

State: ANDHRAPRADESH

Agriculture Contingency Plan for District: KARIMNAGAR

1.0 District Agriculture profile										
1.1	Agro-Climatic/Ecological Zone									
	Agro Ecological Sub Region (ICAR)		North Telangana Plateau, hot moist semi arid ESR (7.2)							
	Agro-Climatic Region (Planning Commission)		Southern Plateau Hills Region (X)							
	Agro Climatic Zone (NARP)		Northern Telangana Zone (AP-4)							
	List all the districts or part thereof falling under the NARP Zone		Nizamabad, Adilabad, Karimnagar,							
	Geographic coordinates of district		Latitude 17 ⁰ 5'0" N			Longitude 78 ⁰ 29'0" E			Altitude 1600 M	
	Name and address of the concerned ZRS/ ZARS/ RARS/ RRS/ RRTTS		Regional Agriculture Research Station (RARS) P.O: Polasa; Jagtial, Dist:Karimnagar							
Mention the KVK located in the district		1. Prakasam Krishi Vignana Kendra, Jammikunta 2. Krishi Vignana Kendra, Kamanpur								
1.2	Rainfall		Normal RF(mm)	Normal Rainy days (no)	Normal Onset (specify week and month)			Normal Cessation (specify week and month)		
	SW monsoon (June-Sep):		756	54	Second week of June			September first week		
	NE Monsoon(Oct-Dec):		101	6	-			-		
	Winter (Jan- Feb)		18	3	-			-		
	Summer (Mar-May)		45	4	-			-		
	Annual		920	67	-			-		
1.3	Land use pattern of the district (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

	Area (000' ha)	1182.3	250.4	89.7	41.3	26.6	10.8	96.3	199.7	38.4
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* To check Map in Library with MBSS

1.4	Major Soils (common names like shallow red soils etc.,)	Area ('000 ha)	Percent (%) of total
	Red sandy Loam	532.0	45
	Black soils	650.2	55
	Others (specify):		
1.5	Agricultural land use	Area ('000 ha)	Cropping intensity %
	Net sown area	454.1	154.5
	Area sown more than once	247.3	
	Gross cropped area	701.4	

1.6	Irrigation	Area ('000 ha)		
	Net irrigated area	341.0		
	Gross irrigated area	547.4		
	Rainfed area	113.1		
	Sources of Irrigation	Number	Area ('000 ha)	Percentage of total irrigated area
	Canals		15.7	4.6
	Tanks / kuntas	5512	24.2	7.1
	Open wells / all wells	235067		
	Bore wells		300.0	88.2
	Lift irrigation			
	Micro-irrigation			
	Other sources		0.3	0.1
	Total Irrigated Area		340.2	100.0
	Pump sets	172155		
	No. of Tractors	9061		
	Groundwater availability and use* (Data source: State/Central Ground water Department /Board)	No. of blocks/mandals Tehsils	(% area)	
	Over exploited	9		
	Critical	8		
	Semi- critical	5		
	Safe	35		
Wastewater availability and use				
Ground water quality				
*over-exploited: groundwater utilization > 100%; critical: 90-100%; semi-critical: 70-90%; safe: <70%				

Area under major field crops & horticulture etc.

1.7		Major Field Crops cultivated (Average of last 5 years: 2004,05,06, 07, 08)	Area ('000 ha)					
			Kharif		Rabi		Summer	Total
			Irrigated	Rainfed	Irrigated	Rainfed		
			1	Paddy	126.6		84.2	

2	Maize	106		45.6	-	-	151.6
3	Cotton	42	62	-	-	-	104
4	Greengram	16.8		1.6	-		18.4
5	Redgram	12.2		--			12.2
	Horticulture crops – Fruits	Total area (000' ha)					
1	Mango	15.2					
2	Orange & Batavian	4.1					
	Horticultural crops - Vegetables	Total area (000' ha)					
1	Chillies	4.71					
2	Tomato	1.63					
3	Cucumber	1.50					
	Spice crops						
1	Turmeric	18.3					

1.8	Livestock	Male (number)	Female (number)	Total (number)			
	Non descriptive Cattle (local low yielding)	401.8	139.5	541.3			
	Crossbred cattle	4.7	19.4	24.1			
	Non descriptive Buffaloes (local low yielding)	87.6	560.1	647.8			
	Graded Buffaloes						
	Goat			383.0			
	Sheep			1738.7			
	Others (Camel, Pig, Yak etc.)			61.74			
	Commercial dairy farms (Number)						
1.9	Poultry	No. of farms	Total No. of birds (number)				
	Commercial		2471577				
	Backyard		2424071				
1.10	Fisheries (Data source: Chief Planning Officer)						
	A. Capture						
	i) Marine (Data Source: Fisheries Department)	No. of fishermen	Boats		Nets		Storage facilities (Ice plants etc.)
			Mechanized	Non-mechanized	Mechanized (Trawl nets, Gill nets)	Non-mechanized (Shore Seines, Stake & trap nets)	
	No. Farmer owned ponds	No. of Reservoirs		No. of village tanks			

	ii) Inland (Data Source: Fisheries Department)	50	3	612
B. Culture				
		Water Spread Area (ha)	Yield (t/ha)	Production ('000 tons)
	i) Brackish water (Data Source: MPEDA/ Fisheries Department)	-	-	0
	ii) Fresh water (Data Source: Fisheries Department)	21	-	0.1
	Others			9.2

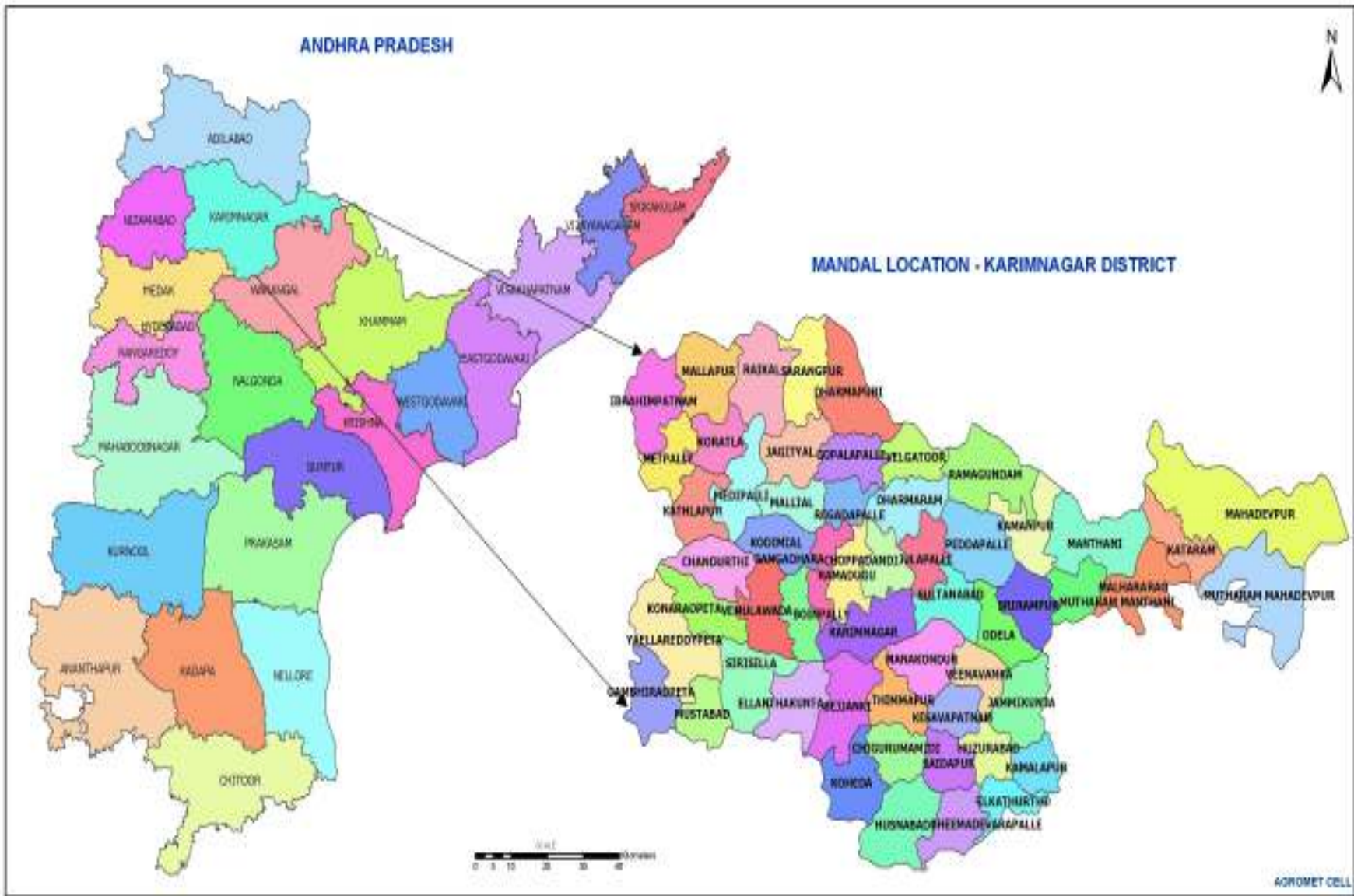
1.11	Production and Productivity of major crops (Average of last 5 years: 2004,05,06, 07, 08)	Kharif		Rabi		Summer		Total		Crop residue as fodder ('000 tons)
		Production ('000 t)	Productivity (kg/ha)	Production ('000 t)	Productivity (kg/ha)	Production ('000 t)	Productivity (kg/ha)	Production ('000 t)	Productivity (kg/ha)	
Major Field crops (Crops to be identified based on total acreage)										
	Paddy	401.6	3082.2	352.2	3254.6	-	-	753.8	6336.8	
	Maize	406.2	3828.8	224.6	4758.6	-	-	630.8	8587.4	
	Cotton	235.2	371.6	-	-	-	-	235.2	371.6	
	Redgram	6	499.6	-	-	-	-	6	499.6	
	Greengram	5.2	300	1.2	564.2	-	-	6.4	864.2	
Major Horticultural crops (Crops to be identified based on total acreage)										
Horticulture crops - Fruits										
	1	Mango						126.0	8267	
	2	Orange&Batavian						54.9	133.0	
Vegetables										
	1	Chillies						126.0	826.7	

	2	Tomato						54.9	133.0	
	3	Cucumber						126.0	826.7	
	Spice crops									
	1	Turmeric						113.8	620.0	

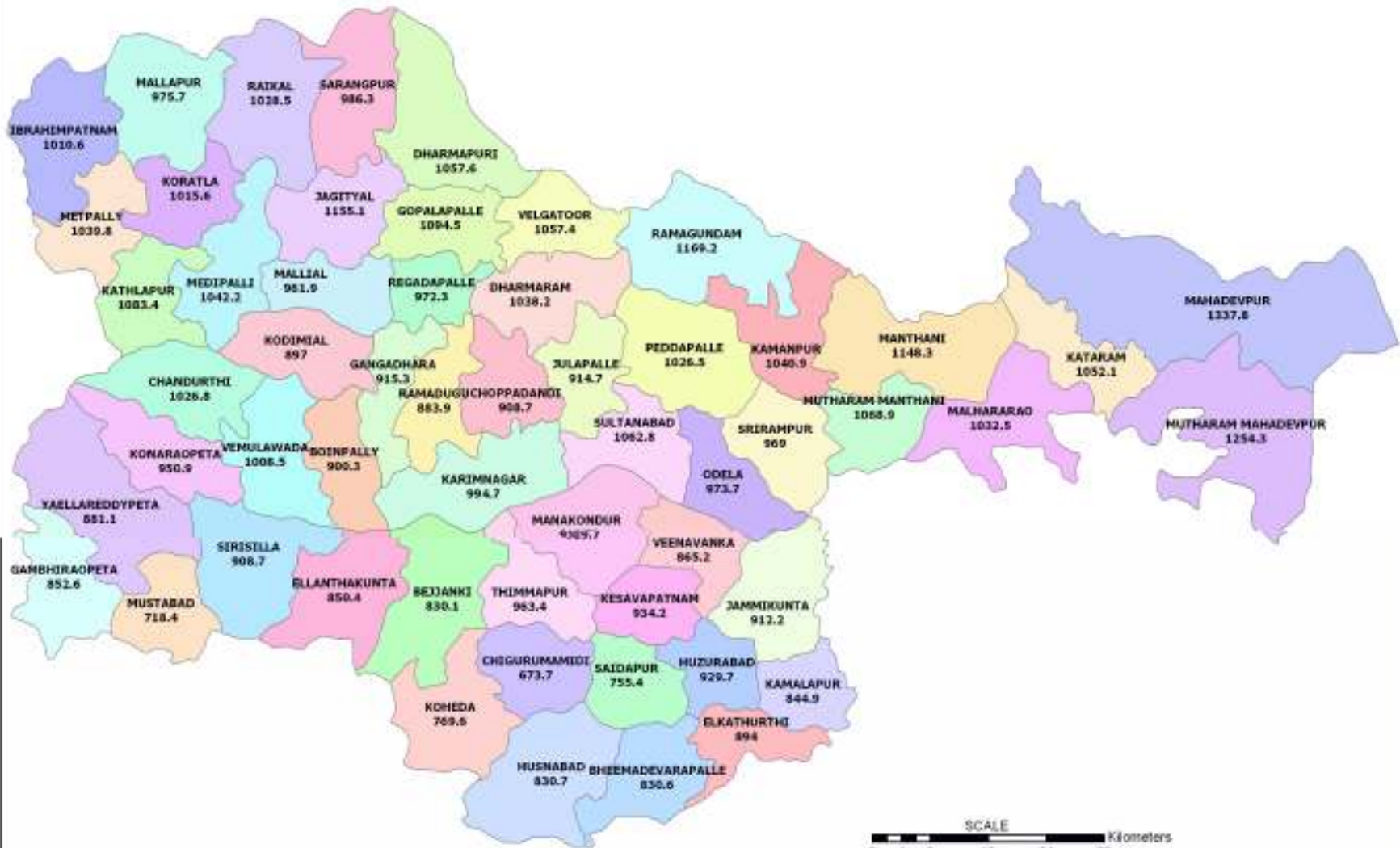
1.12	Sowing window for 5 major field crops (start and end of normal sowing period)	Paddy	Maize	Cotton	Redgram	Greengram
	Kharif- Rainfed	--	--	June 2 nd week to July 1st week	June 2 nd fortnight to August 2 nd week	June 1 st fortnight
	Kharif-Irrigated	June 4 th week to July 4 th week (Nursery)	June 2 nd week to July 2 nd week	June 2 nd week to July 1st week		
	Rabi- Rainfed	--	--	--	--	
	Rabi-Irrigated	November 2 nd fortnight	October 2 nd week to December 1 st week	--	--	2 nd fortnight of January

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			
	Cyclone			
	Hail storm		√	
	Heat wave		√	
	Cold wave			
	Frost			
	Sea water intrusion			
	Pests and diseases (specify)	√		

1.14	Include Digital maps of the district for	Location map of district within state as Annexure I	Enclosed: Yes
		Mean annual rainfall as Annexure 2	Enclosed: Yes
		Soil map as Annexure 3	Enclosed: Yes

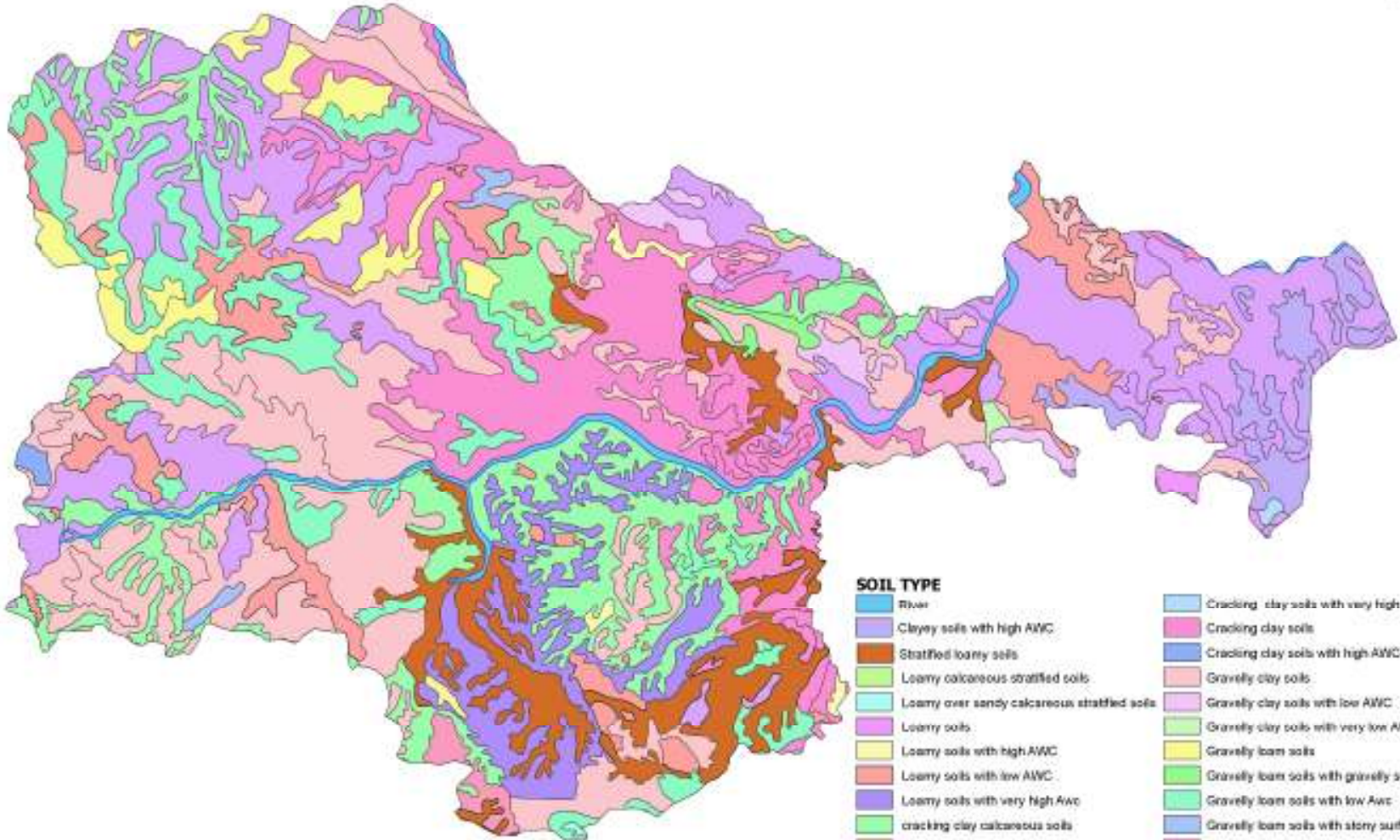


**MANDAL WISE - NORMAL RAINFALL (mm)
KARIMNAGAR DISTRICT**



AUROMET CELL

SOIL MAP - KARIMNAGAR DISTRICT



- SOIL TYPE**
- | | |
|---|---|
| River | Cracking clay soils with very high AWC |
| Clayey soils with high AWC | Cracking clay soils |
| Stratified loamy soils | Cracking clay soils with high AWC |
| Loamy calcareous stratified soils | Gravelly clay soils |
| Loamy over sandy calcareous stratified soils | Gravelly clay soils with low AWC |
| Loamy soils | Gravelly clay soils with very low AWC |
| Loamy soils with high AWC | Gravelly loam soils |
| Loamy soils with low AWC | Gravelly loam soils with gravelly surface |
| Loamy soils with very high AWC | Gravelly loam soils with low AWC |
| cracking clay calcareous soils | Gravelly loam soils with stony surface |
| Clayey over sandy calcareous stratified soils | Gravelly loam soils with very low AWC |
| Clayey soils | |



AGROMET-CELL

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) Delay by 2 weeks (up to June end)	Red soils	Maize - Maize / greengram	No change	No change	-
		Cotton			
		Redgram			
		Greengram - Maize			
		Redgram + greengram			
	Black soils	Redgram			
		Greengram - Maize			
		Cotton			

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) Delay by 4 weeks (July 2 nd week)	Red soils	Maize - Maize / greengram	No change	Wilt Resistant Medium Duration varieties (Maruthi, PRG-158)	
		Cotton			
		Redgram	Maize	Wilt Resistant Medium Duration varieties (Maruthi, PRG-158)	
		Greengram - Maize			
		Redgram + greengram			
	Black soils	Redgram	Maize (Short duration hybrids should be taken)	-do-	
		Greengram - Maize			
		Cotton	No change		

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) Delay by 6 weeks (July 4 th week)	Red soils	Maize - Maize / greengram	Sunflower	Short duration variety / hybrids	
		Cotton	Redgram (LRG 30, PRG 158, LRG 41, MRG 66, PRG 100)	Adopt closer spacing	
		Redgram	-do-	Adopt closer spacing	
		Greengram - Maize	Sunflower	Prefer short duration variety / hybrids	
		Redgram + greengram	No change	Adopt closer spacing (90x20 cm)	
	Black soils	Redgram		Adopt Closer spacing (120x30 cm)	
		Greengram - Maize	Sunflower	Prefer medium duration variety / hybrids	

		Cotton	Redgram (LRG 30, PRG 158, LRG 41, MRG 66, PRG 100)	Adopt Closer spacing	
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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) Delay by 8 weeks (August 2 nd week)	Black soils	Cotton	Sunflower / Sesamum (Chandana, Swetha Til, Rajeshwari)	-	
		Redgram	No change	Closer spacing (120 x 20 cm)	
		Greengram - maize	Sunflower	Short duration variety / hybrids	
	Red soils	Maize - maize / green gram	Redgram, Sunflower	Closer spacing of redgram	
		Red gram	Wilt Resistant Medium Duration (Maruthi, PRG -158.),	Adopt closer spacing (90 x 20 cm)	
		cotton	sunflower + green gram	Prefer short duration variety / hybrids	
		Greengram - maize	Sunflower + groundnut / green gram / maize	Prefer Short duration hybrids	
		Redgram + Ground nut	Wilt Resistant Medium Duration(Maruthi, PRG - 158.),	Adopt closer spacing	

Condition	Major Farming situation	Normal Crop/cropping system	Suggested Contingency measures		
			Crop management	Soil nutrient & moisture conservation measures	Remarks on Implementation
Early season drought (Normal onset)					
Normal onset followed by 15-20 days dry spell after sowing leading to poor germination/crop stand etc.	Red soils	Cotton	Gap filling Stem application of systemic insecticide to control sucking pests.	Intercultivation	
		Maize	Gap filling If population is sparse, re-sowing may be taken-up with short duration hybrids.		
		Redgram	Gap filling/ Re-sowing		
		Greengram - maize			
	Redgram + groundnut	Maintain optimum population to avoid competition	Thinning and intercultivation to break crust formation		
	Black soils	Cotton	Gap filling by raising seedlings in polythene bags		
		Redgram	thinning		
Greengram - maize					

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, consecutive 2 weeks rainless (>2.5 mm) period)					
At vegetative stage	Red soils	Cotton	Spray 2% urea or 2% DAP solution two to three times at 10-15 day intervals Take up pest control measures	Frequent intercultivation Delay fertilizer application till the rain received	
		Maize - green gram / maize		Give supplemental irrigation ,if available Spray 2% urea or 2% DAP	

				solution two to three times at 10-15 day intervals	
		Redgram		Give supplemental irrigation, if available Frequent intercultivation Spray 2% urea or 2% DAP solution	
		Greengram - maize	Removal of 1/3 rd plant population	Frequent Intercultivations Spray 2% urea or 2% DAP solution	
		Redgram + groundnut		Spray 2% urea solution	
	Black soils	Cotton		Frequent inter cultivation to conserve soil moisture Delay fertilizer application till the rain received Application of (Spray) 2% urea solution two to three times at 10-15 day intervals	
		Redgram			
		Greengram - maize	Removal of 1/3 rd plant population	Frequent intercultivations with push hoe, guntaka	

Condition			Suggested Contingency measures		
Mid season drought (long dry spell)	Major Farming situation	Normal Crop/cropping system	Crop management	Soil nutrient & moisture conservation measues	Remarks on Implementation
At reproductive stage	Red soils	Cotton		Frequent intercultivation Foliar spray of urea @ 2% for proper boll development	
		Maize - greengram /maize	Irrigate alternate row to protect the crop if water is available	Foliar spray of urea @ 2%	
		Redgram	Give supplemental irrigation, ,if available	Foliar spray of urea @ 2%	
		Greengram - maize	Harvest as fodder		
		Redgram + groundnut	Harvest groundnut as fodder to save redgram		
	Black soils	Cotton		Foliar spray of urea @ 2% for proper boll development	
		Redgram	Give supplemental irrigation, if available	Foliar spray of urea @ 2%	
Greengram - maize		Do as above	Foliar spray of urea @ 2%		

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Condition	Major Farming situation	Normal Crop/cropping system	Suggested Contingency measures		
			Crop management	Rabi Crop planning	Remarks on Implementation
Terminal drought	Red soils	Cotton	Topping to avoid new flush	Frequent intercultivations if possible Foliar spray of 2% urea solution to protect the crop	
		Maize - greengram / maize	Harvest for fodder	Normal <i>rabi</i> sowing with less water requirement crops like Jowar, Safflower, Sunflower, Greengram	
		Redgram	Give supplemental irrigation if available		
		Greengram - maize	Harvest for fodder		
		Redgram + groundnut	Harvest groundnut for fodder to save redgram		
		Black soils rainfed	Cotton	Foliar spray of 2% urea	
	Redgram	Supplemental irrigation if available			
	Greengram - maize	Harvest for fodder			

2.1.2 Irrigated situation

Condition	Suggested Contingency measures				
	Major Farming situation	Normal Crop/cropping system	Change in crop/cropping system	Agronomic measures	Remarks on Implementation
Delayed release of water in canals due to low rainfall	Black soils	Paddy- Paddy	No change	<ol style="list-style-type: none"> Where ever possible green manure crops like sunhemp, pillipesara, greengram may be sown with little showers. Some portion of sunhemp may be fed as fodder, left over may be incorporated as and when release of water When the aged seedlings transplanted, increase N level by 50% and apply in equal splits in the main field Direct sowing of paddy with drum seeder Dry seeding of rice can also be takenup with Gallmidge resistant varieties like Eerramallelu, Kavya, Jagtial sannalu,polasaprabha are preferred Nitrogen application in nurseries may be avoided 	
	Red soils	Paddy-paddy Turmeric	No change	Same as above	

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	Paddy - Paddy	Sunflower / black gram		
	Red soils	Paddy - Paddy Turmeric	Sunflower / black gram No change		

Condition	Major Farming situation	Normal Crop/cropping system	Suggested Contingency measures		Remarks on Implementation
			Change in crop/cropping system	Agronomic measures	
Non release of water in canals under delayed onset of monsoon in catchment	Black soils	Paddy-Paddy	Sunflower	Use medium duration hybrids	
	Red soils	Paddy-Paddy	Sunflower / maize / redgram		
		Turmeric	No change		

Condition	Major Farming situation	Normal Crop/cropping system	Suggested Contingency measures		Remarks on Implementation
			Change in crop/cropping system	Agronomic measures	
Lack of inflows into tanks due to insufficient /delayed onset of monsoon	Red soils	Paddy - Paddy	No change	1. Short duration varieties like Erramallelu, Jagtiala Sannalu, WGL-44, JGL-3844, MTU-1010 and Tellahamsa 2. Planting aged seedlings with special management practices	
		Turmeric			
	Black soils	Paddy		-do-	

Condition	Major Farming situation	Normal Crop/cropping system	Suggested Contingency measures		Remarks on Implementation
			Change in crop/cropping system	Agronomic measures	
Insufficient ground water recharge due to low rainfall	Black soils	Paddy	Maize / sesamum	Irrigate at critical stages	
	Red soils	Paddy	Sunflower		
		Turmeric	Redgram		

Condition	Major Farming situation	Normal Crop/cropping system	Suggested Contingency measures		Remarks on Implementation
			Change in crop/cropping system	Agronomic measures	
Canal supported wells	Black soils	Paddy	Maize / sesamum	Irrigate at critical stages	
	Red soils	paddy	Sunflower		
		Turmaric	Redgram		

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
Continuous high rainfall in a short span leading to water logging				
Paddy	<ol style="list-style-type: none"> 1.Excess water from the field to be drained out 2. A booster dose of 20-25kg urea and 15 Kg MOP per acre is to be applied to hasten the establishment and promote more tillering. 3. Proper weed control measures should be adopted .. 	<ol style="list-style-type: none"> 1.Excess water from the field to be drained out 2. A booster dose of 20-25kg urea and 15 Kg MOP per acre is to be applied to hasten the establishment. . 	<ol style="list-style-type: none"> 1. Drain the excess water as early as possible 	<ol style="list-style-type: none"> 1. Drain out water and spread sheaves loosely in field and paddy sheaves threshed immediately 2. Spray common salt at 5% on panicles to prevent germination and spoilage of straw from moulds 3. Ensure proper grain moisture before storing
Cotton	<ol style="list-style-type: none"> 1. Excess water from the field to be drained out 2. Inter cultivate with gorru and apply a booster dose of 30 kg urea+ 1%KNO₃ per acre Delay in intercultural operation may harm the crop 3 Gap filling should be done. 4. In water logged areas spray with urea 2%+ MgSO₄ (1%) 5.Spray and also drench with Copper oxychloride 6. Take up timely control measures against the outbreak of diseases eg: BLB (Black arm) etc. 	<ol style="list-style-type: none"> 1. Drain the excess water as early as possible 2. Apply 30 kg N + 15 kg K /acre after draining excess water 3. Spray fungicides like Copper oxy chloride 0.3 % or Carbendazim 0.1 % or Mancozeb 0.25% two to three times by rotating the chemicals 5. Take up timely control measures against 	<ol style="list-style-type: none"> 1. Drain the excess water as early as possible 2. To spray KNO₃ 1 % or water soluble fertilizers like 19-19-19, 20-20-20, 21-21-21 at 1% to support nutrition 3. Spray fungicides like Copper oxy chloride 0.3 % or Carbendazim 0.1 % or Mancozeb 0.25% two to three times by rotating the chemicals 4. Take up timely control measures against the outbreak of pests like Spodoptera, Helicoverpa etc. 	<ol style="list-style-type: none"> 1. Dry the produce properly before packing and sending to market
Maize	<ol style="list-style-type: none"> 1. Drain the excess water as early as possible 2. Apply 20 kg N + 10 kg K /acre 	<ol style="list-style-type: none"> 1. Drain the excess water as early as possible 	<ol style="list-style-type: none"> 1. Drain the excess water as early as possible 2. Allow the crop to dry 	<ol style="list-style-type: none"> 1. Harvest the cobs after they are dried up properly. Dry the grain

	<p>after draining excess water</p> <p>3. Take up inter cultivation and at optimum soil moisture condition to loosen and aerate the soil and to control weeds</p> <p>4. Earthenup the crop for anchorage</p> <p>5. To spray KNO₃ 1 % or water soluble fertilizers like 19-19-19, 20-20-20, 21-21-21 at 1% to support nutrition</p>	<p>2. Apply 20 kg N + 10 kg K /acre</p> <p>after draining excess water</p> <p>3. To spray KNO₃ 1 % or water soluble fertilizers like 19-19-19, 20-20-20, 21-21-21 at 1% to support nutrition</p>	<p>completely before harvesting</p>	<p>to optimum moisture condition before storing</p>
Redgram	<p>1. Excess water from the field to be drained out</p> <p>2. Apply 20 kg urea + 15 kg MoP /acre after draining excess water</p> <p>3. Take up inter cultivation at optimum soil moisture condition to loosen and aerate the soil and to control weeds</p>	<p>1. Drain the excess water as early as possible</p> <p>2. To spray KNO₃ 1 % or water soluble fertilizers like 19-19-19, 20-20-20, 21-21-21 at 1% to support nutrition</p>	<p>1. Drain the excess water as early as possible</p> <p>2. Allow the crop to dry completely before harvesting</p>	<p>1. Harvest the pods quickly with forewarning of cyclonic storms wherever possible</p> <p>2. Spread the bundles drenched in rain on field bunds or drying floors to quicken the drying</p> <p>3. Thresh the bundles after they are dried properly</p> <p>4. Dry the grain to proper moisture per cent before bagging and storing to prevent deterioration in quality during storage</p>
Greengram	<p>1. Drain the excess water as early as possible</p> <p>2. Apply 4-5 kg N /acre after draining excess water</p> <p>3. Spray fungicides like Copper oxy chloride 0.3 % or Carbendazim 0.1 % or Mancozeb 0.25% two to three times by rotating the chemicals</p>	<p>1. Drain the excess water as early as possible</p> <p>2. Apply 4-5 kg N /acre after draining excess water</p> <p>3. Spray fungicides like Copper oxy chloride 0.3 % or Carbendazim 0.1 % or Mancozeb 0.25% two to three times by rotating</p>	<p>1. Drain the excess water as early as possible</p> <p>2. Allow the crop to dry completely before harvesting</p>	<p>1. Harvest the pods quickly with the forewarning of cyclonic storms wherever possible</p> <p>2. Thresh the bundles after they are dried properly</p> <p>3. Dry the grain to proper moisture per cent before bagging and</p>

		the chemicals		storing to prevent deterioration in quality during storage
Horticulture				
Mango	<ul style="list-style-type: none"> • Drain the excess water as soon as possible • Spray 1% KNO₃ or Urea 2% solution 2-3 times. 	<ul style="list-style-type: none"> • Drain the excess water as soon as possible • Spray 1% KNO₃ or Urea 2% solution 2-3 times. 	<ul style="list-style-type: none"> • Drain the excess water as soon as possible • Harvest the mature produce in a clear sunny day' 	<ul style="list-style-type: none"> • Store the fruits in well ventilated place temporarily before it can be marketed. • Market the fruits as soon as possible.
Orange & Batavian	<ul style="list-style-type: none"> • Drain the excess water as soon as possible. • Spray 1% KNO₃ or Urea 2% solution 2-3 times. • Foliar spray of micronutrient mixture is also to be taken up. • Sand casting around the tree trunks should be removed up to the collar region of the tree to prevent fungal infections. • If the tree age is above eight years a booster dose of 500 g of Urea and 750 g MOP per tree should be applied. 	<ul style="list-style-type: none"> • Drain the excess water as soon as possible. • Spray 1% KNO₃ or Urea 2% solution 2-3 times. • Foliar spray of micronutrient mixture is also to be taken up. • Sand casting around the tree trunks should be removed up to the collar region of the tree to prevent fungal infections. • If the tree age is above eight years a booster dose of 500 g of Urea and 750 g MOP per tree should be applied. 	<ul style="list-style-type: none"> • Drain the excess water as soon as possible. • Harvest the mature fruits in a clear sunny day. 	<ul style="list-style-type: none"> • Store the fruits in well ventilated place temporarily before it can be marketed. • Market the fruits as soon as possible.
Horticulture crops vegetables				
Chillies	<ul style="list-style-type: none"> • Drain the excess water as soon as possible • Spray Urea 2% solution 2-3 times. 	<ul style="list-style-type: none"> • Drain the excess water as soon as possible 	<ul style="list-style-type: none"> • Drain the excess water as soon as possible • Harvest the matured 	<ul style="list-style-type: none"> • Dry the pods on concrete floor immediately after

	<ul style="list-style-type: none"> • Topdressing of booster dose of 15 kg MOP + 30 kg Urea per acre as soon as possible. • Gap filling may be taken up if the plants are two weeks old and sowing window is still available for the crop. • 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. 	<ul style="list-style-type: none"> • Spray Urea 2% solution 2-3 times. • Topdressing of booster dose of 15 kg MOP + 30 kg Urea per acre as soon as possible. 	fruits in a clear sunny day.	<p>the appearance of sunlight (or).</p> <ul style="list-style-type: none"> • Use poly house solar driers for quick drying • Grade the pods and market as soon as possible. • Do not store such produce for long periods.
Tomato	<ul style="list-style-type: none"> • Drain the excess water as soon as possible • Spray Urea 2% solution 2-3 times. • Topdressing of booster dose of 12 kg MOP + 30 kg Urea per acre as soon as possible. • Gap filling may be taken up if the plants are two weeks old and sowing window is still available for the crop. • 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. 	<ul style="list-style-type: none"> • Drain the excess water as soon as possible • Spray Urea 2% solution 2-3 times. • Topdressing of booster dose of 10 kg MOP + 30 kg Urea per acre as soon as possible. 	<ul style="list-style-type: none"> • Drain the excess water as soon as possible • Harvest the marketable fruits in a clear sunny day' 	<ul style="list-style-type: none"> • Store the harvested fruits in well ventilated place temporarily before it can be marketed. • Market the fruits as soon as possible.
Cucumber	<ul style="list-style-type: none"> • Drain the excess water as soon as possible • Spray Urea 2% solution 2-3 times. • Topdressing of booster dose of 10 kg MOP + 30 kg Urea per acre as soon as possible. • Gap filling may be taken up if the plants are two weeks old and sowing window is still available for the crop. • 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. 	<ul style="list-style-type: none"> • Drain the excess water as soon as possible • Spray Urea 2% solution 2-3 times. • Topdressing of booster dose of 10 kg MOP + 30 kg Urea per acre as soon as possible. 	<ul style="list-style-type: none"> • Drain the excess water as soon as possible • Spray Urea 2% solution once. 	<ul style="list-style-type: none"> • Drain the excess water as soon as possible. • Harvest the mature produce as soon as possible. • Store the produce in well ventilated place temporarily before it can be marketed. • Market the produce as soon as possible.
Spices and Plantation crops				

Turmeric	<ul style="list-style-type: none"> • Drain the excess water as soon as possible • Spray Urea 2% or 1% KNO₃ followed by Ferrous Sulphate 0.5% + Citric Acid 0.1 % solution 2-3 times. • Topdressing of booster dose of 40 kg MOP + 50 kg Urea along with 250 kg of Neem Cake per acre as soon as possible. • 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. 	<ul style="list-style-type: none"> • Drain the excess water as soon as possible • Spray Urea 2% or 1% KNO₃ solution 2-3 times. 	<ul style="list-style-type: none"> • Drain the excess water as soon as possible • Harvest the rhizomes when field comes to normal 	<ul style="list-style-type: none"> • Dry the rhizomes on concrete floor or use boilers (if available) for processing immediately • Grade and separate the rotten and mould affected rhizomes. • Pack the dried material in gunny bags disinfected with safe insecticides • Store in a well ventilated rooms
Outbreak of pests and diseases due to unseasonal rains				
Rice	Blast, Stem rot and Sheath blight Soon after cyclone the rodent population tend to increase-monitor rodents and adopt community rodent management practices	BPH, Blast, Sheath blight incidence may increase due to unseasonal rains	Climbing cutworm and neck blast	-
Cotton	Sucking pests, Wilt and root rot, Bacterial leaf blight	Jassids, <i>Spodoptera</i> , Wilt and root rot, Bacterial leaf blight, Grey mildew	Dusky cotton bug, Grey mildew	-
Redgram	Spodoptera, wilt and root rot	Spodoptera, Wilt and root rot	-	Dry the grain to optimum seed moisture content to avoid damage in storage
Green gram	Spodoptera and leaf spots	Spodoptera, Leaf spots, Powdery mildew	Spodoptera - Need based plant protection measures to be initiated	-do-
Maize	Spodoptera	Bacterial stalk rot	Post flowering Stalk rots	
Turmeric	Rhizome rot, leaf spots	Rhizome rot, leaf spots	Rhizome rot, leaf spots	
Chillies	Wilts, leaf spots	fruit rot	fruit rot	

2.3 Floods

Condition	Transient water logging/ partial inundation			
	Suggested contingency measure			
	Seedling / nursery stage	Vegetative stage	Reproductive stage	At harvest
Rice	1.Excess water from the field to be drained out as early as possible	<ol style="list-style-type: none"> To drain out the excess water at the earliest Immediately after the water recedes apply a booster dose of 20kg Urea+15kg MOP application, preferably in the mud followed by light irrigation after 24 hrs. If mortality of hills takes and field is patchy, gap filling with split tillers is recommended along with application of booster dose of 20kg urea and 15kg MOP Take-up need based plant protection measures 	<ol style="list-style-type: none"> To drain out the excess water at the earliest Takeup need based plant protection measures 	<ol style="list-style-type: none"> Drain out water .Spread sheaves loosely in field or field bunds where there is no water stagnation Spray common salt at 5% on panicles to prevent germination and spoilage of straw from moulds Thresh after drying the sheaves properly Ensure proper grain moisture before storing Grow varieties having seed dormancy in flood prone areas
Cotton	<ol style="list-style-type: none"> Excess water from the field to be drained out as early as possible Take up the gap filling at the earliest Immediately after the soil comes to condition, intercultivate with gorru and apply a booster dose of 30kg urea+15kg MOP per acre. Delay in interculture may harm the crop Take up plant protection measures against possible pests and disease incidence 	<ol style="list-style-type: none"> To drain out the excess water at the earliest Inter cultivate at optimum field moisture condition Immediately after the soil comes to condition, intercultivate with gorru and apply a booster dose of 30kg urea+15kg MOP per acre. In water logged areas, spray with 2% urea+1% MgSO₄ followed by Annabhedhi 5g+citric acid 0.5g/l Spray and also drench with copper oxychloride 0.3% to control wilt 	<ol style="list-style-type: none"> To drain out the excess water at the earliest To spray KNO₃ 1 % or water soluble fertilizers like 19-19-19, 20-20-20, 21-21-21 at 1% to support nutrition Take up plant protection measures against possible pests and disease incidence 	<ol style="list-style-type: none"> Kapas picking should be done carefully to prevent admixtures with waste plant material
Redgram	1. To drain out the excess	1. To drain out the excess	1. To drain out the	1. To drain out the excess

	<p>water at the earliest</p> <ol style="list-style-type: none"> 2. Takeup the gap filling at the earliest 3. Inter cultivate at optimum field moisture condition 4. Apply 4-5 kg N/acre after draining excess water 	<p>water at the earliest</p> <ol style="list-style-type: none"> 2. Takeup the gap filling at the earliest 3. Inter cultivate at optimum field moisture condition 4. Apply 4-5 kg N/acre after draining excess water 	<p>excess water at the earliest</p> <ol style="list-style-type: none"> 2. To spray KNO₃ 1 % or water soluble fertilizers like 19-19-19, 20-20-20, 21-21-21 at 1% to support nutrition 3. Take up plant protection measures against possible pests and disease incidence 	<p>water at the earliest</p> <ol style="list-style-type: none"> 2. Harvest the crop when the field condition permits 3. Drying of bundles should be done on elevated places like filed bunds or drying floors
Green gram	<ol style="list-style-type: none"> 1. To drain out the excess water at the earliest 2. Take up the gap filling at the earliest 3. Takeup weed control either mechanically or through weedicides 4. Apply 4-5 kg N/acre after draining excess water 5. Take up plant protection measures against possible pests and disease incidence 	<ol style="list-style-type: none"> 1. To drain out the excess water at the earliest 2. Takeup weed control either mechanically or through weedicides 3. Apply 4-5 kg N/acre after draining excess water 4. To spray KNO₃ 1 % or water soluble fertilizers like 19-19-19, 20-20-20, 21-21-21 at 1% to support nutrition 5. Take up plant protection measures against possible pests and disease incidence 	<ol style="list-style-type: none"> 1. To drain out the excess water at the earliest 2. Apply 4-5 kg N/acre after draining excess water 3. To spray KNO₃ 1 % or water soluble fertilizers like 19-19-19, 20-20-20, 21-21-21 at 1% to support nutrition 4. Take up plant protection measures against possible pests and disease incidence 	<ol style="list-style-type: none"> 1. Drain out the excess water at the earliest 2. Harvest the crop after the fields are dried up
Maize	<ol style="list-style-type: none"> 1. To drain out the excess water at the earliest 2. Intercultivation and earthing up to be done 3. Apply 20 kg N + 10 kg K /acre after draining excess water 4. Take up plant protection measures against possible pests and disease incidence 	<ol style="list-style-type: none"> 1. To drain out the excess water at the earliest 2. Intercultivation and earthing up to be done 3. Apply 20 kg N + 10 kg K /acre after draining excess water 4. Take up plant protection measures against possible pests and disease incidence 	<ol style="list-style-type: none"> 1. To drain out the excess water at the earliest 2. Take up plant protection measures against possible pests and disease incidence 	<ol style="list-style-type: none"> 1. To drain out the excess water at the earliest 2. Cob picking to be done after they are dried fully
Horticulture crops – Fruits				
Mango	<ul style="list-style-type: none"> • Drain the excess water as 	<ul style="list-style-type: none"> • Drain the excess water as 	<ul style="list-style-type: none"> • Drain the excess 	<ul style="list-style-type: none"> • Drain the excess water

	<p>soon as possible</p> <ul style="list-style-type: none"> • Spray 1% KNO₃ or Urea 2% solution 2-3 times. 	<p>soon as possible</p> <ul style="list-style-type: none"> • Spray 1% KNO₃ or Urea 2% solution 2-3 times. 	<p>water as soon as possible</p> <ul style="list-style-type: none"> • Spray 1% KNO₃ or Urea 2% solution 2-3 times. 	<p>as soon as possible.</p> <ul style="list-style-type: none"> • Harvest the mature fruits as soon as possible. • Store the fruits in well ventilated place temporarily before it can be marketed. • Market the fruits as soon as possible.
Orange & Batavian	<ul style="list-style-type: none"> • Drain the excess water as soon as possible. • Spray 1% KNO₃ or Urea 2% solution 2-3 times. 	<ul style="list-style-type: none"> • Drain the excess water as soon as possible. • Spray 1% KNO₃ or Urea 2% solution 2-3 times. • Foliar spray of micronutrient mixture is also to be taken up. • Sand casting around the tree trunks should be removed up to the collar region of the tree to prevent fungal infections. • If the tree age is above eight years a booster dose of 500 g of Urea and 750 g MOP per tree should be applied. 	<ul style="list-style-type: none"> • Drain the excess water as soon as possible. • Spray 1% KNO₃ or Urea 2% solution 2-3 times. • Foliar spray of micronutrient mixture is also to be taken up. • Sand casting around the tree trunks should be removed up to the collar region of the tree to prevent fungal infections. • If the tree age is above eight years a booster dose of 500 g of Urea and 750 g MOP per tree should be applied. 	<ul style="list-style-type: none"> • Drain the excess water as soon as possible. • Harvest the mature fruits as soon as possible. • Store the fruits in well ventilated place temporarily before it can be marketed. • Market the fruits as soon as possible.
Horticulture crops vegetables				
Chillies	<ul style="list-style-type: none"> • Drain the excess water as soon as possible 	<ul style="list-style-type: none"> • Drain the excess water as soon as possible • Spray Urea 2% solution 2-3 times. • Topdressing of booster dose of 15 kg MOP + 30 kg Urea per acre as soon 	<ul style="list-style-type: none"> • Drain the excess water as soon as possible • Spray Urea 2% solution 2-3 times. • Topdressing of booster dose of 15 	<ul style="list-style-type: none"> • Drain the excess water as soon as possible. • Dry the pods on concrete floor/ tarpaulins. • Spray any drying oil after the pods are free

		<ul style="list-style-type: none"> as possible. Gap filling may be taken up if the plants are two weeks old and sowing window is still available for the crop. 	kg MOP + 30 kg Urea per acre as soon as possible.	<ul style="list-style-type: none"> from surface moisture for quick drying. Use poly house solar driers for quick drying Remove the pest and disease infected pods. Market the produce as soon as possible
Tomato	<ul style="list-style-type: none"> Drain the excess water as soon as possible 	<ul style="list-style-type: none"> Drain the excess water as soon as possible Spray Urea 2% solution 2-3 times. Topdressing of booster dose of 10 kg MOP + 30 kg Urea per acre as soon as possible. 	<ul style="list-style-type: none"> Drain the excess water as soon as possible Spray Urea 2% solution once. 	<ul style="list-style-type: none"> Drain the excess water as soon as possible. Harvest the mature produce as soon as possible. Store the produce in well ventilated place temporarily before it can be marketed. Market the produce as soon as possible.
Cucumber		<ul style="list-style-type: none"> Drain the excess water as soon as possible Spray Urea 2% solution 2-3 times. Topdressing of booster dose of 10 kg MOP + 30 kg Urea per acre as soon as possible. Gap filling may be taken up if the plants are two weeks old and sowing window is still available for the crop. In case of severe damage (considered as complete economical loss), and the contingency period is between June to August, go for resowing 	<ul style="list-style-type: none"> Drain the excess water as soon as possible Spray Urea 2% solution once. 	<ul style="list-style-type: none"> Drain the excess water as soon as possible. Harvest the mature produce as soon as possible. Store the produce in well ventilated place temporarily before it can be marketed. Market the produce as soon as possible.
Spices and Plantation crops				
Turmeric		<ul style="list-style-type: none"> Drain the excess water as 	<ul style="list-style-type: none"> Drain the excess 	<ul style="list-style-type: none"> Drain the excess water

		<p>soon as possible</p> <ul style="list-style-type: none"> • Spray Urea 2% or 1% KNO₃ solution 2-3 times. • Spray ferrous sulphate 20g + citric acid 5g in 10 lit of water twice at weekly intervals 	<p>water as soon as possible</p> <ul style="list-style-type: none"> • Spray Urea 2% or 1% KNO₃ solution 2-3 times. • Spray ferrous sulphate 20g + citric acid 5g in 10 lit of water twice at weekly intervals 	<p>as soon as possible.</p> <ul style="list-style-type: none"> • Dry the rhizomes on concrete floor immediately after the appearance of sunlight. Mix thoroughly and periodically for quick and uniform drying of surface moisture. • Use boilers and polishers for processing • Remove and separate the rotten and mould affected rhizomes. • Cook and dry the rhizomes as soon as possible.
Condition - Continuous submergence for more than 2 days				
	Suggested contingency measure			
Rice	<ol style="list-style-type: none"> 1. Top dressing with 0.2 kg N/40 sq.m immediately after recede of flood water 2. Spray of ZnSO₄, FeSO₄ to correct micronutrient deficiencies 3. Weed control through mechanical or Chemical measures 	<ol style="list-style-type: none"> 1. To drain out the excess water at the earliest 2. Take up gap filling either with available nursery or by splitting the tillers from the surviving hills if the gaps are < 30% if more go for replanting 3. Apply 20 kg N + 10 kg K /acre after draining excess water 4. Proper weed control measures to be taken up 4. Timely plant protection measures for pest and disease out break 	<ol style="list-style-type: none"> 1. To drain out the excess water at the earliest 2. Takeup need based plant protection measures 	<ol style="list-style-type: none"> 1. Drain out water spread sheaves loosely in field or field bunds where there is no water stagnation 2. Spray common salt at 5% on panicles to prevent germination and spoilage of straw from moulds 3. Thresh after drying the sheaves properly 4. Ensure proper grain moisture before storing 5. Grow varieties having seed dormancy

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
Cyclone				
Horticulture crops – Fruits				
Mango	<ul style="list-style-type: none"> If the damage is severe, go for replanting Provide support to the young plants. Grow wind breaks 	<ul style="list-style-type: none"> Trees fallen on ground may be lifted and earthed up Manuring and plant protection measures have to be taken up. Broken and damaged branches may be pruned and applied with Bordeaux paste 	<ul style="list-style-type: none"> Tress fallen on ground may be lifted and earthed up Manuring and plant protection measures have to be taken up. Broken and damaged branches may be pruned and applied with Bordeaux paste 	<ul style="list-style-type: none"> Drain the excess water as soon as possible. Harvest the mature fruits as soon as possible. Collect the fallen fruits and sell immediately or go for preparation of processed products. If to store, store the produce in well ventilated place temporarily before it can be marketed. Broken and damaged branches may be pruned and applied with Bordeaux paste
Orange & Batavian	<ul style="list-style-type: none"> If the damage is severe, go for resowing. 	<ul style="list-style-type: none"> Tress fallen on ground may be lifted and earthed up Manuring and plant protection measures have to be taken up. Broken and damaged branches may be pruned and applied with Bordeaux paste 	<ul style="list-style-type: none"> Tress fallen on ground may be lifted and earthed up Manuring and plant protection measures have to be taken up. Broken and damaged branches may be pruned and applied with Bordeaux paste 	<ul style="list-style-type: none"> Drain the excess water as soon as possible. Harvest the mature fruits as soon as possible. Collect the fallen fruits and sell immediately or go for preparation of processed products. If to store, store the produce in well ventilated place temporarily before it can be marketed. Broken and damaged branches may be pruned and applied with Bordeaux paste
Horticulture crops vegetables				
Chillies	<ul style="list-style-type: none"> Grow nursery on raised beds. 	<ul style="list-style-type: none"> Uprooted plants may be lifted and earthed up Drain the excess water as soon as possible Gap filling must be done 	<ul style="list-style-type: none"> Uprooted plants may be lifted and earthed up Drain the excess water as soon as possible Spray Urea 2% solution 2-3 	<ul style="list-style-type: none"> Drain the excess water as soon as possible. Dry the pods on concrete floor/ tarpaulins immediately use poly house solar driers for

		<p>immediately</p> <ul style="list-style-type: none"> • If damage is more go for replanting Spray Urea 2% solution 2-3 times. • Topdressing of booster dose of 15 kg MOP + 30 kg Urea per acre as soon as possible. 	<p>times.</p> <ul style="list-style-type: none"> • Topdressing of booster dose of 15 kg MOP + 30 kg Urea per acre as soon as possible. 	<p>quick drying</p> <ul style="list-style-type: none"> • Remove the pest and disease infected pods.
Tomato	<ul style="list-style-type: none"> • Grow nursery on raised beds. • If damage is more go for re-sowing 	<ul style="list-style-type: none"> • Uprooted plants may be lifted and earthed up • Drain the excess water as soon as possible • Gap filling must be done immediately • Spray Urea 2% solution 2-3 times. • Topdressing of booster dose of 15 kg MOP + 30 kg Urea per acre as soon as possible. • If damage is more ,go for replanting 	<ul style="list-style-type: none"> • Uprooted plants may be lifted and earthed up • Drain the excess water as soon as possible • Spray Urea 2% solution 2-3 times. • Topdressing of booster dose of 15 kg MOP + 30 kg Urea per acre as soon as possible. • Spray COC 30 g in 10 liters of water, 2-3 times against leaf spots. If damage is more ,go for replanting 	<ul style="list-style-type: none"> • Drain the excess water as soon as possible. • Harvest the mature produce as soon as possible. • Store the produce in well ventilated place temporarily before it can be marketed. • Market the produce as soon as possible.
Cucumber		<ul style="list-style-type: none"> • Drain the excess water as soon as possible • Spray Urea 2% solution 2-3 times. • Topdressing of booster dose of 10 kg MOP + 30 kg Urea per acre as soon as possible. • Gap filling may be taken up if the plants are two weeks old and sowing window is still available for the crop. • In case of severe damage (considered as complete economical loss), and the contingency period is between June to August, go for resowing 	<ul style="list-style-type: none"> • Drain the excess water as soon as possible • Spray Urea 2% solution 2-3 times. • Topdressing of booster dose of 10 kg MOP + 30 kg Urea per acre as soon as possible. 	<ul style="list-style-type: none"> • Drain the excess water as soon as possible. • Harvest the mature produce as soon as possible. • Store the produce in well ventilated place temporarily before it can be marketed. Market the produce as soon as possible.
Spices and Plantation crops				
Turmeric		<ul style="list-style-type: none"> • Drain the excess water as soon as possible 	<ul style="list-style-type: none"> • Drain the excess water as soon as possible 	<ul style="list-style-type: none"> • Drain the excess water as soon as possible.

		<ul style="list-style-type: none"> • Spray Urea 2% or 1% KNO₃ followed by Ferrous Sulphate 0.5% + Citric Acid 0.1 % solution 2-3 times. • Topdressing of booster dose of 40 kg MOP + 50 kg Urea along with 250 kg of Neem Cake per acre as soon as possible. • 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. 	<ul style="list-style-type: none"> • Spray Urea 2% or 1% KNO₃ followed by Ferrous Sulphate 0.5% + Citric Acid 0.1 % solution 2-3 times. • Topdressing of booster dose of 40 kg MOP + 50 kg Urea along with 250 kg of Neem Cake per acre as soon as possible. 	<ul style="list-style-type: none"> • Harvest the rhizomes when field comes to normal • Use boilers and polishers for processing • Remove and separate the rotten and mould affected rhizomes. • Cook and dry the rhizomes as soon as possible.
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2.5 Contingent strategies for Livestock, Poultry & Fisheries

General contingency measures for livestock

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

<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>
Health and disease Management		
<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>

2.5.1 Detailed contingency strategies for livestock

	Suggested contingency measures		
	Before the event	During the event	After the event
Drought			
Feed and Fodder availability	<p>In chronically drought prone districts 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</p> <p>Urea molasses mineral bricks (UMMB):50-100 t</p> <p>Hay:100-250 t</p> <p>Concentrates: 20-50 t</p> <p>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, panchayat lands or private property resources (PPRs) like waste and degraded lands with the monsoon pattern for higher biomass production</p> <p>In chronically drought prone districts promote cultivation of short duration fodder crops of sorghum/bajra/maize(UP chari, MP</p>	<p>Harvest and use biomass of dried up crops (Sorghum, Bajra, Maize, Rice) 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>Mild drought: hay should be transported to the needy areas from the near by districts</p> <p>Moderate drought: hay, silage and vitamin & 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>Severe drought: UMMB, hay, concentrates and vitamin & 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. Train the farmers about usage of sunflower heads in concentrate mixture preparation. 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 & breeding stock)</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 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>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 mandatory in every village through supply and establishment of good quality chaff cutters.</p> <p>Avoid burning of maize stover</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 areas</p>	<p>Available kitchen waste should be mixed with dry fodder while feeding</p> <p>Arrangements should be made for mobilization of small ruminants across the districts 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"> i) Plantation of trees like Neem, Pipal, Subabul around the shed ii) Spreading of husk/straw/coconut leaves over the roof top of the shed iii) Water sprinklers / foggers in the animal shed iv) Application of white reflector paint on the roof to reduce thermal radiation effect 	<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 manageme	<p>Timely vaccination (as per enclosed vaccination schedule) against all endemic diseases</p>	<p>Carryout deworming to all animals entering into relief camps</p> <p>Identification and quarantine of sick animals</p>	<p>Conducting mass animal health camps</p> <p>Conducting fertility camps</p>

nt	Procurement of emergency medicines and medical kits Surveillance and disease monitoring network to be established at Joint Director (Animal Husbandry) office in the district	Constitution of Rapid Action Veterinary Force Performing ring vaccination (8 km radius) in case of any outbreak Restricting movement of livestock in case of any epidemic Rescue of sick and injured animals and their treatment	Mass deworming camps Farmers should be advised to breed their milch animals during July-September so that the peak milk production does not coincide with mid summer 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:

Disease	Age and season at vaccination
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)

Disease	Season
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)	Routine practices are followed

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

	to safer places when warnings are issued, to avoid fishing, etc	nets to safer places	nets and provision of boats and nets for restoration of livelihoods
(iii) No.of houses damaged	Avoidance of construction of houses in flood prone areas, construction of pucca houses at elevated places,	Shifting of people by relief boats to the relief camps	Assessment of damages to houses and provision of compensation in case of partial damage and sanction house under existing schemes
(iv) Loss of stock	Avoidance of surface species like catla, silver carp since they are vulnerable in tanks prone to floods, erection of nets across the spill way or just beyond it	Erection of nets at spill ways	Taking up compensatory stocking
(v) Changes in water quality		When dissolved oxygen levels go down, aerators, recirculation of water, etc are to be attempted to maintain DO levels, going for partial harvest, etc	
(vi) Health and diseases	Sometimes there may be heavy accumulation of nutrients and organic matter.	There may be break out of Hemorrhagic septicemia. Addition of antibiotics like Chloro Tetra Cycline or Oxy Tetra Cycline to the feed to control the disease	Removal of weeds, top layer of soil, deep ploughing of tank and application of lime, exposing to sun light
B. Aquaculture			
(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
3. Cyclone / Tsunami			
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, shelters/huts etc)	Pumps, aerators, etc must be protected by moving them to safe locations	To avoid use of aerators, pumps and other appliances	Overhauling of the equipment to prevent from being damaged
4. Heat wave and cold wave			
A. Capture			
Inland	Monitoring dissolved oxygen levels	Monitoring dissolved oxygen levels	No intervention
B. Aquaculture			
(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