

**State: ANDHRA PRADESH**

**Agriculture Contingency Plan for District: MEDAK**

<b>1.0 District Agriculture profile</b>					
<b>1.1</b>	<b>Agro-Climatic/Ecological Zone</b>				
	Agro Ecological Sub Region (ICAR)	Deccan Plateau (Telangana) And Eastern Ghats (7.2)			
	Agro-Climatic Region (Planning Commission)	Southern Plateau hills Region (X)			
	Agro Climatic Zone (NARP)	Northern Telangana Zone (AP-4, AP-5)			
	List all the districts or part thereof falling under the NARP Zone	Medak , Nizamabad, Adilabad, Karimnagar, parts of Warangal, Khammam and Nalgonda.			
	Geographic coordinates of district	Latitude	Latitude	Altitude	
		17 <sup>0</sup> 27' 0" - 18 <sup>0</sup> 19' N	17 <sup>0</sup> 27' 0" - 18 <sup>0</sup> 19' E	442m AMSL	
	Name and address of the concerned ZRS/ ZARS/ RARS/ RRS/ RRTTS	RARS ,Warangal-506007			
	Mention the KVK located in the district	KVK –DDS Located at Zaheerabad			
<b>1.2</b>	<b>Rainfall</b>	Normal RF(mm)	Normal Rainy days (no)	Normal Onset ( specify week and month)	Normal Cessation (specify week and month)
	SW monsoon (June-Sep):	708	40	2 <sup>nd</sup> week of June	2 <sup>nd</sup> week of October
	NE Monsoon(Oct-Dec):	105	5	Negligible	
	Winter (Jan- Feb)	11	2	-	-
	Summer (Mar-May)	55	5	-	-

	Annual		1001	52	-			-		
<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>	970.0	91.4	70.3	30.2	20.0	3.8	59.8	131.5	105.1

<b>1.4</b>	<b>Major Soils (common names like shallow red soils etc.,)</b>	<b>Area ('000 ha)</b>	<b>Percent (%) of total</b>
	1. Sandy loams	324	55
	2. Black Clay Loams	260	44
	3. Laterite soils	6	1
	Others (specify):		
<b>1.5</b>	<b>Agricultural land use</b>	<b>Area ('000 ha)</b>	<b>Cropping intensity %</b>
	Net sown area	424.8	125.3
	Area sown more than once	107.6	
	Gross cropped area	532.3	

<b>1.6</b>	<b>Irrigation</b>	Area ('000 ha)		
	Net irrigated area	138.6		
	Gross irrigated area	200.6		
	Rainfed area	286.2		
	<b>Sources of Irrigation</b>	Number	Area ('000 ha)	Percentage of total irrigated area
	Canals		1.9	1.2
	Tanks		3.3	2.1
	Open wells			
	Bore wells		147.6	95.8
	Lift irrigation			
	Micro-irrigation			
	Other sources		1.34	0.9
	Total Irrigated Area		154.1	100.0
	Pump sets			
	No. of Tractors			
	<b>Groundwater availability and use* (Data source: State/Central Ground water Department /Board)</b>	No. of blocks/ Tehsils / Mandals	(% area)	
	Over exploited	12	25	
	Critical	9	20	
	Semi- critical	13	25	
	Safe	12	25	
Wastewater availability and use				
Ground water quality	Ec-610-3200Microsiemens/cm. chlorides-21-400. Florides-<1.5			
*over-exploited: groundwater utilization > 100%; critical: 90-100%; semi-critical: 70-90%; safe: <70%				



	<b>Plantation crops</b>	<b>Total area('000 ha)</b>
1	Turmeric	3.0
	<b>Total fodder crop area</b>	0.3
	<b>Grazing land</b>	30
	<b>Sericulture etc</b>	15 ha
	<b>Others (Specify) Total flowers</b>	82 ha

<b>1.8</b>	<b>Livestock</b>	<b>Male (number)</b>	<b>Female (number)</b>	<b>Total (number)</b>	
	Non descriptive Cattle (local low yielding)	271.4	192.4	463.8	
	Crossbred cattle	10.5	8.5	19.0	
	Non descriptive Buffaloes (local low yielding)	97.3	353.8	451.2	
	Graded Buffaloes				
	Goat			549.3	
	Sheep			1062.5	
	Others (Camel, Pig, Yak etc.)			37.4	
	Commercial dairy farms (Number)				
<b>1.9</b>	<b>Poultry</b>	<b>No. of farms</b>	<b>Total No. of birds (number)</b>		
	Commercial		7399.3		
	Backyard		980.4		
<b>1.10</b>	<b>Fisheries (Data source: Chief Planning Officer)</b>				
	<b>A. Capture</b>				
	<b>i) Marine</b> (Data Source: Fisheries Department)	<b>No. of fishermen</b>	<b>Boats</b>		<b>Storage facilities (Ice plants etc.)</b>
			Mechanized	Non-mechanized	
	<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>
		3		3	686238
	<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)	2	-	-	

	Others			-					7.0
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1.11	Production and Productivity of major crops (Average of last 5 years: 2004,05,06, 07, 08)	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>										
1	Maize							428.9	4222	
2	Rice							281.49	3033	
3	Green gram							45	852	
4	Sugarcane							4173.5	80107	
5	Jowar							54.9	1228	
6	Bengalgram							37.4	993	
7	Redgram							12.0	504	
Others	Blackgram							14.7	696	
<b>Major Horticultural crops (Crops to be identified based on total acreage)</b>										
<b>Horticulture crops - Fruits</b>										
1	Mango							51.803	8267	
2	Banana							87.632	30000	
<b>Horticultural crops - Vegetables</b>										
1	Chillies							14517	2750	
2	Tomato							87.438	19000	
3	Onion							72.873	17000	
4	potato							54.013	19000	
5	beans							27.583	10333	
<b>Horticultural crops- Flowers</b>										
1	Crossandra							0.700	14000	
<b>Plantation crops</b>										

1	Turmeric							18.393	6200	
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1.12	Sowing window for 5 major field crops (start and end of normal sowing period)	Maize	Paddy	Sugarcane	Cotton	Greengram
	Khharif- Rainfed	June 2 <sup>nd</sup> to July 2 <sup>nd</sup> week			June 2 <sup>nd</sup> week to July 1 <sup>st</sup> week	June 2 <sup>nd</sup> fortnight
	Khharif-Irrigated		June 1 <sup>st</sup> week to July 3 <sup>rd</sup> week	-		-
	Rabi- Rainfed					
	Rabi-Irrigated	November	December	Dec –Jan	-	-

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 (specify)	Rice: stem borer, Gundhi bug, Leaf folder, BPH, Blast, sheath-blight Maize: stem borer Greengram : YMV, Maruca borer Redgram & Bengalgram : Wilt, Helicoverpa Pod borer Sugarcane: ESB	Rice: Hispa, Sugarcane Whip smut, Leafhoppers, Woolly Aphid	

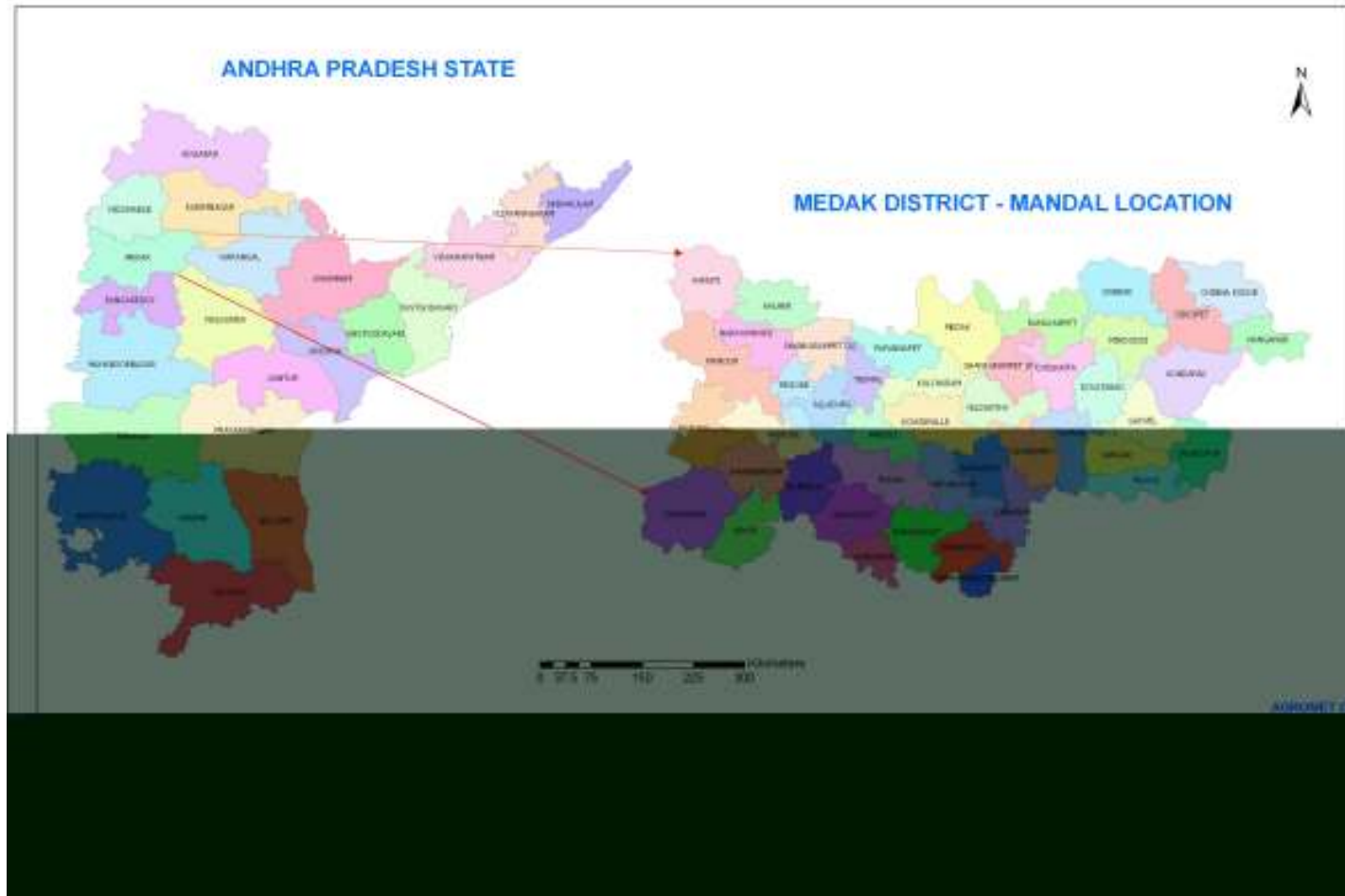
		Cotton : Sucking pests, Leaf spots		
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<b>1.14</b>	<b>Include Digital maps of the district for</b>	Location map of district within State as Annexure I	Enclosed: Yes
		Mean annual rainfall as Annexure 2	Enclosed: Yes
		Soil map as Annexure 3	Enclosed: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

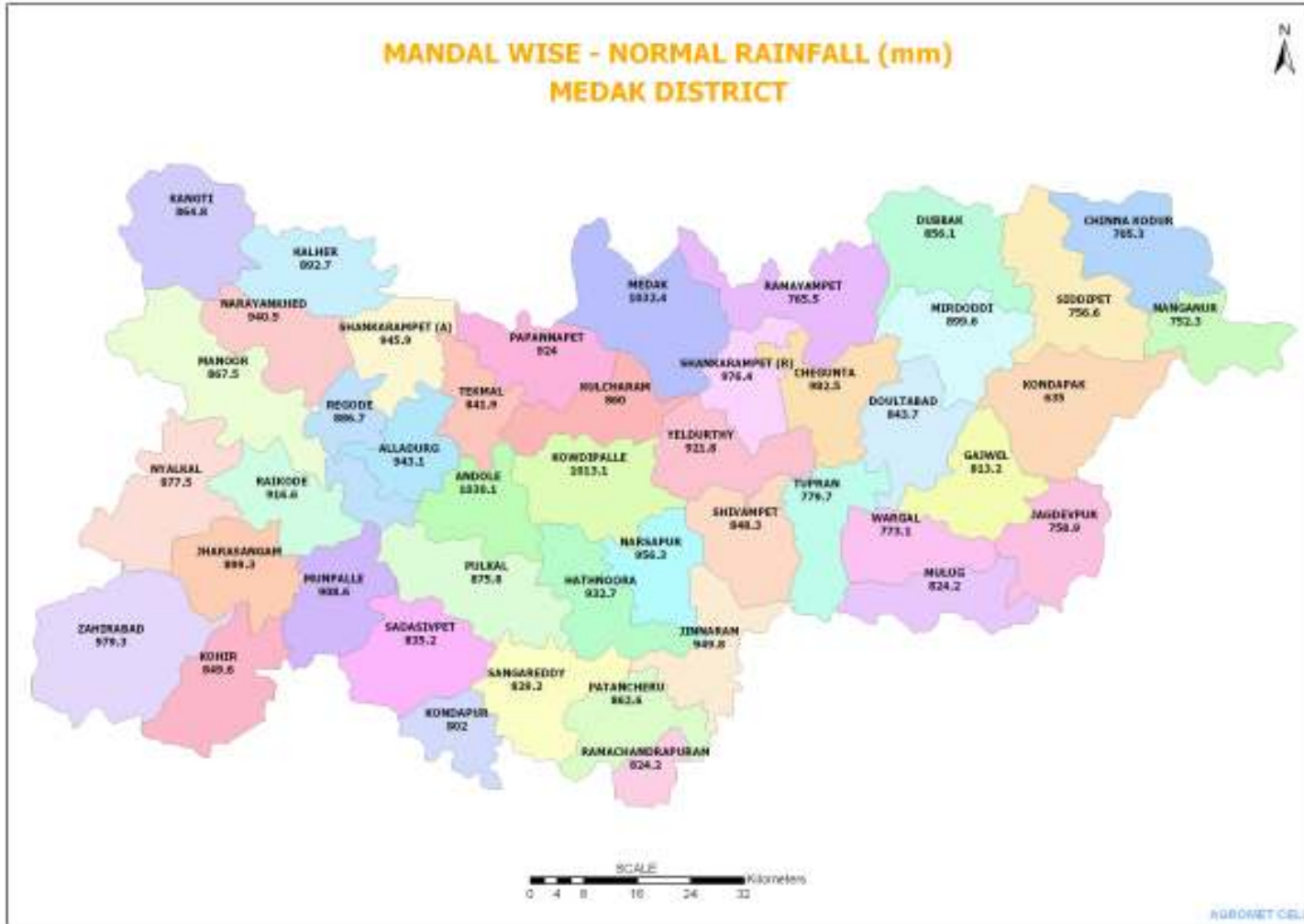


ANNEXURE-I

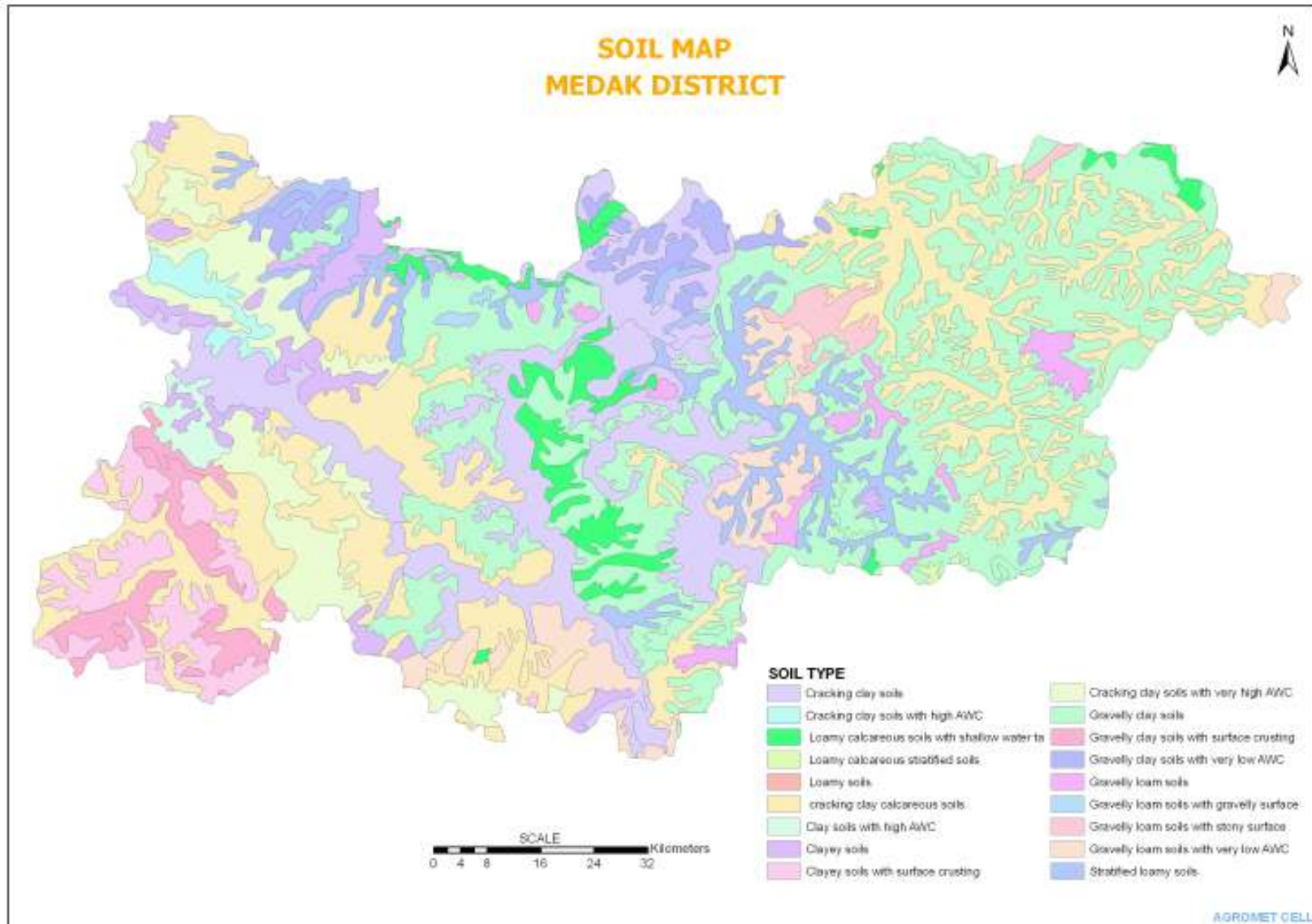
LOCATION MAP OF MEDAK WITH IN ANDHRA PRADESH



**ANNEXURE-II**  
**MEAN ANNUAL RAINFALL**



ANNEXURE-III



## 2.0 Strategies for weather related contingencies

### 2.1 Drought

#### 2.1.1 Rainfed situation

Condition	Major Farming situation	Normal Crop/cropping system	Suggested Contingency measures		
			Change in crop/cropping system	Agronomic measures	Remarks on Implementation
Early season drought (delayed onset)	Rainfed Black Soils	Maize	No change	Select short duration hybrid (KH-510, DHM-115) Thinning & Mulching	During Pre Kharif wide campaign on contingency plan to be taken up by extension officers
		Greengram		Prefer short duration, YMV Resistant varieties	
		Jowar		Prefer dual purpose Jowar varieties	
		Redgram		Prefer resistant medium duration cultivars (Maruthi, PRG-158, LRG-30)	
		Redgram + Maize (Intercrop)		Selection of medium /short duration varieties	
		Cotton		Selection of short duration BT Cotton hybrids	
		Rainfed Red Chalka soils		Cotton	
	Maize				
	Redgram				

Condition	Major Farming situation	Normal Crop/cropping system	Suggested Contingency measures		
			Change in crop/cropping system	Agronomic measures	Remarks on Implementation
<b>Early season drought (delayed onset)</b>					
Delay by 4 weeks (July 2 <sup>nd</sup> Week)	Black Soils Rainfed	Maize	No change		
		Greengram	Maize, Cotton		
		Jowar			
		Redgram	No change		
		Redgram +Maize (Intercrop)			
		Cotton			
	Rainfed Red Chalka soils	Cotton			
		Maize			
		Red gram			
		Maize			
		Red gram			

Condition	Major Farming situation	Normal Crop/cropping system	Suggested Contingency measures		
			Change in crop/cropping system	Agronomic measures	Remarks on Implementation
<b>Early season drought (delayed onset)</b>					
Delay by 6 weeks (July 4 <sup>th</sup> week)	Black Soils Rainfed	Maize	Redgram, castor	Wilt resistant medium duration varieties of Redgram	-
		Greengram			
		Jowar			
		Redgram		Wilt resistant medium duration (Maruthi, PRG-158)	
		Redgram + Maize(Intercrop)	Redgram		
		Cotton	Redgram, castor		
	Rainfed Chalka soils	Cotton	Redgram, castor, sunflower	Selection of medium duration hybrids	
		Maize	Redgram (Maruti PRG-158), castor		

		Redgram			
<b>Condition</b>			<b>Suggested Contingency measures</b>		
<b>Early season drought (delayed onset)</b>	<b>Major Farming situation</b>	<b>Normal Crop/cropping system</b>	<b>Change in crop/cropping system</b>	<b>Agronomic measures</b>	<b>Remarks on Implementation</b>
Delay by 8 weeks (Specify month)	Rainfed Black Soils Rainfed chalka soils	Maize, Greengram, Jowar, Redgram, Redgram +Maize, Cotton	Redgram (Wilt resistant medium duration variety Maruthi, PRG-158)	closer spacing (90cm between rows) horsegram	

<b>Condition</b>			<b>Suggested Contingency measures</b>		
<b>Early season drought (Normal onset)</b>	<b>Major Farming situation</b>	<b>Normal Crop/cropping system</b>	<b>Crop management</b>	<b>Soil nutrient &amp; moisture conservation measues</b>	<b>Remarks on Implementation</b>
Normal onset followed by 15-20 days dry spell after sowing leading to poor germination/crop stand etc.	Rainfed Black Soils	Maize	Gap filling. If population is sparse, re-sowing may be taken-up with short duration hybrids.	-	-
		Greengram	control whitefly which transmits YMV		
		Jowar	Resowing		
		Redgram	Resowing		
	Rainfed Red Chalka soils	Redgram + Maize (Intercrop)	Re-sowing medium and short duration varieties		
		Cotton	Gap filling  Systemic insecticide to control sucking pests.		
		Maize	If population is sparse, re-sowing of short duration hybrids.		
		Redgram	If population is sparse, re-sowing with medium duration cultivars.		

Condition			Suggested Contingency measures		
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 phase	Rainfed Black Soils	Cotton	Stem application of systemic insecticides of control sucking pests. Foliar spray 2% urea With receipt of rains after cessation of drought, apply booster dose of top dress with nitrogen	Frequent inter-cultivation to control weeds and to conserve moisture.	-
		Maize	Top dress higher dose of nitrogen to boost the growth after receipt of rains		
		Sunflower	Foliar spray of urea @ 2% to sustain the crop during drought		
	Rainfed Red Chalka Soils	Maize	Irrigate alternate row to protect the crop if water is available.  Top dress urea after supplemental irrigation to boost the growth		
		Cotton	Irrigate alternate row to protect the crop.  Top dress urea after supplemental irrigation to boost the growth.		
		Sunflower	Irrigate alternate row to protect the crop.		

			Top dress urea after supplemental irrigation to boost the growth.		
		Greengram	Irrigate alternate row if irrigation is available		

Condition	Major Farming situation	Normal Crop/cropping system	Suggested Contingency measures		
			Crop management	Soil nutrient & moisture conservation measure <sup>s</sup>	Remarks on Implementation
Mid season drought (long dry spell)	Rainfed black soils	Maize , Cotton, Sunflower, Greengram, Redgram	Foliar spray with 2% urea	-	
	Rainfed Red Chalka Soils	Maize , Cotton, Sunflower, Greengram, Redgram	Life saving irrigation if water is available		Digging of farm ponds

Condition	Major Farming situation	Normal Crop/cropping system	Suggested Contingency measures		
			Crop management	Rabi Crop planning	Remarks on Implementation
Terminal drought	Rainfed Black Soils	Maize , Cotton, Sunflower, Greengram, Redgram	Spray 2% urea or 1% KNO <sub>3</sub> life saving irrigation	Normal <i>rabi</i> crops like sunflower and Chickpea under residual soil moisture conditions incase rain received during second fortnight of October	-
	Rainfed Red Chalka Soils	Maize, Cotton	Spray 2% urea or 1% KNO <sub>3</sub> life saving irrigation	Normal <i>rabi</i> sowing with less water requirement crops like Jowar, safflower, sunflower, chickpea	



### 2.1.2 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	NA				

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	NA				

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	NA	Rice	Sunflower Redgram	Open dead furrow to conserve soil moisture	

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	Light& Heavy Soils Irrigated	Rice-Rice	Rice-Sunflower Rice-Maize		

Condition			Suggested Contingency measures		
	Major Farming situation	Normal Crop/cropping system	Change in crop/cropping system	Agronomic measures	Remarks on Implementation
Insufficient groundwater recharge due to low rainfall	Light& Heavy Soils Irrigated	Rice	Sunflower Redgram	Irrigate at critical stages  Discourage rice. Grow less water requiring	

Condition	Suggested Contingency measures				
	Major Farming situation	Normal Crop/cropping system	Change in crop/cropping system	Agonomic measures	Remarks on Implementation
				crops. Redgram, chickpea, sunflower, safflower <i>etc.</i>	

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

Condition	Suggested contingency measure			
Continuous high rainfall in a short span leading to water logging (or) high speed winds in a short span	Vegetative stage	Flowering stage	Crop maturity stage	Post harvest
Maize	Drain out excess water Take-up plant protection measures	Drain out excess water. Timely Plant protection Measures are to be taken up	Drain out excess water	Shifting of cobs immediately after drying
Rice				
Cotton				
Redgram				
Jowar				
<b>Horticulture crops – Fruits</b>				
Mango	<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> <li>• Wind damaged branches should be pruned using disinfected secateurs and cut ends must be smeared with Bordeaux paste</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>
Banana	<ul style="list-style-type: none"> <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> </ul>	<ul style="list-style-type: none"> <li>• Drain the excess water as soon as possible</li> </ul>	<ul style="list-style-type: none"> <li>• Use ripening chambers for quick ripening</li> </ul>

	<ul style="list-style-type: none"> <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> <li>• If the age of the plant is less than three months and submergence up to three feet better to replant the garden.</li> <li>• Wind damaged branches should be pruned using disinfected secateurs and cut ends must be smeared with Bordeaux paste</li> </ul>	<ul style="list-style-type: none"> <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>• 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>	<ul style="list-style-type: none"> <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 prevent further lodging.</li> </ul>	<ul style="list-style-type: none"> <li>• Market the produce as soon as possible.</li> </ul>
<b>Horticultural crops - Vegetables</b>				
Chilies	<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 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</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 soon as possible.</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 soon as possible.</li> <li>• Do not store such produce for long periods.</li> </ul>

	June to August, sowing of best alternative crop must be taken up.			
Tomato	<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>• 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>
Onion	<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> </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>• Dry the harvested onions in thin layers under shade in well ventilated places</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>
Potato				
Beans				
Horticulture flowers				
Crossandra	<ul style="list-style-type: none"> <li>• Drain the excess water as soon as possible</li> <li>• Spray Urea 2% or 1% KNO3 solution 2-3 times.</li> </ul>	<ul style="list-style-type: none"> <li>• Drain the excess water as soon as possible</li> <li>• Spray Urea 2% or 1% KNO3 solution 2-3 times.</li> </ul>	<ul style="list-style-type: none"> <li>• Drain the excess water as soon as possible</li> <li>• Spray Urea 2% or 1% KNO3 solution 2-3 times.</li> <li>• Harvest the marketable flowers as soon as possible</li> </ul>	<ul style="list-style-type: none"> <li>• Store the flowers in well ventilated place temporarily before it can be marketed.</li> <li>• Market the flowers as soon as possible</li> </ul>
Spices & Plantation				

crops				
Turmeric	<ul style="list-style-type: none"> <li>• Drain the excess water as soon as possible</li> <li>• Spray Urea 2% or 1% KNO3 followed by Ferrous Sulphate 0.5% + Citric Acid 0.1 % solution 2-3 times.</li> <li>• Topdressing of booster dose of 40 kg MOP + 50 kg Urea along with 250 kg of Neem Cake per acre as soon as possible.</li> <li>• In case of severe damage (considered as complete economical loss or if inundation is more than for four days), 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% or 1% KNO3 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 rhizomes when field comes to normal</li> </ul>	<ul style="list-style-type: none"> <li>• Dry the rhizomes on concrete floor or use boilers (if available ) for processing immediately</li> <li>• Grade and separate the rotten and mould affected rhizomes.</li> <li>• Pack the dried material in gunny bags disinfected with safe insecticides</li> <li>• Store in a well ventilated rooms</li> </ul>
<b>Outbreak of pests and diseases due to unseasonal rains</b>				
Maize	Sucking Pest like Thrips		Spodoptera	
Rice	Aphids,Jassids,Mites		Heliothis	
Cotton	Panicle mite in Rice		Blast,Sheathblight,Wilt	
Redgram				
Jowar				
<b>Horticulture crops – Fruits</b>				
Mango				
Banana				
<b>Horticulture vegetables</b>				
Chillies				
Tomato				
Onion				
Potato				
Beans				

<b>Horticulture flowers</b>				
Crossandra				
<b>Horticulture spice &amp; plantation</b>				
Turmeric				

### 2.3 Floods

Condition	Suggested contingency measure			
	Seedling / nursery stage	Vegetative stage	Reproductive stage	At harvest
<b>Transient water logging/partial inundation<sup>1</sup> (or) Continuous submergence for more than 2 days</b>				
Maize	Drain out excess water Take-up plant protection measures	Drain out excess water. Timely Plant protection Measures are to be taken up	Drain out excess water	
Rice				
Cotton				
Redgram				
Jowar				
Horticulture crops – Fruits				
Mango	<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>• 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 fruits as soon as possible.</li> <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>
Banana	<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> <li>• Topdressing of booster dose of 80 g MOP + 100 g</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> <li>• Stake the plants with bamboos to prevent</li> </ul>	<ul style="list-style-type: none"> <li>• Drain the excess water as soon as possible.</li> <li>• Harvest the mature bunches as soon as possible.</li> <li>• use ripening chambers</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> <li>• Topdressing of booster dose of 80 g MOP + 100 g</li> </ul>

	<p>Urea per plant in two to three splits at monthly intervals.</p> <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> </ul>	<p>further lodging.</p>	<p>for quick and uniform ripening</p> <ul style="list-style-type: none"> <li>Store the harvested bunches in well ventilated place temporarily before it can be marketed.</li> <li>Market the fruits as soon as possible.</li> </ul>	<p>Urea per plant in two to three splits at monthly intervals.</p> <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> </ul>
Horticulture Vegetables				
Chilies	<ul style="list-style-type: none"> <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>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>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>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.</li> <li>Spray any drying oil after the pods are free from surface moisture for quick drying.</li> <li>Use poly house solar driers for quick drying</li> <li>Remove the pest and disease infected pods.</li> <li>Market the produce as soon as possible.</li> </ul>
Tomato	<ul style="list-style-type: none"> <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>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>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>
Onion	<ul style="list-style-type: none"> <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> </ul>	<ul style="list-style-type: none"> <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> </ul>



		<ul style="list-style-type: none"> <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>• Spray Urea 2% solution once.</li> </ul>	<ul style="list-style-type: none"> <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>
Potato	<ul style="list-style-type: none"> <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>• 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>• 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>
Beans	<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> <li>• Intercultivate the soil with</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 12 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 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>

	<p>gorru for better aeration</p> <ul style="list-style-type: none"> <li>• Spray ferrous sulphate 20g + citric acid 5g in 10 lit of water twice at weekly intervals</li> </ul>			
Flowers				
Crossandra	<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> </ul>	<ul style="list-style-type: none"> <li>• Drain the excess water from the field as early as possible.</li> <li>• Apply booster dose of nutrients to promote the growth</li> <li>• Take appropriate measures to check the soil borne pathogens and sucking pest complex.</li> </ul>	<ul style="list-style-type: none"> <li>• Drain the excess water from the field as early as possible.</li> <li>• Apply booster dose of nutrients to promote the growth</li> <li>• Take appropriate measures to check the soil borne pathogens and sucking pest complex.</li> </ul>	<ul style="list-style-type: none"> <li>• Drain the excess water from the field as early as possible.</li> <li>• Apply booster dose of nutrients to promote the growth</li> <li>• Take appropriate measures to check the soil borne pathogens and sucking pest complex.</li> <li>• Harvest the flowers and market immediately</li> </ul>
Spices & plantation				
Turmeric		<ul style="list-style-type: none"> <li>• Drain the excess water as soon as possible</li> <li>• Spray Urea 2% or 1% KNO3 solution 2-3 times.</li> <li>• Spray ferrous sulphate 20g + citric acid 5g in 10 lit of water twice at weekly intervals</li> </ul>	<ul style="list-style-type: none"> <li>• Drain the excess water as soon as possible</li> <li>• Spray Urea 2% or 1% KNO3 solution 2-3 times.</li> <li>• Spray ferrous sulphate 20g + citric acid 5g in 10 lit of water twice at weekly intervals</li> </ul>	<ul style="list-style-type: none"> <li>• Drain the excess water as soon as possible.</li> <li>• Dry the rhizomes on concrete floor immediately after the appearance of sunlight. Mix thoroughly and periodically for quick and uniform drying of surface moisture.</li> <li>• Use boilers and polishers for processing</li> <li>• Remove and separate the rotten and mould affected rhizomes.</li> <li>• Cook and dry the rhizomes as soon as possible.</li> </ul>

## 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
<b>Heat Wave</b>				
Rice	Irrigation in early Hours			
Sugarcane	Mulching			
<b>Horticulture</b>	Shade Nets,			
Fruit Trees	1% Urea Spray, irrigation during night hours			
Vegetables	Water Spraying			

## 2.5 Contingent strategies for Livestock, Poultry & Fisheries

### 2.5.1 Livestock

Before the event	During the event	After the event
<b>Feed and fodder availability</b>		
<ol style="list-style-type: none"> <li>1. Conserving fodder/crop residues/ forest grass by silage / hay making either by individual or on community basis</li> <li>2. Preparing complete diets and storing in strategic locations</li> <li>3. Organize procurement of dry fodders / feed ingredients from surplus areas</li> <li>4. Establish fodder banks and feed banks</li> <li>5. Livestock relief camps during floods/cyclones must be planned in the vicinity of relief camps for people</li> <li>6. Capacity building and preparedness</li> </ol>	<ol style="list-style-type: none"> <li>1. Organise relief camps</li> <li>2. Supply silage / hay to farmers with productive stock on subsidized rates</li> <li>3. Segregate old, weak and unproductive stock and send for slaughter</li> <li>4. Supply mineral mixture to avoid deficiencies</li> <li>5. Dry fodder must be offered to the livestock in little quantities for number of times</li> <li>6. Concentrate feed or complete feed must be offered to only productive and young stock only</li> </ol>	<ol style="list-style-type: none"> <li>1. Capacity building to stakeholders on drought /cyclone/flood mitigation in livestock sector</li> <li>2. Promote fodder cultivation.</li> <li>3. Flushing the stock to recoup</li> <li>4. Avoid soaked and mould infected feeds / fodders to livestock</li> <li>5. Replenish the feed and fodder banks</li> <li>6. Promote fodder preservation techniques like silage / hay making</li> </ol>

<b>Drinking water</b>		
<p>1. Construct drinking water tanks in herding places, village junctions and in relief camp locations</p> <p>2. Plan for sufficient number of tanks for water transportation</p> <p>3. Identify bore wells, which can sustain demand.</p> <p>4. Procure sufficient quantities of water Sanitizers</p>	<p>1. Regular supply of clean drinking water to all tanks</p> <p>2. Cleaning the tanks in regular intervals</p> <p>3. Keep the livestock away from contaminated flood/cyclone/stagnated waters</p> <p>3. Add water sanitizers</p>	<p>1. Hand over the maintenance of the structures to panchayats</p> <p>2. Sensitize the farming community about importance of clean drinking water</p>
<b>Health and disease Management</b>		
<p>1. Procure and stock emergency medicines and vaccines for important endemic diseases of the area</p> <p>2. All the stock must be immunized for endemic diseases of the area</p> <p>3. Carry out deworming to all young stock</p> <p>4. Keep stock of bleaching powder and lime</p> <p>5. Carry out Butax spray for control of external parasites</p> <p>6. Identify the Clinical staff and trained paravets and indent for their services as per schedules</p> <p>7. Identify the volunteers who can serve in need of emergency</p>	<p>1. Keep close watch on the health of the stock</p> <p>2. Sick animals must be isolated and treated Separately.</p> <p>3. Carry out deworming and spraying to all animals entering into relief camps</p> <p>4. Clean the animal houses regularly and apply disinfectants.</p> <p>5. Safe and hygienic disposal of dead animal carcasses</p> <p>6. Organize with community daily lifting of dung from relief camps</p>	<p>1. keep close surveillance on disease outbreak.</p> <p>2. Undertake the vaccination depending on need</p> <p>3. Keep the animal houses clean and spray disinfectants</p>

### 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	<p>As chronically drought prone district, it should have reserves of the following at any point of the year for mobilization to the needy areas (for feeding 5000 ACU (maintenance ration) for about 1-3 weeks period)</p> <p>Silage:20-50 t Urea molasses mineral bricks (UMMB):50-100 t Hay:100-250 t Concentrates: 20-50 t Minerals and vitamin supplements mixture:1-5 t</p> <p>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)</p> <p>Top dressing of N in 2-3 split doses @ 20-25 kg N/ha in common property resources (CPRs) like temple lands, panchyat lands or private property resources (PPRs) like waste and degraded lands with the monsoon pattern for higher biomass production</p> <p>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</p> <p>Chopping of fodder should be made as</p>	<p>Harvest and use biomass of dried up crops (Rice, sorghum, Maize, Bajra, Groundnut, Horse gram, black gram) material as fodder.</p> <p>Harvest the tree fodder (Neem, Subabul, Acasia, Pipal etc) and unconventional feeds resources available and use as fodder for livestock (LS).</p> <p>Available feed and fodder should be cut from CPRs and stall fed in order to reduce the energy requirements of the animals</p> <p><b>Mild drought:</b> hay should be transported to the needy areas from the near by districts</p> <p><b>Moderate drought:</b> hay, silage and vitamin &amp; minerals mixture should be transported to the needy areas from the reserves at the district level initially and latter stages from the near by districts</p> <p><b>Severe drought:</b> 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/horse gram 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</p> <p>Herd should be split and supplementation should be given only to the highly productive and breeding animals</p> <p>Provision of emergency grazing/feeding (Cow-calf camps or other special arrangements to protect high productive &amp; breeding stock)</p> <p>Motivate the farmers to mix the dry fodder with available kitchen waste while feeding</p>	<p>Concentrates supplementation should be provided to all the animals.</p> <p>The farmers may be advised to practice “flushing the stock” to recoup</p> <p>Short duration fodder crops of should be sown in unsown and crop failed areas where no further routine crop sowing is not possible</p> <p>Supply of quality seeds of fodder varieties and motivating the farmers to cultivate at least 10% of their land holding for fodder production</p>

	<p>mandatory in every village through supply and establishment of good quality chaff cutters.</p> <p>Establishment of backed yard cultivation of Azolla</p> <p>Harvesting and collection of perennial vegetation particularly grasses which grow during monsoon</p> <p>Proper drying, bailing and densification of harvested grass from previous season</p> <p>Creation of permanent fodder, feed and fodder seed banks in all drought prone villages</p>	<p>Arrangements should be made for mobilization of small ruminants across the villages where no drought exits with subsidized road/rail transportation and temporary shelter provision for the shepherds</p> <p>Unproductive livestock should to be culled during severe drought</p> <p>Create transportation and marketing facilities for the culled and unproductive animals (10000-20000 animals)</p> <p>Supply silage and or hay on subsidized rates to the farmers having high productive stock</p> <p>Subsidized loans (5-10 crores) should be provided to the livestock keepers</p>	
Heat wave	<p>As the district being chronically prone to heat waves the following permanent measures are suggested</p> <ol style="list-style-type: none"> <li>i) Plantation of trees like Neem, Pipal, Subabul around the shed</li> <li>ii) Spreading of husk/straw/coconut leaves over the roof top of the shed</li> <li>iii) Water sprinklers / foggers in the animal shed</li> <li>iv) Application of white reflector paint on the roof to reduce thermal radiation effect</li> </ol>	<p>Allow the animals preferably 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 during heat waves in case of high productive animals</p> <p>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.</p>	<p>Feed the animals as per routine schedule</p> <p>Allow the animals for grazing (normal timings)</p>
Health and Disease management	<p>Timely vaccination (as per enclosed vaccination schedule) against all endemic diseases</p> <p>Procurement of emergency medicines and medical kits</p> <p>Surveillance and disease monitoring network to be established at Joint Director (Animal Husbandry) office in the district</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>Rescue of sick and injured animals and their treatment</p>	<p>Conducting mass animal health camps</p> <p>Conducting fertility camps</p> <p>Mass deworming camps</p> <p>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>

			Keeping vigil on disease outbreak
Insurance	Encouraging insurance of livestock	Listing out the details of the dead animals	Submission for insurance claim and availing insurance benefit Purchase of new productive animals
Drinking water	Identification of water resources Rain water harvesting and create water bodies/watering points (when water is scarce use only as drinking water for animals) Construction of drinking water tanks in herding places/village junctions/relief camp locations	Restrict wallowing of animals in water bodies/resources	Bleach (0.1%) drinking water / water sources Provide clean drinking water

**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	During the event	After the event
Drought			
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	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	Rain water harvesting	Sanitation of drinking water	Give sufficient water as per the bird's requirement
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)	Hygienic and sanitation of poultry house Disposal of dead birds by burning / burying with lime powder in pit
Heat wave			
Shelter/environment management	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
Health and disease management	Deworming and vaccination against RD and fowl pox	Supplementation of house hold grain Provide cool and clean drinking water with electrolytes and vit. C (5-10 ml per litre) In hot summer, add anti-stress probiotics	Routine practices are followed



		in drinking water or feed (Reestobal etc., 10-20ml per litre)	
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### 2.5.3 Fisheries/ Aquaculture

	Suggested contingency measures		
	Before the event	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 advnced 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 qaulity	Immediate harvesting or changing the water quality by application of sanitisers.	Removal of top layer, deep ploughing of tank and application of lime
<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	Frenquent change of water with fresh water	Frequent draining of the pond with fresh water, removal of top layers
<b>2) Floods</b>			
<b>A. Capture</b>			
Inland			
(i) Average compensation paid due to	Shifting the people from low lying	Deployment of specially trained	Payment sufficient ex-gratia to the

loss of human life	areas to relief camps	persons for rescue operations by providing life bouys, jackets, ropes, boats, etc	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 Heamorrhagic septicimea. Addition of antibiotics like Chloro Tetra Cycline or Oxy Tetra Cycline to the feed to constrol 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 where they are prone to breaches, 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>			
A. Capture			
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. Aquaculture			
(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, huts etc)	Pumps, aerators, etc must be protected	To avoid use of aerators, pumps	Overhauling of the equipment to

aerators, shelters/huts etc)	by moving them to safe locations	and other appliances	prevent from being damaged
<b>4. Heat wave and cold wave</b>			
<b>A. Capture</b>			
Inland	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