpetocycline to reduced wilt incidence.		Harvested early & disposed
<b>Outbreak of pests and diseases due to unseasonal rains</b>				
Paddy	Spraying of Tricyclazole @ 0.6gm/liter for management of Blast.	Spraying of Monocrotophos @ 2 ml/liter for management of steamborer.	Dusting of Malathion 8kg/acrefor management of Gandhibug.	Use of Cellphos for store grain pest control.
Maize	Spraying of Monocrotophus /Chloropyrophus @ 2 ml/liter for management of steamborer.	Spraying of Mancozeb @ 4 gm/liter for management of Leaf spot.	Spraying of Endosulfan @ 2 ml/liter for management of heliothis.	Use of Cellphos for store grain pest control.
<b>Horticulture</b>				
Vegetables	Spraying of bavistin + strpetocycline for management wilt.	Spraying of Chloropyriphos/ Quinalphus @ 2 ml/liter for management of Fruit borer.	Spraying of copperoxychloride @ 4 gm/liter for management of Fruitrut.	
Mango, Litchi, Guava, Citrus & Pomegranate	Spraying of Endosulfan @ 2 ml/liter +Mancozeb @ 2 gm/liter for management of steamborer.	Alter Net spraying of Dimethoate/Malathion @ 2ml/liter for mango hopper. Need based plant protection measure should be taken.	Poison bait against Fruitfly	Early Harvested & disposed

## 2.3 Floods

Condition	Suggested contingency measure			
	Seedling / nursery stage	Vegetative stage	Reproductive stage	At harvest
<b>Transient water logging/ partial inundation</b>				
Paddy	Re sows the crop. Grow short Duration var. or grow short duration Pulse like cowpea, B.gram and G.gram	Grow short duration Pulse like cowpea, B.gram and G.gram.	If germination is below 70 % then Paddy seeds should not be used for seed purpose and may be consumed.	If germination is below 70 % then Paddy seeds should not be used for seed purpose and may be consumed.
<b>Horticulture</b>				
	-	-	-	-
<b>Continuous submergence for more than 2 days</b>				
Paddy	Spraying of Tricyclazole @ 1 gm/liter for management of Blast.	Spraying of Monocrotophus @ 2 ml/liter for management of steamborer.	Spraying of Malathion @ 2 ml/liter for management of Gandhibug.	Use of Cellphos for store grain pest control.
<b>Horticulture</b>				
	-	-	-	-
<b>Sea water intrusion</b>				
Paddy	Spraying of Tricyclazole @ 1 gm/liter for management of Blast.	Spraying of Monocrotophus @ 2 ml/liter for management of steamborer.	Spraying of Malathion @ 2 ml/liter for management of Gandhibug.	Use of Cellphos for store grain pest control.
<b>Horticulture</b>				
	-	-	-	-

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

Extreme event type	Suggested contingency measure			
	Seedling / nursery stage	Vegetative stage	Reproductive stage	At harvest
Heat Wave	-NA-			
Cold wave	-NA-			
Frost	-NA-			
Hailstorm				
Cyclone				

## 2.5 Contingent strategies for Livestock, Poultry & Fisheries

### 2.5.1 Livestock

	Suggested contingency measures		
	Before the event	During the event	After the event
<b>Drought</b>			
Feed and fodder availability	<p>As the district is occasionally prone to drought the following practices may be implemented to prevent fodder shortage problem</p> <p>Sowing of cereals (fodder varieties of Sorghum/Bajra) and leguminous crops (Lucerne, Berseem, Horse gram, Cowpea) during rabi under dry land system for fodder production.</p> <p>Collection of groundnut haulms and</p>	<p>Harvest and use biomass of dried up crops (Paddy, Maize, Ragi, Green gram, Black gram, cow pea, Groundnut, Sugarcane, Tapioca etc., ) material as fodder</p> <p>Use of locally available cheap feed resources like GN haulms and tapioca waste as supplement for feeding of livestock during drought</p> <p>Harvest all the top fodder available (Subabul, Glyricidia, Pipol, Prosopis etc) and feed the LS during drought</p> <p>Concentrate ingredients such as Grains, brans, chunnies &amp; oilseed cakes, low grade grains etc.</p>	<p>Encourage progressive farmers to grow multi cut fodder crops of sorghum/bajra/maize(UP chari, MP chari, HC-136, HD-2, GAINT BAJRA, L-74, K-677, Ananad/African Tall, Kisan composite, Moti, Manjari, B1-7 on their own lands with input subsidy</p> <p>Supply of quality stem cuttings of Hybrid napier (CO1), paragrass, guinea grass, combo grass well</p>

	<p>groundnut cake for use as feed supplement during drought</p> <p>Motivating the sugarcane farmers to convert green sugarcane tops in to silage by the end of February</p> <p>Preserving the green maize fodder as silage</p> <p>Encourage fodder production with Bajra – stylo- Bajra on rotation basis and also to cultivate short-term fodder crops like sunhemp</p> <p>Formation of village Disaster Management Committee</p> <p>Capacity building and preparedness of the stakeholders and official staff for the drought/floods</p>	<p>unfit for human consumption should be procured from Govt. Godowns for feeding as supplement for high productive animals during drought</p> <p>Promotion of Horse gram as contingent crop and harvesting it at vegetative stage as fodder</p> <p>Continuous supplementation of minerals to prevent infertility.</p> <p>Encourage mixing available kitchen waste with dry fodder while feeding to the milch animals</p>	<p>before monsoon</p> <p>Flushing the stock to recoup</p> <p>Replenish the feed and fodder banks</p>
<p>Drinking water</p>	<p>Adopt various water conservation methods at village level to improve the ground water level for adequate water supply.</p> <p>Identification of water resources</p> <p>Desilting of ponds</p> <p>Rain water harvesting and create water bodies/watering points (when water is scarce use only as drinking water for animals)</p> <p>Construction of drinking water tanks in herding places/village junctions/relief camp locations</p> <p>Community drinking water trough can be arranged in shandies /community grazing areas</p>	<p>Adequate supply of drinking water.</p> <p>Restrict wallowing of animals in water bodies/resources</p> <p>Add alum in stagnated water bodies</p>	<p>Watershed management practices shall be promoted to conserve the rainwater.</p> <p>Bleach (0.1%) drinking water / water sources</p> <p>Provide clean drinking water</p>

<p>Health and disease management</p>	<p>Procure and stock emergency medicines and vaccines for important endemic diseases of the area</p> <p>All the stock must be immunized for endemic diseases of the area</p> <p>Surveillance and disease monitoring network to be established at Joint Director (Animal Husbandry) office in the district</p> <p>Adequate refreshment training on draught management to be given to VAS, Jr.VAS, LI with regard to health &amp; management measures</p> <p>Procure and stock multivitamins &amp; area specific mineral mixture</p>	<p>Carryout deworming to all animals entering into relief camps</p> <p>Identification and quarantine of sick animals</p> <p>Constitution of Rapid Action Veterinary Force</p> <p>Performing ring vaccination (8 km radius) in case of any outbreak</p> <p>Restricting movement of livestock in case of any epidemic</p> <p>Tick control measures be undertaken to prevent tick borne diseases in animals</p> <p>Rescue of sick and injured animals and their treatment</p> <p>Organize with community, daily lifting of dung from relief camps</p>	<p>Keep close surveillance on disease outbreak.</p> <p>Undertake the vaccination depending on need</p> <p>Keep the animal houses clean and spray disinfectants Farmers should be advised to breed their milch animals during July-September so that the peak milk production does not coincide with mid summer</p>
<p><b>Floods</b></p>			
	<p>In case of early forewarning (EFW), harvest all the crops (Paddy, Maize, Black gram, Groundnut, Green gram, Horse gram, cow pea etc.) that can be useful as feed/fodder in future (store properly)</p> <p>Protect the dried Dongri grass, sorghum stover etc., from inundation of flood water</p> <p>Keeping sufficient of dry fodder to transport to the flood affected villages</p> <p>Don't allow the animals for grazing if severe floods are forewarned</p> <p>Keep stock of bleaching powder and lime</p> <p>Carry out Butax spray for control of external parasites</p> <p>Procure and stock emergency medicines</p>	<p>Transportation of animals to elevated areas</p> <p>Proper hygiene and sanitation of the animal shed</p> <p>In severe storms, un-tether or let loose the animals</p> <p>Use of unconventional and locally available cheap feed ingredients for feeding of livestock.</p> <p>Avoid soaked and mould infected feeds / fodders to livestock</p> <p>Carryout deworming to all animals entering into relief camps</p> <p>Identification and quarantine of sick animals</p> <p>Constitution of Rapid Action Veterinary Force</p> <p>Performing ring vaccination (8 km radius) in case of any outbreak</p>	<p>Repair of animal shed</p> <p>Bring back the animals to the shed</p> <p>Cleaning and disinfection of the shed</p> <p>Bleach (0.1%) drinking water / water sources</p> <p>Encouraging farmers to cultivate short-term fodder crops like sunhemp.</p> <p>Deworming with broad spectrum dewormers</p> <p>Proper disposal of the dead animals / carcasses by burning / deep burying (4-8 feet) with lime powder (1kg for small ruminants)</p>

	<p>and vaccines for important endemic diseases of the area</p> <p>All the stock must be immunized for endemic diseases of the area</p> <p>Surveillance and disease monitoring network to be established at Joint Director (Animal Husbandry) office in the district</p> <p>Adequate refreshment training on draught management to be given to VAS, Jr.VAS, LI with regard to health &amp; management measures</p> <p>Identify the Clinical staff and trained paravets and indent for their services as per schedules</p> <p>Identify the volunteers who can serve in need of emergency</p> <p>Arrangement for transportation of animals from low lying area to safer places and also for rescue animal health workers to get involve in rescue operations</p>	<p>Restricting movement of livestock in case of any epidemic</p> <p>Emergency outlet establishment for required medicines or feed in each village</p> <p>Spraying of fly repellants in animal sheds</p>	<p>and 5kg for large ruminants) in pit</p> <p>Drying the harvested crop material and proper storage for use as fodder.</p> <p>Keep close surveillance on disease outbreak.</p>
<p><b>Cyclone</b></p>	<p>Harvest all the possible wetted grain (paddy/wheat/Sorghum/Bajra./maize/horse gram/ groundnut/ soya etc) and use as animal feed.</p> <p>Stock of anti-diarrheal drugs and electrolytes should be made available for emergency transport</p> <p>Don't allow the animals for grazing in case of early forewarning (EFW) of cyclone</p> <p>Incase of EFW of severe cyclone, shift the animals to safer places.</p>	<p>Treatment of the sick, injured and affected animals through arrangement of mobile emergency veterinary hospitals / rescue animal health workers.</p> <p>Diarrhea out break may happen. Health camps should be organized</p> <p>In severe cases un-tether <b>or</b> let loose the animals</p> <p>Arrange transportation of highly productive animals to safer place</p> <p>Spraying of fly repellants in animal sheds</p>	<p>Repair of animal shed</p> <p>Deworm the animals through mass camps</p> <p>Vaccinate against possible disease out breaks like HS, BQ, FMD and PPR</p> <p>Proper dispose of the dead animals / carcasses by burning / deep burying (4-8 feet) with lime powder (1kg for small ruminants and 5kg for large ruminants) in pit</p> <p>Bleach / chlorinate (0.1%)</p>

			<p>drinking water or water resources</p> <p>Collect drowned crop material, dry it and store for future use</p> <p>Sowing of short duration fodder crops in unsown and water logged areas when crops are damaged and no chance to replant</p> <p>Application of urea (20-25kg/ha) in the inundated areas and CPR's to enhance the bio mass production.</p>
<b>Heat wave</b>	<p>i) Plantation around the shed</p> <p>ii) H<sub>2</sub>O sprinklers / foggers in the shed</p> <p>iii) Application of white reflector paint on the roof</p> <p>iv) Thatched sheds should be provided as a shelter to animal to minimize heat stress</p>	<p>Allow the animals early in the morning or late in the evening for grazing during heat waves</p> <p>Feed green fodder/silage / concentrates during day time and roughages / hay during night time in case of heat waves</p> <p>Put on the foggers / sprinklers /fans during heat waves in case of high yielders (Jersey/HF crosses)</p> <p>In severe cases, vitamin 'C' and electrolytes should be added in H<sub>2</sub>O during heat waves.</p>	<p>Feed the animals as per routine schedule</p> <p>Allow the animals for grazing (normal timings)</p>
<b>Insurance</b>	Encouraging insurance of livestock	Listing out the details of the dead animals	<p>Submission for insurance claim and availing insurance benefit</p> <p>Purchase of new productive animals</p>



## 2.5.2 Poultry

	Suggested contingency measures			Convergence/linkages with ongoing programs, if any
	Before the event	During the event	After the event	
<b>Drought</b>				
Shortage of feed ingredients	Storing of house hold grain like maize, broken rice etc, in to use as feed in case of severe drought	Supplementation only for productive birds with house hold grain Supplementation of shell grit (calcium) for laying birds Culling of weak birds	Supplementation to all survived birds	
Drinking water		Use water sanitizers or offer cool hygienic drinking water		
Health and disease management	Culling of sick birds. Deworming and vaccination against RD and IBD	Mixing of Vit. A,D,E, K and B-complex including vit C in drinking water (5ml in one litre water)	Hygienic and sanitation of poultry house Disposal of dead birds by burning / burying with lime powder in pit	
<b>Floods</b>				
Shortage of feed ingredients	In case of early forewarning of floods, shift the birds to safer place Storing of house hold grain like maize, broken rice, bajra etc,	Use stored feed as supplement Don't allow for scavenging Culling of weak birds	Routine practices are followed Deworming and vaccination against RD	

Drinking water		Use water sanitizers or offer cool hygienic drinking water		
Health and disease management	In case of EFW, add antibiotic powder (Terramycin/Ampicilline/ Ampicloxx etc., 10g in one litre) in drinking water to prevent any disease outbreak	Prevent water logging surrounding the sheds through proper drainage facility Assure supply of electricity by generator or solar energy or biogas Sprinkle lime powder to prevent ammonia accumulation due to dampness	Sanitation of poultry house Treatment of affected birds Disposal of dead birds by burning / burying with lime powder in pit Disposal of poultry manure to prevent protozoal problem Supplementation of coccidiostats in feed Vaccination against RD	
<b>Cyclone</b>				
Shortage of feed ingredients	In case of EFW, shift the birds to safer place Storing of house hold grain like maize, broken rice, bajra etc, Culling of weak birds	Use stored feed as supplement Don't allow for scavenging Protect from thunder storms	Routine practices are followed	
Drinking water		Use water sanitizers or offer cool drinking water		
Health and disease management	In case of EFW, add antibiotic powder in drinking water to prevent any disease outbreak	Sanitation of poultry house Treatment of affected birds Prevent water logging surrounding the sheds Assure supply of electricity Sprinkle lime powder (5-10g per square feet) to prevent ammonia	Disposal of dead birds by burning / deep burying with lime powder in pit Disposal of poultry manure to prevent protozoal problem Supplementation of coccidiostats in feed Vaccination against Ranikhet	

		accumulation due to dampness	Disease (0.5ml S/c)	
<b>Heat wave and cold wave</b>				
<b>Shelter/environment management</b>	<i>Heat wave:</i> Provision of proper shelter with good ventilation	In severe cases, foggers/water sprinklers/wetting of hanged gunny bags should be arranged  Don't allow for scavenging during mid day	Routine practices are followed	
<b>Health and disease management</b>	Deworming and vaccination against RD and fowl pox	Supplementation of house hold grain  Provide cool and clean drinking water with electrolytes and vit. C  In hot summer, add anti-stress probiotics in drinking water or feed	Routine practices are followed	

### 2.5.3 Fisheries/ Aquaculture

	Suggested contingency measures		
	Before the event	During the event	After the event
<b>1) Drought</b>			
A. Capture			
Marine	-	-	-
Inland			
(i) Shallow water depth due to insufficient rains/ inflow	1. Restricted release of water from reservoir. 2. Supplementary water harvest structures like pond and tanks has to be developed. 3. Renovation and maintenance of existing water harvest structures.	-	-
(ii) Changes in water quality	1. Prepare to release water into the habitat.	1. Mixing of water from the water harvest structure like ponds and tanks into the fish habitat.	1. Monitoring the water quality and health of aquatic organisms.
B. Aquaculture			
(i) Shallow water in ponds	1. Building deep ditches in culture ponds for	1. Recharge the ponds with bore well water	-

due to insufficient rains/ inflow	shelter of the fish to overcome high temperature	or water from other sources. 2. Partial harvesting of the stock to reduce stocking density. 3. Artificial shelter by putting aquatic floating weeds in 1/3 <sup>rd</sup> area.	
(ii) Impact of salt load build up in ponds/ change in water quality	Application of organic manure in culture system	Recharge the ponds with bore well water or water from other sources	Application of organic manure in culture system
<b>2) Floods</b>			
<b>A. Capture</b>			
Marine	-	-	-
Inland			
(i) Average compensation paid due to loss of human life	1. Construction of humane shelter. 2. Storage of sand filled bags for emergency use. 3. Repair and maintenance of bunds. 4. Preparedness for relief 5. Insurance coverage provision for life and property	1. Timely broadcast and telecast and other types of announcement warning about the danger level with respect to water level. 2. Evacuation of people to flood shelter areas. 3. Relief operation.	1. Relief operation will continue. 2. Care of health of affected people 3. Settlement of insurance. 4. Financial support to other people.
(ii) No. of boats / nets damaged	1. The boats has to be secured safely to river/ reservoir banks. 2. Non operation of fixed bag nets in streams and rivers. 3. Insurance coverage for nets and boats.	1. Checking of the safety of the boats / nets. 2. An inventory logbook with name of crewmembers should be maintained. 3. Number of crew and load should be much below the marked tonnage.	1. Maintenance of the boats and nets. 2. Assessment and settlement of insurance.
(iii) No. of houses damaged	Insurance coverage for houses.	-	Settlement of insurance.
(iv) Loss of stock	-	-	1. Assessment of stock (fish population) and replenishment if stock is depleted. 2. Habitat restoration for the stock remaining.
(v) Changes in water quality	-	-	1. Application of lime in tanks. 2. Application of fertilizer.
(v) Health and diseases	-	-	1. Observation of the health status of fish and accordingly control measure should be taken. 2. Control on transport of brooders and seeds
<b>B. Aquaculture</b>			
(i) Inundation with flood	1. Strengthening and increase in dyke height.	Net enclosure should be provided over the	Repairing and strengthening of

water	2. They should be constructed with inlet and out let facility.	dyke to prevent the escape of fish from pond.	dyke if required.
(ii) Water contamination and changes in water quality	Application of lime.	-	1. Application of lime and geolite. 2. Application of Alum. 3. Application of KMnO <sub>4</sub>
(iii) Health and diseases	Application of lime	-	1. Application of lime and KMnO <sub>4</sub> 2. Assessment of the health status of fish and accordingly control measure should be taken. 3. Control on transport of brooders and seeds.
(iv) Loss of stock and inputs (feed, chemicals ets)	1. Strengthening and increase in dyke height. 2. Before flood the stock should be harvested and sold in flood prone areas. 3. Transport of feed and chemicals to safer place. 4. Purchase of feeds and chemicals on weekly or fortnightly basis. 5. Insurance coverage for stock.	1. Net enclosure should be provided over the dyke to prevent the escape of fish from pond. 2. Water should be diverted from the main stream. 3. Sand bags can be used for protection of dykes. 4. Storing of feed and chemicals to safer place.	1. Stock assessment and restocking with advanced fingerlings or yearling if required. 2. Repairing of dykes. 3. Assessment of quality of feed and fertilizer. 4. Assessment and settlement of insurance.
(v) Infrastructure damage (pumps, aerators, huts etc.)	1. Construction of flood shelter for pumps, aerators etc.	-	1. Repairing of pumps, aerators if required. 2. Repairing of damaged hut.
<b>3. Cyclone/ Tsunami</b>			
<b>A. Capture</b>			
Marine			
Inland			
<b>B. Aquaculture</b>			
(i) Over flow/ flooding of ponds	1. Strengthening and increase in dyke height. 2. They should be constructed with inlet and out let facility.	Net enclosure should be provided over the dyke to prevent the escape of fish from pond.	Repairing and strengthening of dyke if required.
(ii) Changes in water quality (fresh water / brackish water ratio)			

(iii) Health and diseases	-	-	<ol style="list-style-type: none"> <li>1. Application of lime and <math>KMnO_4</math></li> <li>2. Assessment of the health status of fish and accordingly control measure should be taken.</li> <li>3. Control on transport of brooders and seeds.</li> </ol>
(iv) Loss of stock and inputs (feed, chemicals etc)	<ol style="list-style-type: none"> <li>1. Strengthening and increase in dyke height.</li> <li>2. Transport of feed and chemicals to safer place.</li> <li>3. Insurance coverage for stock.</li> </ol>	<ol style="list-style-type: none"> <li>1. Net enclosure should be provided over the dyke to prevent the escape of fish from pond.</li> <li>2. Storing of feed and chemicals to safer place.</li> </ol>	<ol style="list-style-type: none"> <li>1. Stock assessment and restocking with advanced fingerlings or yearling if required.</li> <li>2. Repairing of dykes.</li> <li>3. Assessment of quality of feed and chemicals.</li> <li>4. Assessment and settlement of insurance.</li> </ol>
(v) Infrastructure damage (pumps, aerators, shelters/ huts etc.)	-	-	<ol style="list-style-type: none"> <li>1. Repairing of pumps, aerators if required.</li> <li>2. Repairing of damaged hut.</li> </ol>
<b>4. Heat Wave and Cold Wave : -NA-</b>			
<b>A. Capture</b>			
Marine	-	-	-
Inland	-	-	-
<b>B. Aquaculture</b>			
(i) Change in pond environment	-	-	-
(ii) Health and disease management	-	-	-