State: ANDHRA PRADESH
Agriculture Contingency Plan for District: KRISHNA

1.0 District Agriculture profile					
1.1	**Agro-Climatic/Ecological Zone**				
	Agro Ecological Sub Region (ICAR)	Eastern Coastal plane , hot, sub-humid to semi arid eco region **(**7.3,18.3)			
	Agro-Climatic Region (Planning Commission)	East Coast plain and hill region (XI)			
	Agro Climatic Zone (NARP)	Krishna – Godavari Zone, RARS, Lam (AP-1)			
	List all the districts or part thereof falling under the NARP Zone	Guntur,Krishna, East Godavari (excluding upland areas), West Godavari, parts of Nalgonda, Khammam and Prakasam			
	Geographic coordinates of district	Latitude		Longitude	Altitude
		15^0 -43 N and 17^0 10 N		80 E longitude and 81^0 33E	
	Name and address of the concerned ZRS/ ZARS/ RARS/ RRS/ RRTTS	Regional Agricultural Research Station, Lam , Guntur, 522 034			
	Mention the KVK located in the district	Krishi Vigyan Kendra, Garikapadu, Krishna District 521 175			
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):	686	30-37	Second week of June	1^{st} week of October
	NE Monsoon(Oct-Dec):	250	7-10	2^{nd} week of October	Last week of December
	Winter (Jan- Feb)	15	0-5	-	-
	Summer (Mar-May)	83	2-4	-	-
	Annual	1034	41-60	-	-

1.3	**Land use pattern of the district** (latest statistics) 2009-10	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)	872.7	76.18	178.3	10.7	27.5	9.6	38.0	28.5	27.1

1. 4	**Major Soils (common names like shallow red soils etc.,)**	**Area ('000 ha)**	**Percent (%) of total**
	1. Black Cotton Soils	260	57.6
	2. Red Soils	76	19.4
	3. Coastal Sandy Soils	41	
	4.Alluvial Soils	11	
	5. saline soils	14	
	Others (specify): Acidic	3	

1.5	**Agricultural land use**	**Area ('000 ha)**	**Cropping intensity %**
	Net sown area	463.0	154.7
	Area sown more than once	253.3	
	Gross cropped area	716.3	

1.6	**Irrigation**	Area (‘000 ha)		
	Net irrigated area	307.9		
	Gross irrigated area	427.9		
	Rainfed area	155.1		
	Sources of Irrigation	Number	Area (‘000 ha)	Percentage of total irrigated area
	Canals	KE canal System	228.6	71.7
	Tanks	913	22.3	7.0
	Open wells	15552		
	Bore wells	13549	54.1	17.0
	Lift irrigation			
	Micro-irrigation			
	Other sources	64	13.7	4.3
	Total Irrigated Area		318.8	100.0
	Pump sets			
	No. of Tractors	8469		
	Groundwater availability and use* (Data source: State/Central Ground water Department /Board)	No. of blocks/ Tehsils	(%) area	
	Over exploited		not available	
	Critical			
	Semi- critical			
	Safe			
	Wastewater availability and use			
	Ground water quality	not available		
*over-exploited: ground water utilization > 100%; critical: 90-100%; semi-critical: 70-90%; safe: <70%				

Area under major field crops & horticulture etc. (2009-10)

1.7		**Major Field Crops cultivated**	**Area ('000 ha)**					
			Kharif		**Rabi**		**Summer**	**Total**
			Irrigated	**Rainfed**	**Irrigated**	**Rainfed**		
	1	**Paddy**	273.9	6	*120.0*	-		394.5
	2	Blackgram	-	2.6	-	90.6	0.50	93.6
	3	Maize	3.2	1.8	24.2	-		29.3
	4	Cotton	36.7	-	-	-	-	36.7
	5	Greengram	-	10.4	-	1.4	0.50	12.5
	6	Sugarcane	-	-	11.2	-	-	11.3
	7	Chillies	7.9	-	0.7	-	-	8.6
	8	Groundnut	0.06	4.1	3.1	0.9	-	8.2
	9	Tobacco	-	-	4.5	2.6	-	7.1
	10	Red gram	-	3.5	-	-	-	3.5
		Horticulture crops - Fruits	**Total area('000 ha)**					
	1	Mango	63.5					
	2	Banana	2.7					
	3	Guava	1.2					
	4	Papaya	0.1					
	5	Batavia	0.04					
	6	Cashew nut	0.3					
		Horticultural crops - Vegetables	**Total area('000 ha)**					
	1	Chillies	7.9					
	2	Bhendi	2.0					
	3	Tomato	1.6					
	4	Gourds	1.1					

	5	Cucumber	1.1
	6	Leaf Vegetables	0.3

		Medicinal and Aromatic crops	**Total area('000 ha)**
	1	Turmeric	1.8
	2	Ginger	0.02
	3	Onion	0.02
	4	Eucalyptus	0.9
	5	Betelvine	0.2
		Plantation crops	**Total area('000 ha)**
	1	Banana	1.4
	2	Cococnut	2.1
	3	Sapota	0.4
	4	Acid lime	0.7
	5	Oil palm	3.1
		Fodder crops	**Total area('000 ha)**
	1	Jowar	1.7
	2	Maize	1.1
	3	Para napier	1.3
	4	Pillipaesara	6.2
	5	Sunhemp	
		Total fodder crop area	10.2
		Grazing land	
		Sericulture etc	
		Others (Specify)	

1.8	**Livestock**	**Male (number)**	**Female (number)**	**Total (number)**
	Non descriptive Cattle (local low yielding)	42.9	50.5	93.5
	Crossbred cattle	1.9	9.0	10.9
	Non descriptive Buffaloes (local low yielding)	117.6	801.8	919.4
	Graded Buffaloes			
	Goat			156.0
	Sheep			482.1
	Others (Camel, Pig, Yak etc.)			16.77
	Commercial dairy farms (Number)			

1.9	**Poultry**	**No. of farms**	**Total No. of birds (number)**
	Commercial		
	Backyard		

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)	
	5774	96	781 / 137	214 / 72375	366 / 10	32 / 0

ii) Inland (Data Source: Fisheries Department)	No. Farmer owned ponds	No. of Reservoirs	No. of village tanks
	9131	1	219

B. Culture

	Water Spread Area (ha)	**Yield (t/ha)**	**Production ('000 tons)**
i) Brackish water (Data Source: MPEDA/ Fisheries Department)	4750	-	6.4
ii) Fresh water (Data Source: Fisheries Department)	23958	-	10.2
Others		-	394.3

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)										
1	Paddy	776	3003	325	3805			745	3264	
2	Maize	26	4589	86	7367			17	4592	
3	Pulses	12	531	101	706			1	187	
4	Ground nut	6	2111	11	2228			6	2307	
5	Sugarcane	2221	97813	-	-			780	90	
6	Cotton	17	448	-	-			25	596	
7	Tobacco	-	-	9	2940			17	2750	
8	Chillies	27	3675	3	2559			298	2620	
Others										
Major Horticultural crops (Crops to be identified based on total acreage)										
1	Mango	64623								
2	Oil palm	2724								
3	Coconut	1591								
4	Banana	1385								
5	Guava	1161								
Others	Acid lime	669								

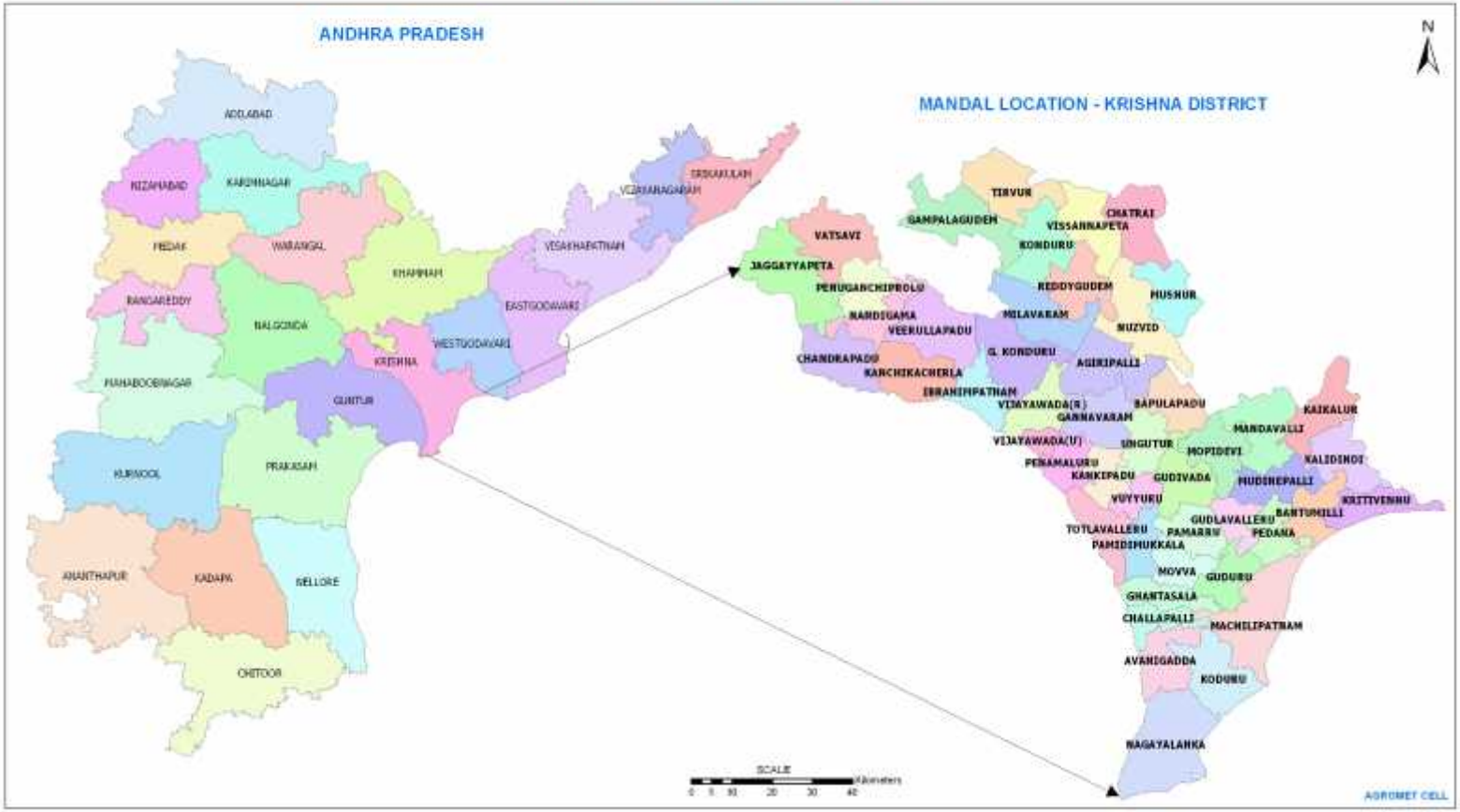
1.12	**Sowing window for 5 major field crops (start and end of normal sowing period)**	Paddy	Maize	Pulses	Groundnut	Cotton
	Kharif- Rainfed	-	July 1st fortnight – July 2nd fortnight	June 1st fortnight – July 2nd fortnight	-	June 1st fortnight – July 2nd fortnight

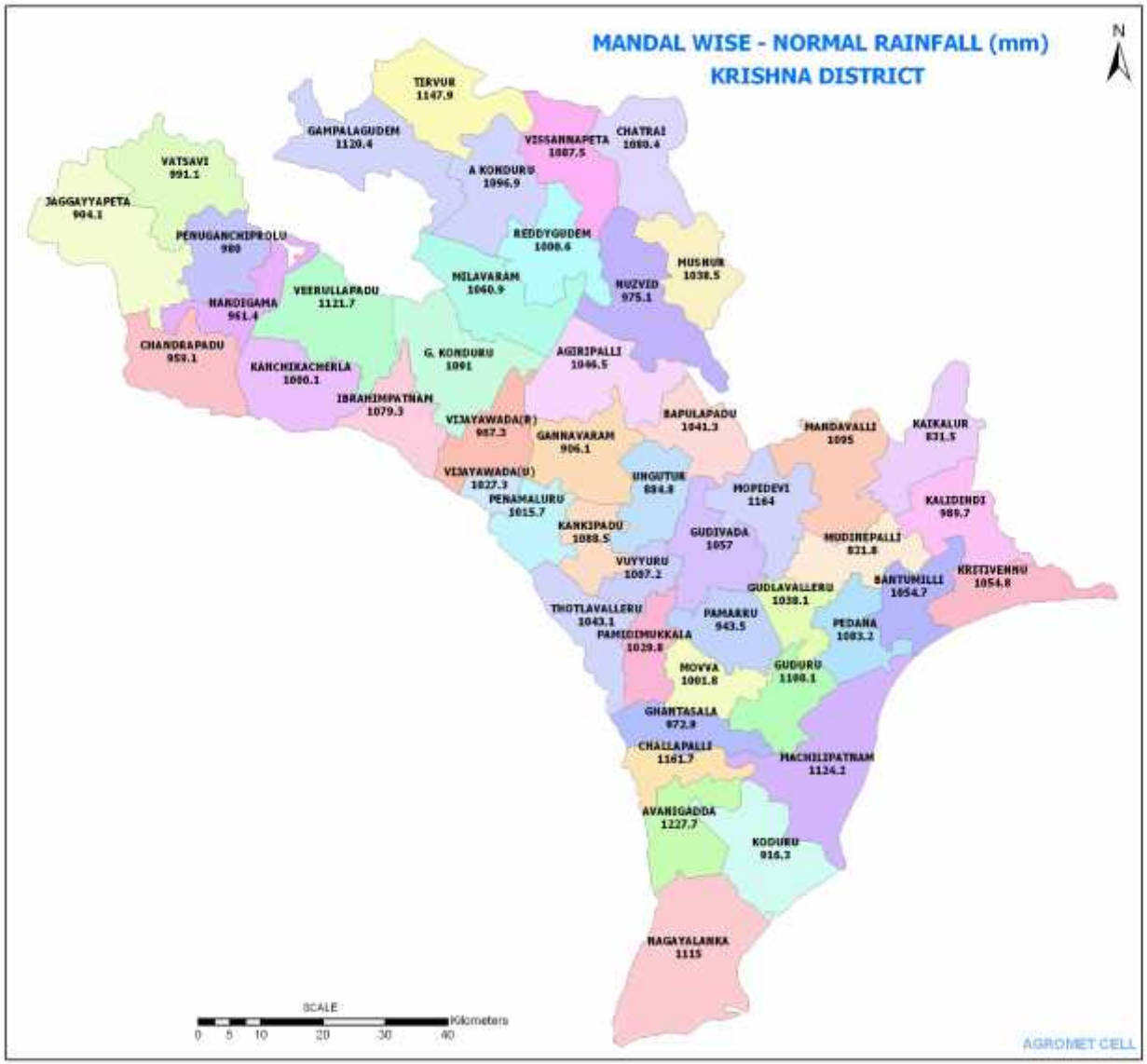
	Kharif-Irrigated	June 1st fortnight – July 2nd fortnight	July 1st fortnight – July 2nd fortnight	-	-	-
	Rabi- Rainfed	-	-	September 1st fortnight – October 1st fortnight	October 2nd fortnight – November 1st fortnight	-
	Rabi-Irrigated	December 2nd fortnight – January 1st fortnight	-	October 2nd fortnight	November 2nd fortnight – December 1st fortnight	-

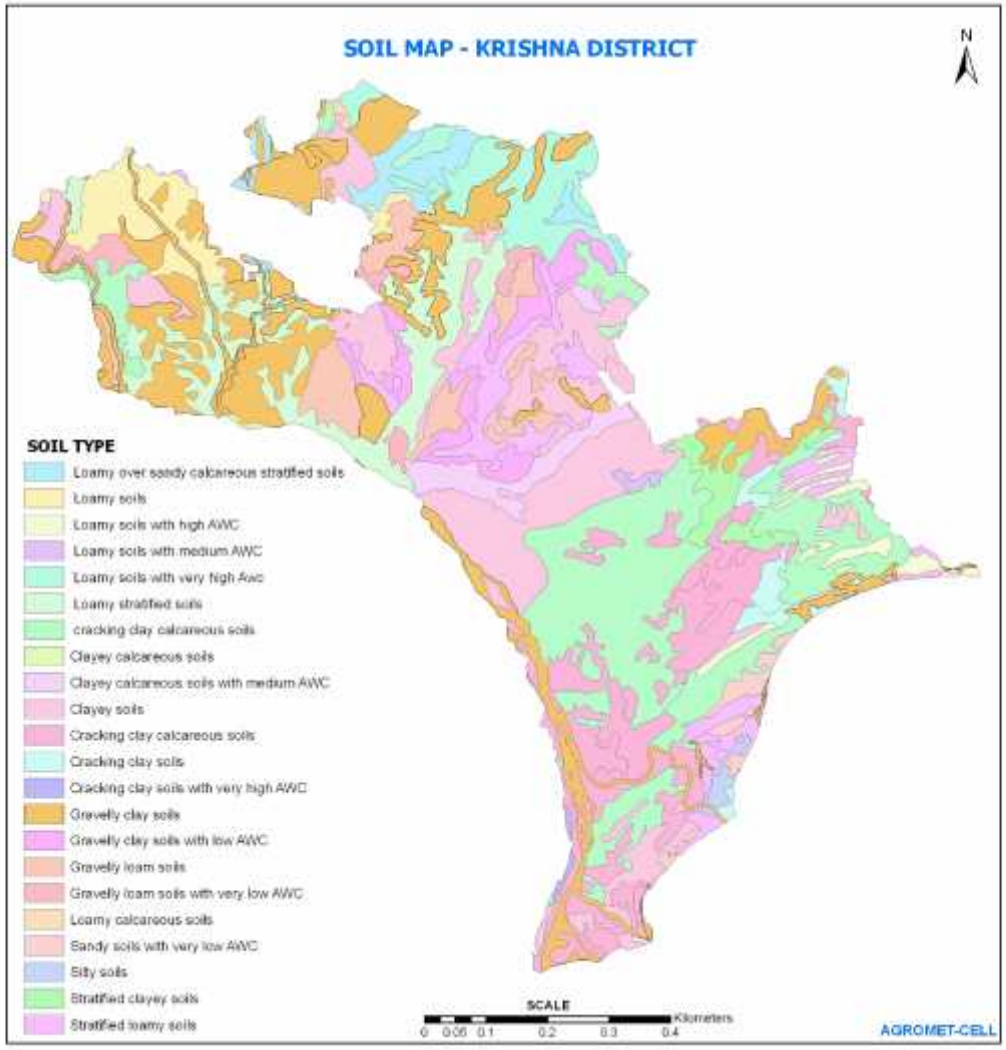
1.13	**What is the major contingency the district is prone to? (Tick mark and mention years if known during the last 10 year period)**	Regular	Occasional	None
	Drought		√	
	Flood		√	
	Cyclone	√		
	Hail storm			
	Heat wave			
	Cold wave			
	Frost			
	Sea water intrusion		√	
	Pests and diseases (specify)	Rice: Blast Redgram: Maruca and Helicoverpa Cotton: Sucking pest complex Blackgram : YMV		
	Others (Fog)			

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
		Fertility Status as Annexure 3	Enclosed: Yes

KRISHNA DISTRICT INDEX MAP




MANDAL WISE - NORMAL RAINFALL (mm)
KRISHNA DISTRICT
N
TERVUR 1147.9
GAMPALAGUDEM 1120.4
VISSANNAPETA 1087.5
CHATRAI 1080.4
VATSAVI 991.1
A KONDURU 1096.9
JAGGAYYAPETA 904.1
REDDYGUDEM 1008.6
PENUGANCHIPROLU 980
MUSHUR 1038.5
MILAVARAM 1060.9
NUZVID 975.1
VEERULLAPADU 1121.7
NANDIGAMA 961.4
CHANDRAPADU 959.1
G. KONDURU 1091
AGIRIPALLI 1046.5
KANCHIKACHERLA 1080.1
IBRAHIMPATNAM 1079.3
VIJAYAWADA(R) 987.3
BAPULAPADU 1041.3
MANDAVALLI 1095
KAIKALUR 831.5
GANNAVARAM 906.1
VIJAYAWADA(U) 1027.3
UNGUTUR 894.8
MOPIDEVI 1164
KALIDINDI 989.7
PENAMALURU 1015.7
KANKIPADU 1088.5
GUDIVADA 1057
MUDINEPALLI 831.8
VUYYURU 1097.2
KRETIVENNU 1054.8
GUDLAVALLERU 1038.1
BANTUMILLI 1054.7
THOTLAVALLERU 1043.1
PAMARRU 943.5
PEDANA 1083.2
PAMIDIMUKKALA 1029.8
MOVVA 1001.8
GUDURU 1108.1
GHANTASALA 972.9
CHALLAPALLI 1161.7
MACHILIPATNAM 1124.1
AVANIGADDA 1227.7
KODURU 916.2
NAGAYALANKA 1115
SCALE
Kilometers
0 5 10 20 30 40
AGROMET CELL


SOIL MAP - KRISHNA DISTRICT
N
SOIL TYPE
Loamy over sandy calcareous stratified soils
Loamy soils
Loamy soils with high AWC
Loamy soils with medium AWC
Loamy soils with very high Awc
Loamy stratified soils
cracking clay calcareous soils
Clayey calcareous soils
Clayey calcareous soils with medium AWC
Clayey soils
Cracking clay calcareous soils
Cracking clay soils
Cracking clay soils with very high AWC
Gravelly clay soils
Gravelly clay soils with low AWC
Gravelly loam soils
Gravelly loam soils with very low AWC
Loamy calcareous soils
Sandy soils with very low AWC
Silty soils
Stratified clayey soils
Stratified loamy soils
SCALE
0 0.05 0.1 0.2 0.3 0.4
Kilometers
AGROMET-CELL

2.0 Strategies for weather related contingencies

2.1 Drought

2.1.1 Rainfed situation

Condition			**Suggested Contingency measures**		
Early season drought (delayed onset)	**Major Farming situation**	**Normal Crop/cropping system**	**Change in crop/cropping system**	**Agronomic measures**	**Remarks on Implementation**
Delay by 2 weeks (3rd week of June)	Black soils – Rainfed	Cotton	No change	Normal practices	-
		Greengram			
		Redgram			
	Red soils – Rainfed	Cotton			
		Redgram (Sole crop)			
		Redgram+Greengram / Groundnut (1:7)			
		Green gram/ black gram – Red gram (7:1)			
Condition			**Suggested Contingency measures**		
Early season drought (delayed onset)	**Major Farming situation**	**Normal Crop/cropping system**	**Change in crop/cropping system**	**Agronomic measures**	**Remarks on Implementation**
Delay by 4 weeks (July 1st week)	Black soils – Rainfed	Cotton	No change	Normal practices	
	Red soils – Rainfed	Cotton		Normal practices	
		Redgram (Sole crop)		Reduce Redgram row spacing 180 cm to 150 cm	
		Redgram+Greengram / Groundnut (1:7)		Normal practices	
		Green gram/ black gram – Red gram (7:1)			

Condition			**Suggested Contingency measures**		
Early season drought (delayed onset)	**Major Farming situation**	**Normal Crop/cropping system**	**Change in crop/cropping system**	**Agronomic measures**	**Remarks on Implementation**
Delay by 6 weeks (July 3rd week)	Black soils – Rainfed	Cotton	No change	Adopt closer spacing of 90x45cms	-
		Pulses	Short duration varieties PRG-100,ICPL-84031		
	Red soils - Rainfed	Cotton	No change	Adopt closer spacing of 90X45 cm	
		Redgram (Sole crop)		Reduce row spacing 180 cm to 150 cm	
		Redgram+Greengram/ Groundnut		Normal practices	

Condition			**Suggested Contingency measures**		
Early season drought (delayed onset)	**Major Farming situation**	**Normal Crop/cropping system**	**Change in crop/cropping system**	**Agronomic measures**	**Remarks on Implementation**
Delay by 8 weeks (August 1st week)	Black soils – Rainfed	Cotton	No change	Adopt closer spacing of 90X30 cm	-
	Red soils - Rainfed	Cotton		Adopt closer spacing of 75X30 cm. Top dressing of fertilizer at 20 days interval	
		Redgram (Sole crop)		Reduce row spacing 180 cm to 120 cm	
		Redgram+Greengram/ Ground nut	Redgram sole crop	Reduce row spacing 180 cm to 120 cm	

Condition			**Suggested Contingency measures**		
Early season drought **(Normal onset)**	**Major Farming situation**	**Normal Crop/cropping system**	**Crop management**	**Soil nutrient & moisture conservation measures**	**Remarks on Implementation**
Normal onset followed by 15-20 days dry spell after sowing leading to poor germination/crop stand etc.	Black soils – Rainfed	Cotton	Gap filling to be done by pot watering 7- 10 days after sowing if the crop stand is poor	When the crop is 2 weeks old, take up intercultivation to conserve moisture Spray 2 % urea solution or 1 % water soluble fertilizers like 19-19-19, 20-20-20, 21-21-21 to supplement nutrition	-
	Red soils - Rainfed	Cotton			
		Redgram (sole crop)		Inter cultivation to be done after 2 weeks of sowing to conserve soil moisture Foliar spray of 2% urea to supplement nutrition	
		Redgram+ Greengram	-		

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 stage	Black soils – Rainfed	Cotton	Spray 2 % urea solution or 1 % water soluble fertilizers like 19-19-19, 20-20-20, 21-21-21	Inter cultivate periodically (7-10 days interval) to conserve soil moisture	-
	Red soils - Rainfed	Cotton			
		Redgram (sole crop)			
		Redgram+Greengram	Harvest intercrops as fodders as chances of grain yield are poor Supplement the nutrients to the main crop through foliar spray	Inter cultivate periodically (7-10 days interval) to conserve soil moisture	

Condition			**Suggested Contingency measures**		
Mid season drought (long dry spell)	**Major Farming situation**	**Normal Crop/cropping system**	**Crop management**	**Soil nutrient & moisture conservation measures**	**Remarks on Implementation**
At reproductive stage	Black soils – Rainfed	Cotton	Spray urea - 2 % or KNO_3 1% or other water soluble fertilizers like 19-19-19,20-20-20-20,21-21-21@ 1 % to supplement nutrition	Intercultivation to create soil mulch to conserve moisture	-
	Red soils - Rainfed	Cotton		Intercultivation to conserve moisture. Supplemental irrigation, if available	
		Redgram (sole crop)		-	
		Redgram+Greengram			

Condition			**Suggested Contingency measures**		
Terminal drought	**Major Farming situation**	**Normal Crop/cropping system**	**Crop management**	**Rabi Crop planning**	**Remarks on Implementation**
		Cotton	Spray urea - 2 % or KNO_3 1% or other water soluble fertilizers 1 % to supplement nutrition Topping to prevent formation of new vegetative and reproductive flush Supplemental irrigation if available	-	-
	Red soils - Rainfed	Cotton			
		Redgram (sole crop)			
		Redgram+Greengram			

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 – Canal irrigated (KED)	Green manure – Rice – Blackgram/Maize	Green manure – Rice – Greengram / Blackgram / Maize	Increase the plant density. Adopt prophylactic measures for Blast During Rabi season select Blackgram varieties like LBG 20, LBG 752, LBG 709 which are early maturing and suitable for delayed sowings Greengram can be grown in rice fallows under late seasonal conditions Zero tillage maize in paddy fields with varieties DHM 117, Trishulatha and other popular hybrids	
		Paddy – Sugarcane (plant) and Sugarcane (ratoon)	Paddy – Sugarcane plant and ratoon – paddy	Raising of nurseries with single buded sets to save the time and water Use of drip system to save the water quantity Mulching with sugarcane trash between rows and frequent intercultivations to conserve moisture	
	Red Soils/Black Soils – Canal irrigated (NSP left canal Command area/ Tank fed and lift irrigation)	Greengram – Rice – Greengram / Maize / Blackgram / Fodder	Rice- Greengram/ Maize/ Blackgram/ Fodder	Management of aged seedlings Direct sowing of short duration varieties Short duration crops like greengram, blackgram, maize and groundnut	

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 – Canal irrigated (KED)	Green manure – Rice – Blackgram/Maize	Green manure – Rice – Black gram/Greengram - Aerobic rice	Management of over aged seedlings Direct seeding verities (<135 days) with short duration Adopt alternate wetting and drying upto primordial Initiation stage to save water Short duration varieties of crops shall be selected. Blackgram varieties LBG 20, LBG 752, LBG 709 and maize varieties DHM 117, Trishulatha Water saving micro irrigation systems like Sprinkler irrigation for Greengram and Blackgram can be followed,	
		Paddy – Sugarcane plant and ratoon – paddy	No change	Raising of nurseries with single buded sets to save the time and water Conservation practices like inter cultivation, earthing up, Alternate row irrigation shall be practiced Water loss during conveyance can be reduced by using PVC/Metallic pipes instead of running water in open field channels	
	Black soils/Red soils – Left Canal irrigated (NSP left canal Command area/ Tank fed and lift irrigation)	Greengram – Rice – Blackgram/ Greengram/Maize/ Fodder	• Green manure – Rice – Greengram/ Blackgram/Jowar / Fodder • Redgram + Greengram /Jowar • Cotton (Wherever drainage facilities available)	For rice and rice fallow crops the agronomic measures as suggested for the above farming situation shall be followed Proper drainage facilities should be created to take up cropping systems as suggested	Farmers to be trained on the upland crop cultivation practices

Condition			Suggested Contingency measures		
	Major Farming situation	**Normal Crop/cropping system**	**Change in crop/cropping system**	**Agronomic measures**	**Remarks on Implementation**
Non release of water in canals under delayed onset of monsoon in catchment	Black soils – Canal irrigated (KED)	Green manure – Rice – Blackgram/Maize	• Go for early rabi • Green manure – Blackgram – Maize/Blackgram/Groundnut	Green manure crops should be incorporated Sowing of ID crops (blackgram and groundnut) can be taken from September second fortnight onwards Maize, Blackgram can be grown from December to February with two to three irrigations after the harvest of early Rabi crops	Farmers are to be trained on the upland crop cultivation practices
	Black soils/Red soils – Canal irrigation (NSP left canal Command area/ Tank fed and lift irrigation)	• Greengram/Green manure – Rice – Blackgram/Greengram/Jowar/Fodder	• Greengram/Green manure – Blackgram / Maize/Fodder • Greenmanure/ Greengram – Cotton • Greenmanure /Greengram – Redgram	Green manure crops should be incorporated Sowing of upland crops can be taken from September second fortnight onwards Maize, Blackgram can be grown from December to February/March with two to three irrigations after the harvest of early rabi crops	

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	Green manure / fodder / paddy	Green gram / fodder crops and green manure crops – medium to short duration paddy	Green manure crops - ID crops like maize , jowar , red gram, groundnut	• Green manure crops should be incorporated in to the soil at right stage and allow it to decompose with the moisture received from rain • Sowing of crops can be taken from September second fortnight onwards • Maize, Blackgram can be grown from December to February with two to three irrigations after the harvest of early rabi crops	

Condition			Suggested Contingency measures		
	Major Farming situation	**Normal Crop/cropping system[g]**	**Change in crop/cropping system[h]**	**Agronomic measures**	**Remarks on Implementation**
Insufficient groundwater recharge due to low rainfall	NA				
Any other condition (specify)					

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

Condition - Continuous high rainfall in a short span leading to water logging and Heavy rainfall with high speed winds in a short span				
Crop	**Suggested contingency measure**			
	Vegetative stage	**Flowering stage**	**Crop maturity stage**	**Post harvest**
Rice	Drain the excess water as early as possible Apply 20 kg N + 10 kg K /ha after draining excess water Take up gap filling either with available nursery or by splitting the tillers from the surviving hills Take up suitable plant protection Measures in anticipation of pest & disease out breaks	Drain the excess water as early as possible Apply 20 kg N + 10 kg K /ha after draining excess water Take up suitable plant protection Measures in anticipation of pest & disease out breaks	Drain the excess water as early as possible Take up suitable plant protection measures in anticipation of pest & disease out breaks	Drain out water and 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
Cotton	Drain the excess water as early as possible Apply 20 kg N + 10 kg K /ha after draining excess water Take up inter cultivation at optimum soil moisture condition to loosen and aerate the soil and to control weeds Spray KNO_3 1 % or water soluble fertilizers like 19-19-19, 20-20-20, 21-21-21 @ 1% to support nutrition Spray fungicides like Copper oxy chloride 0.3 % or Carbendazim 0.1 % or Mancozeb 0.25% two to three times by rotating the chemicals Take up timely control measures against the out break of pests like Spodoptera, Helicoverpa etc.	Drain the excess water as early as possible Apply 20 kg N + 10 kg K /ha after draining excess water Spray KNO_3 1 % or water soluble fertilizers like 19-19-19, 20-20-20, 21-21-21 at 1% to support nutrition Spray fungicides like Copper oxy chloride 0.3 % or Carbendazim 0.1 % or Mancozeb 0.25% two to three times by rotating the chemicals Take up timely control measures against the out break of pests like Spodoptera, Helicoverpa etc.	Drain the excess water as early as possible Pray KNO_3 1 % or water soluble fertilizers like 19-19-19, 20-20-20, 21-21-21 at 1% to support nutrition Spray fungicides like Copper oxy chloride 0.3 % or Carbendazim 0.1 % or Mancozeb 0.25% two to three times by rotating the chemicals Take up timely control measures against the out break of pests like Spodoptera, Helicoverpa etc.	Dry the produce properly before packing and sending to market
Redgram	Drain the excess water as early as	Drain the excess water as early as	Drain the excess water as early as	Spread the bundles

	possible Apply 20 kg N + 10 kg K /ha after draining excess water Take up inter cultivation at optimum soil moisture condition to loosen and aerate the soil and to control weeds Spray KNO_3 1 % or water soluble fertilizers like 19-19-19, 20-20-20, 21-21-21 at 1% to support nutrition	possible Spray KNO_3 1 % or water soluble fertilizers like 19-19-19, 20-20-20, 21-21-21 at 1% to support nutrition Take up timely control measures against the out break of pests like Spodoptera, Helicoverpa etc.	possible Allow the crop to dry completely before harvesting	drenched in rain on field bunds or drying floors to quicken the drying Thresh the bundles after they are dried properly Dry the grain to proper moisture per cent before bagging and storing to prevent deterioration in quality during storage
Blackgram	Drain the excess water as early as possible Apply 4-5 kg N /ha after draining excess water Spray KNO_3 1 % or water soluble fertilizers like 19-19-19, 20-20-20, 21-21-21 at 1% to support nutrition Spray fungicides like Copper oxy chloride 0.3 % or Carbendazim 0.1 % or Mancozeb 0.25% two to three times by rotating the chemicals Take up timely control measures against the out break of pests like *Spodoptera* etc.	Drain the excess water as early as possible Apply 4-5 kg N /ha after draining excess water Spray KNO_3 1 % or water soluble fertilizers like 19-19-19, 20-20-20, 21-21-21 at 1% to support nutrition Spray fungicides like Copper oxy chloride 0.3 % or Carbendazim 0.1 % or Mancozeb 0.25% two to three times by rotating the chemicals Take up timely control measures against the out break of pests like *Spodoptera* etc.	Drain the excess water as early as possible Allow the crop to dry completely before harvesting	Spread the bundles drenched in rain on field bunds or drying floors to quicken the drying Thresh the bundles after they are dried properly Dry the grain to proper moisture per cent before bagging and storing to prevent deterioration in quality during storage
Maize	Drain the excess water as early as possible Apply 20 kg N + 10 kg K /ha after draining excess water Take up inter cultivation and at optimum soil moisture condition to loosen and aerate the soil and to control weeds Earthenup the crop for anchorage Spray KNO_3 1 % or water soluble fertilizers like 19-19-19, 20-20-20, 21-21-21 at 1% to support nutrition Take up timely control measures for	Drain the excess water as early as possible Apply 20 kg N + 10 kg K /ha after draining excess water Spray KNO_3 1 % or water soluble fertilizers like 19-19-19, 20-20-20, 21-21-21 at 1% to support nutrition Take up timely control measures for sheath blight and post flowering stalk rots	Drain the excess water as early as possible Allow the crop to dry completely before harvesting	Harvest the cobs after the they are dried up properly. Dry the grain to optimum moisture condition before storing

	Pink stem borer, sheath blight and Turcicum leaf blight			
Horticulture crops – Fruits				
Mango	Drain the excess water as soon as possible Spray 1% KNO_3 or Urea 2% solution 2-3 times.	Drain the excess water as soon as possible Spray 1% KNO_3 or Urea 2% solution 2-3 times.	Drain the excess water as soon as possible Harvest the mature produce in a clear sunny day'	Store the fruits in well ventilated place temporarily before it can be marketed. Market the fruits as soon as possible.
Banana	Drain the excess water as soon as possible Inter-cultivate the soil with gorru for aeration. Spray 0.5 % KNO_3 or Urea 2% solution 2-3 times. Topdressing of booster dose of 80 g MOP + 100 g Urea per plant at two to three times intervals. Gap filling may be taken up if the plants are two weeks old and sowing window is still available for the crop. If the age of the plant is less than three months and submergence up to three feet better to replant the garden.	Drain the excess water as soon as possible Spray 0.5 % KNO_3 or Urea 2% solution 2-3 times. Topdressing of booster dose of 80 g MOP + 100 g Urea per plant at two to three times intervals. 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. Staking with bamboos to prevent further lodging.	Drain the excess water as soon as possible Harvest the marketable bunches in a clear sunny day. Spray 0.5 % KNO3 or Urea 2% solution 2-3 times for quick development of immature bunches. Staking with bamboos to prevent further lodging.	Use ripening chambers for quick ripening Market the produce as soon as possible.
Guava	Drain the excess water as soon as possible Spray 1% KNO3 or Urea 2% solution 2-3 times.	Drain the excess water as soon as possible Spray 1% KNO_3 or Urea 2% solution 2-3 times.	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.
Horticultural crops - Vegetables				
Chillies	Drain the excess water as soon as possible Spray Urea 2% solution 2-3 times. Topdressing of booster dose of 15 kg	Drain the excess water as soon as possible Spray Urea 2% solution 2-3 times. Topdressing of booster dose of 15 kg	Drain the excess water as soon as possible Harvest the matured fruits in a clear sunny day.	Dry the pods on concrete floor immediately after the appearance of sunlight (or). Use poly house solar driers

	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.	MOP + 30 kg Urea per acre as soon as possible.		for quick drying Grade the pods and market as soon as possible. Do not store such produce for long periods.
Tomato	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. Spray COC 30 g in 10 liters of water, 2-3 times against leaf spots. 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.	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. Spray COC 30 g in 10 liters of water, 2-3 times against leaf spots	Drain the excess water as soon as possible Harvest the marketable fruits in a clear sunny day'	Store the harvested fruits in well ventilated place temporarily before it can be marketed. Market the fruits as soon as possible.
Cucumber	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	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.	Drain the excess water as soon as possible Spray Urea 2% solution once.	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.

	the contingency period is between June to August, sowing of best alternative crop must be taken up.			
Plantation crops				
Oil palm	Planting should be done on mounts or bunds Drainage system, suited to local conditions may be provided to remove surplus water from root zone Relief drains [shallow] channels are opened at places where water accumulates and connected with main drain to remove water from the surface	Drain the excess water as soon as possible Apply booster dose of NPK fertilizers	Drain the excess water as soon as possible Apply booster dose of NPK fertilizers Harvest the mature nuts as soon as possible	Store the produce in well ventilated place temporarily before it can be market Market the nuts as soon as possible.
Turmeric	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. 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.	Drain the excess water as soon as possible Spray Urea 2% or 1% KNO3 solution 2-3 times.	Drain the excess water as soon as possible Harvest the rhizomes when field comes to normal	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
Coconut	Planting should be done on mounts or bunds Drainage system, suited to local conditions may be provided to remove surplus water from root zone Relief drains [shallow] channels are opened at places where water accumulates and connected with main drain to remove water from the surface	Drain the excess water as soon as possible Apply booster dose of NPK fertilizers	Drain the excess water as soon as possible Apply booster dose of NPK fertilizers Harvest the mature nuts as soon as possible.	Store the produce in well ventilated place temporarily before it can be market Market the nuts as soon as possible.

Condition - Outbreak of pests and diseases due to unseasonal rains				
Rice	Stem rot and Sheath blight - need based plant protection measures to be initiated based on incidence levels	BPH, Blast, Sheath blight incidence may increase due to unseasonal rains - need based plant protection measures to be initiated	Climbing cutworm and neck blast	-
Cotton	Jassids, Wilt and root rot, Bacterial leaf blight - Need based plant protection measures to be initiated	Jassids, *Spodoptera*, Wilt and root rot, Bacterial leaf blight, Grey mildew - Need based plant protection measures to be initiated	Dusky cotton bug, Grey mildew - Need based plant protection measures to be initiated	Dry the seed cotton properly after picking and store it under shade in aerated place
Redgram	Wilt and root rot - Need based plant protection measures to be initiated	Wilt and root rot. Need based plant protection measures to be initiated	-	
Blackgram	Spodoptera - Need based plant protection measures to be initiated	Spodoptera, Leaf spots, Powdery mildew - Need based plant protection measures to be initiated	Spodoptera, Rust - Need based plant protection measures to be initiated	
Maize		Jassids, Wilt and Stalk rot	Post flowering Stalk rots may aggravate if unseasonal rains occurs	

2.3 Floods

Condition	**Transient water logging/ partial inundation and Continuous submergence for more than 2 days**			
	Suggested contingency measure			
	Seedling / nursery stage	**Vegetative stage**	**Reproductive stage**	**At harvest**
Rice	Drain out the excess water at the earliest Apply booster dose of 0.2 kg N/40 sq. m Spray micronutrients like Zn, Fe two to three times at 4 -5 days interval Takeup proper weed control measures	Drain out the excess water at the earliest Take up gap filling either with available nursery or by splitting the tillers from the surviving hills Apply a booster dose of 20 kg N/acre Spray $ZnSO_4$ 0.2 % if it is less than 45 days after transplanting Takeup need based plant protection measures	Drain out the excess water at the earliest Takeup need based plant protection measures	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

	Spray of $ZnSO_4$, $FeSO_4$ to correct micronutrient deficiencies			Ensure proper grain moisture before storing
Cotton	Drain out the excess water at the earliest. Takeup the gap filling at the earliest. Inter cultivate at optimum field moisture condition. Apply 20 kg N + 10 kg K /ha after draining excess water. To spray KNO_3 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. Mortality is most likely hence resowing to be taken up. With short duration hybrids Adopt closer spacing of 90X45 or 90X30 cm.	Drain out the excess water at the earliest Inter cultivate at optimum field moisture condition. Apply 20 kg N + 10 kg K /ha after draining excess water. To spray KNO_3 1 % or water soluble fertilizers like 19-19-19, 20-20-20, 21-21-21 at 1% to support nutrition. Spray of micronutrients two times at 7-10 days interval. Take up plant protection measures against possible pests and disease incidence.	Drain out the excess water at the earliest. To spray KNO_3 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.	Kapas picking should be done carefully to prevent admixtures with waste plant material. To spray KNO_3 1 % or water soluble fertilizers like 19-19-19, 20-20-20, 21-21-21 at 1% to support nutrition.
Sugarcane	Drain out the excess water at the earliest	Drain out the excess water at the earliest Apply 50 kg N urea and 25k / ha	Drain out the excess water at the earliest Apply 50 kg N urea and 20k/ha	Drain out the excess water at the earliest Harvest the crop as early as possible
Redgram	Drain out the excess water at the earliest Takeup the gap filling at the earliest Inter cultivate at optimum field moisture condition	Drain out the excess water at the earliest Takeup the gap filling at the earliest Inter cultivate at optimum field moisture condition Apply 4-5 kg N/acre after draining excess water Spray KNO_3 1 % or water soluble	Drain out the excess water at the earliest To spray KNO_3 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	Drain out the excess water at the earliest Harvest the crop when the field condition permits Drying of bundles should be done on elevated places like filed bunds or drying floors

	Apply 4-5 kg N/acre after draining excess water	fertilizers like 19-19-19, 20-20-20, 21-21-21 at 1% to support nutrition Proper weed control measures to be taken up Need based plant protection measures to be taken up	pests and disease incidence Apply 20 kg N + 10 kg K /acre after draining excess water Need based plant protection measures to be taken up	
Blackgram	Drain out the excess water at the earliest Take up the gap filling at the earliest Take up weed control either mechanically or through weedicides Apply 4-5 kg N/acre after draining excess water Take up plant protection measures against possible pests and disease incidence	Drain out the excess water at the earliest Take up weed control either mechanically or through weedicides Apply 4-5 kg N/acre after draining excess water To spray KNO_3 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	Ddrain out the excess water at the earliest Apply 4-5 kg N/acre after draining excess water To spray KNO_3 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	Drain out the excess water at the earliest Harvest the crop after the fields are dried up Dry the bundles on field bunds and drying floors Dry the grain to optimum moisture content before storage
Maize	Drain out the excess water at the earliest Takeup weed control either mechanically or through weedicides Intercultivation and earthing up to be done Apply 20 kg N + 10 kg K /ha after draining excess water Take up plant protection measures against possible pests and disease incidence Re - sow the crop if mortality is > 15 %	Drain out the excess water at the earliest Takeup weed control either mechanically or through weedicides Intercultivation and earthing up to be done Apply 20 kg N + 10 kg K /ha after draining excess water Take up plant protection measures against possible pests and disease incidence Spray $KNO_{3\ @}$ 1 % or water soluble fertilizers like 19-19-19, 20-20-20, 21-21-21 @ 1% to support nutrition Need based plant protection measures to be taken up	Drain out the excess water at the earliest Take up plant protection measures against possible pests and disease incidence Apply 20 kg N + 10 kg K /acre after draining excess water Spray KNO_3 @1 % or water soluble fertilizers like 19-19-19, 20-20-20, 21-21-21 @ 1% to support nutrition Need based plant protection measures to be taken up	Drain out the excess water at the earliest Cob picking to be done after they are dried fully
Horticulture				

mango banana guava	Drain the excess water as soon as possible Spray 1% KNO3 or Urea 2% solution 2-3 times.	Drain the excess water as soon as possible Spray 1% KNO3 or Urea 2% solution 2-3 times.	Drain the excess water as soon as possible Spray 1% KNO3 or Urea 2% solution 2-3 times.	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. Spray Dithane M-45 3.0% or bavistin 1.0% against Anthracnose

2.4 Extreme events: Heat wave / Cold wave / Frost / Hailstorm **/ Cyclone** √

Extreme event type	**Suggested contingency measure**			
	Seedling / nursery stage	**Vegetative stage**	**Reproductive stage**	**At harvest**
Heat Wave				
	Cyclones are common in this district, lot of damage occurred in all crops			
Cold wave				
Frost				
Hailstorm				
Cyclone				
Rice	Drain out the excess water at the earliest Apply booster dose of 0.2 kg N/40 sq. m Spray micronutrients like Zn, Fe 2-3 times at 4 -5 days interval Takeup proper weed control measures	Drain out the excess water at the earliest Apply booster dose of 20 kg N/Acre Spray $ZnSO_4$ 0.2 % if it is less than 45 days after transplanting Take up need based plant protection measures	Drain out the excess water at the earliest Takeup need based plant protection measures Lodged plants to be lifted and tied together to make them stand erect	Drain out water spread sheaves loosely in field or field bunds where there is no water stagnation Spray common salt at 5% to prevent germination of seed and spoilage of straw from moulds Thresh after drying the sheaves properly 4. Ensure proper grain moisture before storing
Cotton	Drain out the excess water at the earliest Inter cultivate at optimum field moisture condition Apply 20 kg N + 10 kg K /ha after draining excess water	Drain out the excess water at the earliest Inter cultivate at optimum field moisture condition Earhting up to be done to provide anchorage to plants Apply 20 kg N + 10 kg K /ha after draining excess water To spray KNO_3@1 % or water soluble fertilizers like 19-19-19, 20-20-20, 21-21-21 @ 1% to support nutrition Spray of micronutrients two times at 7-10 days interval	Drain out the excess water at the earliest Spray KNO_3 @1 % or water soluble fertilizers like 19-19-19, 20-20-20, 21-21-21 @ 1% to support nutrition Earhting up to be done to provide anchorage to plants Spray of micronutrients two times at 7-10 days interval Take up plant protection measures against possible	Kapas picking should be done carefully to prevent admixtures with waste plant material

		Take up plant protection measures against possible pests and disease incidence	pests and disease incidence	
Redgram	Drain out the excess water at the earliest Inter cultivate at optimum field moisture condition Apply 4-5 kg N/acre after draining excess water	Drain out the excess water at the earliest Inter cultivate at optimum field moisture condition Apply 4-5 kg N/acre after draining excess water	Drain out the excess water at the earliest To spray $KNO_{3@}$ 1 % or water soluble fertilizers like 19-19-19, 20-20-20, 21-21-21 @ 1% to support nutrition 3. Take up plant protection measures against possible pests and disease incidence	Drain out the excess water at the earliest Harvest the crop when the field condition permits Drying of bundles should be done on elevated places like filed bunds or drying floors
Blackgram	Drain out the excess water at the earliest Takeup weed control either mechanically or through weedicides Apply 4-5 kg N/acre after draining excess water	Drain out the excess water at the earliest Take up weed control either mechanically or through weedicides Apply 4-5 kg N/acre after draining excess water Spray KNO_3 @1 % or water soluble fertilizers like 19-19-19, 20-20-20, 21-21-21 @ 1% to support nutrition Take up plant protection measures against possible pests and disease incidence	Drain out the excess water at the earliest Apply 4-5 kg N/acre after draining excess water Spray KNO_3 @1 % or water soluble fertilizers like 19-19-19, 20-20-20, 21-21-21 @ 1% to support nutrition Take up plant protection measures against possible pests and disease incidence	Drain out the excess water at the earliest Harvest the crop after the fields are dried up
Maize	Drain out the excess water at the earliest Intercultivation and earthing up to be done Apply 20 kg N + 10 kg K /ha after draining excess water Take up plant protection measures against possible pests and disease incidence	Drain out the excess water at the earliest Takeup weed control either mechanically or through weedicides Intercultivation and earthing up to be done Apply 20 kg N + 10 kg K /ha after draining excess water	Drain out the excess water at the earliest Take up plant protection measures against possible pests and disease incidence	Drain out the excess water at the earliest Cob picking to be done after they are dried fully

		Take up plant protection measures against possible pests and disease incidence		
Horticulture crops – Fruits				
Mango	If the damage is severe, go for replanting.	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	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	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
Banana		Wind damaged plants should be pruned using disinfected secaetures and cut ends must be smeared with Bordeaux paste Drain the excess water as soon as possible The fallen tress may be cut leaving two suckers Inter-cultivate the soil with gorru for aeration. Spray 0.5 % KNO3 or Urea 2% solution 2-3 times. Topdressing of booster dose of 80 g MOP + 100 g Urea per plant at two to three times intervals. Spray Propiconazole 1ml in one litre, 2-3 times against leaf spots. Soil drenching with COC @ 3 g/litre to avoid rhizome rotting.	Wind damaged plants should be pruned using disinfected secaetures and cut ends must be smeared with Bordeaux paste Drain the excess water as soon as possible The fallen tress may be cut leaving two suckers Topdressing of booster dose of 80 g MOP + 100 g Urea per plant at two to three times intervals Mature bunches on the completely damaged plants be covered with Leaves and harvested with in 15-20days	Wind damaged plants should be pruned using disinfected secaetures and cut ends must be smeared with Bordeaux paste Drain the excess water as soon as possible. Harvest the mature bunches as soon as possible. use ripening chambers for quick and uniform ripening Store the harvested bunches in well ventilated place temporarily before it can be marketed. Market the produce as soon as possible. 3-4 foliar application of KNO3on immature/developing bunches and leaves at weekly intervals. Staking with bamboo for support .

		Gap filling may be taken up if the plants are two weeks old and sowing window is still available for the crop. If the age of the plant is less than three months and submergence up to three feet better to replant the garden.		
Guava	Drain the excess water as soon as possible Spray 1% KNO3 or Urea 2% solution 2-3 times. Provide support to the young plants.	Wind damaged branches should be pruned using disinfected secaetures and cut ends must be smeared with Bordeaux paste Drain the excess water as soon as possible Spray 1% KNO3 or Urea 2% solution 2-3 times.	Wind damaged branches should be pruned using disinfected secaetures and cut ends must be smeared with Bordeaux paste Drain the excess water as soon as possible Spray 1% KNO3 or Urea 2% solution 2-3 times.	Wind damaged branches should be pruned using disinfected secaetures and cut endsmust be smeared with Bordeaux paste 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. The unmarketable fruits may be utilized for processing
Horticulture crops vegetables				
Chillies	Grow nursery on raised beds.	Uprooted plants may be lifted and earthed up Drain the excess water as soon as possible Gap filling must be done immediately 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.	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.	Drain the excess water as soon as possible. Dry the pods on concrete floor/ tarpaulins immediately Use poly house solar driers for quick drying Remove the pest and disease infected pods. .
Tomato	Grow nursery on raised beds.	Uprooted plants may be lifted	Uprooted plants may be	Drain the excess water as soon as

	If damage is more go for resowing	and earthed up Drain the excess water as soon as possible Gap filling must be done immaditeatly 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	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	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		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	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.	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				
Oil Palm Coconut	Planting should be done on mounts or bunds Drainage system suited to local conditions. may be provided to remove surplus water from root zone	Drain the excess water as soon as possible Twisted leaves may be cut and removed .Apply booster dose of NPK fertilizers	Drain the excess water as soon as possible Hanging bunches may be provided with supports wherever possible .Apply booster dose of NPK	Twisted leaves may be cut and removed Hanging bunches may be provided with supports wherever possible Harvest the mature nuts as soon as possible.

	Relief drains [shallow] channels are opened at places where water accumulates and connected with main drain to remove water from the surface	.The palms have fallen with root system still having contact with the soil ,they need to be brought to position and provided with soil mound and support	fertilizers .The palms have fallen with root system still having contact with soil they need to be brought to position and provided with soil mound and support	Market the produce as soon as possible.
Turmeric		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.	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.	Drain the excess water as soon as possible. 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.

2.5 Contingent strategies for Livestock, Poultry & Fisheries

2.5.1.1 Livestock

Guntur district experience moderate floods. Moderate drought and mild cyclones in coastal areas

General contingency plans

Before the event	During the event	After the event
Feed and fodder availability		
Conserving fodder/crop residues/ forest grass by silage / hay making either by individual or on community basis Preparing complete diets and storing in strategic locations Organize procurement of dry fodders / feed ingredients from surplus areas Establish fodder banks and feed banks Livestock relief camps during floods/cyclones must be planned in the vicinity of relief camps for people Capacity building and preparedness	Organise relief camps 2.Supply silage / hay to farmers with productive stock on subsidized rates Segregate old, weak and unproductive stock and send for slaughter Supply mineral mixture to avoid deficiencies Dry fodder must be offered to the livestock in little quantities for number of times Concentrate feed or complete feed must be offered to only productive and young stock only	Capacity building to stake holders on drought /cyclone/flood mitigation in livestock sector Promote fodder cultivation. Flushing the stock to recoup Avoid soaked and mould infected feeds / fodders to livestock Replenish the feed and fodder banks Promote fodder preservation techniques like silage / hay making
Drinking water		
Construct drinking water tanks in herding places, village junctions and in relief camp locations Plan for sufficient number of tanks for water transportation Identify bore wells, which can sustain demand. Procure sufficient quantities of water Sanitizers	Regular supply of clean drinking water to all tanks 2.Cleaning the tanks in regular intervals Keep the livestock away from contaminated flood/cyclone/stagnated waters Add water sanitizers	Hand over the maintenance of the structures to panchayats Sensitize the farming community about importance of clean drinking water
Health and disease Management		

Procure and stock emergency medicines and vaccines for important endemic diseases of the area All the stock must be immunized for endemic diseases of the area Carry out deworming to all young stock Keep stock of bleaching powder and lime Carry out Butax spray for control of external parasites Identify the Clinical staff and trained paravets and indent for their services as per schedules Identify the volunteers who can serve in need of emergency	Keep close watch on the health of the stock Sick animals must be isolated and treated Separately. Carry out deworming and spraying to all animals entering into relief camps Clean the animal houses regularly and apply disinfectants. Safe and hygienic disposal of dead animal carcasses Organize with community daily lifting of dung from relief camps	Keep close surveillance on disease outbreak. Undertake the vaccination depending on need Keep the animal houses clean and spray disinfectants

	Suggested contingency measures		
	Before the event	**During the event**	**After the event**
Cyclone	Harvest all the possible wetted grain (Rice/maize/backgram/green gram etc) and use as animal feed. As the district is chronically prone for cyclone, arrange for storing minimum required quantity of hay (25-50 kg) and concentrates (10-25 kg) per animal in farmer's / LS keepers house/ shed for feeding during cyclone. Stock of anti-diarrheal drugs and electrolytes should be made available for emergency transport Don't allow the animals for grazing in case of early forewarning (EFW) of cyclone Incase of EFW of severe cyclone, shift the animals to safer places.	Treatment of the sick, injured and affected animals through arrangement of mobile emergency veterinary hospitals / rescue animal health workers. Diarrhea out break may happen. Health camps should be organized In severe cases un-tether **or** let loose the animals Arrange transportation of highly productive animals to safer place Spraying of fly repellants in animal sheds	Repair of animal shed Deworm the animals through mass camps Vaccinate against possible disease out breaks like HS, BQ, FMD and PPR Proper dispose of the dead animals / carcasses by burning / deep burying (4-8 feet) with lime powder (1kg for small ruminants and 5kg for large ruminants) in pit Bleach / chlorinate (0.1%) drinking water or water resources Collect drowned crop material, dry it and store for future use Sowing of short duration fodder crops in unsown and water logged areas when crops are damaged and no chance to replant Application of urea (20-25kg/ha) in the

			inundated areas and CPR's to enhance the bio mass production.
Floods	In case of early forewarning (EFW), harvest all the crops (Rice/maize/backgram/green gram) that can be useful as fodder in future (store properly) Don't allow the animals for grazing if severe floods are forewarned As regularly flood prone district, arrange for storing minimum required quantity of hay (25-50kg) and concentrates (25kgs) per animals in farmer / LS keepers house / shed for feeding animals during floods Arrangement for transportation of animals from low lying area to safer places and also for rescue animal health workers to get involve in rescue operations	Transportation of animals to elevated areas Stall feeding of animals with stored hay and concentrates Proper hygiene and sanitation of the animal shed In severe floods, un-tether or let loose the animals Emergency outlet establishment for required medicines or feed in each village Spraying of fly repellants in animal sheds	Repair of animal shed Bring back the animals to the shed Cleaning and disinfection of the shed Bleach (0.1%) drinking water / water sources Deworming with broad spectrum dewormers Vaccination against possible disease out breaks like HS, BQ, FMD and PPR Proper disposable of the dead animals / carcasses by burning / deep burying (4-8 feet) with lime powder (1kg for small ruminants and 5kg for large ruminants) in pit Drying the harvested crop material and proper storage for use as fodder.
Health and Disease management	List out the endemic diseases (species wise) in that district and store vaccines for those diseases Timely vaccination (as per enclosed vaccination schedule) against all endemic diseases Surveillance and disease monitoring network to be established at Joint Director (Animal Husbandry) office in the district	Constitution of Rapid Action Veterinary Force Procurement of emergency medicines and medical kits Rescue of sick and injured animals and their treatment	Conducting mass animal health camps Conducting fertility camps Mass deworming camps
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)	Restrict wallowing of animals in water bodies/resources	Bleach (0.1%) drinking water / water sources Provide clean drinking water
Drought			

Feed & Fodder availability	Available paddy straw and sugar cane tops should be properly stored for future use. Chopping of fodder should be made as mandatory in every village through supply and establishment of good quality chaff cutters. Harvesting and collection of perennial vegetation particularly grasses which grow during monsoon Proper drying, bailing and densification of harvested grass from previous season Creation of permanent fodder, feed and fodder seed banks in all drought prone areas	Harvest and use biomass of dried up crops (Rice/maize/greengram/blackgram) material as fodder. Harvest the tree fodder (Neem, Subabul, Acasia, Pipal etc) and unconventional feeds resources available and use as fodder for livestock (LS). Available feed and fodder should be cut from CPRs and stall fed in order to reduce the energy requirements of the animals Hay should be transported to the needy areas from the near by districts in case of drought Advise the farmers about the practice of mixing available kitchen waste with dry fodder while feeding	Short duration fodder crops of sorghum/bajra/maize(UP chari, MP chari, HC-136, HD-2, GAINT BAJRA, L-74, K-677, Ananad/African Tall, Kisan composite, Moti, Manjari, B1-7 should be sown in unsown and crop failed areas where no further routine crop sowing is not possible

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 etc, in to use as feed in case of severe drought.	Supplementation only for productive birds with house holds grain. Supplementation of shell grit (calcium) for laying birds. Culling of weak birds.	Supplementation to all survived birds.
Drinking water		Use water sanitizers or offer cool drinking water	
Health and disease management	Culling of sick birds. Deworming and vaccination against RD and fowl pox	Mixing of Vit. A,D,E, K and B-complex including vit C in drinking water (5ml in one litre water).	Hygienic and sanitation of poultry house. Disposal of dead birds by burning / burying with lime powder in pit.
Floods			
Shortage of feed ingredients	In case of early forewarning of floods, shift the birds to safer place. Storing of house hold grain like maize, broken rice, bajra etc,	Use stored feed as supplement. Don't allow for scavenging Culling of weak birds.	Routine practices are followed Deworming and vaccination against RD .
Drinking water		Use water sanitizers or offer cool drinking water.	
Health and disease management	In case of EFW, add antibiotic powder (Terramycin/Ampicilline/ Ampiclox etc., 10g in one litre) in drinking water to prevent any disease outbreak	Prevent water logging surrounding the sheds through proper drainage facility. Assure supply of electricity by generator or solar energy or biogas. Sprinkle lime powder to prevent ammonia accumulation due to dampness.	Sanitation of poultry house. Treatment of affected birds. Disposal of dead birds by burning / burying with line powder in pit . Disposal of poultry manure to prevent protozoal problem Supplementation of coccidiostats in feed. Vaccination against RD.

Cyclone			
Shortage of feed ingredients	In case of EFW, shift the birds to safer place. Storing of house hold grain like maize, broken rice, bajra etc,. Culling of weak birds.	Use stored feed as supplement Don't allow for scavenging Protect from thunder storms	Routine practices are followed
Drinking water		Use water sanitizers or offer cool drinking water	
Health and disease management	In case of EFW, add antibiotic powder in drinking water to prevent any disease outbreak.	Sanitation of poultry house. Treatment of affected birds. Prevent water logging surrounding the sheds Assure supply of electricity. Sprinkle lime powder (5-10g per square feet) to prevent ammonia accumulation due to dampness.	Disposal of dead birds by burning / deep burying with lime powder in pit . Disposal of poultry manure to prevent protozoal problem. Supplementation of coccidiostats in feed Vaccination against Ranikhet Disease (0.5ml S/c).

2.5.3 Fisheries/ Aquaculture

	Suggested contingency measures		
	Before the event	**During the event**	**After the event**
1) Drought			
A. Capture			
Marine	No intervention	No intervention	No intervention
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 qaulity	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	Frenquent change of water with fresh water	Frequent draining of the pond with fresh water, removal of top layers
(iii) Any other			
2) Floods			
A. Capture			
Marine	No intervention	No intervention	No intervention
Inland			
(i) Average compensation paid due to loss of human life	Shifting the people from low lying areas to relief camps	Deployment of specially trained persons for rescue operations by providing life bouys, jackets, ropes, boats, etc	Payment sufficient ex-gratia to the families

(ii) No. of boats / nets/damaged	Shifting and relocating boats and nets to safer places when warnings are issued, to avoid fishing, etc	Shifting and relocating boats and nets to safer places	Assessment of damages to boats and nets and provision of boats and nets for restoration of livelihoods
(iii) No.of houses damaged	Avoidance of construction of houses in flood prone ares, construction of pucca houses at elevated places,	Shifting of people by relief boats to the relief camps	Assessment of damages to houses and provision of compensation in case of partial damage and sanction house under existing schemes
(iv) Loss of stock	Avoidance of surface species like catla, silver carp since they are vulnerable in tanks prone to floods, erection of nets across the spill way or just beyond it	Erection of nets at spill ways	Taking up compensatory stocking
(v) Changes in water quality		When dissolved oxygen levels go down, aerators, recirculation of water, etc are to be attempted to maintain DO levels, going for partial harvest, etc	
(vi) Health and diseases	Sometimes there may be heavy accumulation of nutrients and organic matter.	There may be break out of 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. 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 Heamorrhagic septicimea. 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 warnigs are issued	Relocating pumps, aerators to elevated places	Assessment of damages and provision of them on subsidy
(vi) Any other			
3. Cyclone / Tsunami			
A. Capture			
Marine			
(i) Average compensation paid due to loss of fishermen lives	Avoidance of fishing, preventing fishermen from venturing into sea, carrying of safety equipment and VHF sets, shifting fishermen from vulnerable areas to relief camps, etc	To ensure the return of fishing boats on long voyages, provision of information on such boats to coast Guard	Payment sufficient ex-gratia to the families
(ii) Avg. no. of boats / nets/damaged	Avoidance of fishing when warnings are issued, shifting of boats and nets to safe places	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) Avg. no. of houses damaged	Avoidance of houses in Coastal Regulation Zone, designing of houses to withstand impact of turbulent wind and water	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
Inland	Erection of protective nets acroos 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 stanidng 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)	Recircualtion water to repleish and ensure sufficient dissolved oxygen levels in the pond. Maintenance of salinity levels by pumping in water from creecks.	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 eqipment to prevent from being damaged
(vi) Any other			
4. Heat wave and cold wave			
A. Capture			
Marine	Avoidance of fishing	Avoidance of fishing	No intervention
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
(iii) Any other			