

State: ANDHRA PRADESH

Agriculture Contingency Plan for District: CHITTOOR

Contributors

1. **Dr.G.Krishna Reddy, Principal Scientist (Agronomy), RARS, Tirupati**
2. **Dr.T.Prathima, Principal Scientist (Agronomy), RARS, Tirupati**
3. **Dr.N.Sunitha, Senior Scientist (Agronomy), RARS, Tirupati**
4. **Dr.S.Tirumala Reddy, Scientist (Agronomy), RARS, Tirupati**
5. **Dr.B.Ravindranatha Reddy, Principal Scientist (Agronomy), RARS, Tirupati**
6. **Dr.P.Rajasekhar, Associate Director of Research, RARS, Tirupati**
7. **Dr.M. Reddikumar, TC, KVK, Kalikiri**

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

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)	1515.1	452.0	146.4	33.9	42.1	28.6	154.4	174.3	118.2
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1.4	Major Soils	Area ('000 ha)	Percent (%) of total
	1. Red loams	232	57
	2. Red sandy	138	34
	3. Clay soils	12	3
	4. Black loamy	4	1
	5. Black loamy	8	2
	6. Red Clay	12	3

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

1.6	Irrigation	Area ('000 ha)	Percent (%)	
	Net irrigated area	157.4		
	Gross irrigated area	184.5		
	Rainfed area	161.2		
	Sources of Irrigation	Number	Area (ha)	% area
	Canals		0.3	0.2
	Tanks	8152	22.9	15.1
	Tube wells & filter points	165000	128.8	84.7
	Lift irrigation	-		
	Dug wells	38000		
	Other sources		0.041	0.02

	Total		152.0	100.0
	Pumpsets	223007		
	Micro-irrigation		30335	
	Groundwater availability and use	No. of blocks	% area	Quality of water
	Over exploited	10		TDS is more than 2000PPM
	Critical	13		
	Semi- critical	15		
	Safe	37		
	Wastewater availability and use			

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

Area under major field crops & horticulture etc.

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

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

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

1.8	Livestock	Male ('000)	Female ('000)	Total ('000)			
	Non descriptive Cattle (local low yielding)	154.3	201.4	355.7			
	Crossbred cattle	91.6	656.9	748.5			
	Non descriptive Buffaloes (local low yielding)	21.9	117.8	139.7			
	Graded Buffaloes						
	Goat			490.9			
	Sheep			1116.6			
	Others (Camel, Pig, Yak etc.)			11.9			
	Commercial dairy farms (Number)						
1.9	Poultry	No. of farms	Total No. of birds (number)				
	Commercial		214150				
	Backyard		1418692				
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)	
		20016	Nil				
	ii) Inland (Data Source: Fisheries Department)	No. Farmer owned ponds		No. of Reservoirs		No. of village tanks	
		17		-		-	
	B. Culture						

		Water Spread Area (ha)	Yield (t/ha)	Production ('000 tons)
	i) Brackish water (Data Source: MPEDA/ Fisheries Department)		-	-
	ii) Fresh water (Data Source: Fisheries Department)	16	-	-
	Others		-	0.5

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

1.12	Sowing window for 5 major crops (start and end of sowing period)	Groundnut	Paddy	Sugarcane	Redgram	Sunflower
	Kharif- Rainfed	June 2nd FN to July 2 nd FN	---	---	June 1 st FN to August 1 st FN	July 2 nd FN to August 1 st FN

	Kharif-Irrigated	May 1 st FN to June 1 st FN	May 2 nd FN to July 2 nd FN	---	---	---
	Rabi- Rainfed	---	---	---	September 2 nd FN to October 1 st FN	---
	Rabi-Irrigated	Nov 15 th – Dec 30 th	Nov 1 st FN – Dec 30 th	December 1 st FN to March	---	Nov 1 st FN – Dec 30 th

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

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

Rainfall distribution pattern in Chittoor district:

Month	Normal rainfall (mm)	Actual Rainfall (mm)									
		2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
January	7.8	0.8	1.7	1.4	2.5	0.0	0.5	0.0	2.7	9.7	0.0
February	4.3	0.0	0.1	23.5	0.0	48.9	0.4	0.0	0.0	0.0	0.0
March	7.7	4.3	1.4	0.0	4.0	18.9	6.7	25.3	1.6	20.9	32.6
April	17.6	9.9	13.6	58.4	36.9	33.7	7.6	90.3	0.3	10.6	8.2
May	61.7	47.0	97.0	35.2	56.6	29.6	49.0	55.9	101.3	55.0	57.3
June	78.7	67.9	104.8	50.2	56.6	69.6	73.6	85.6	160.2	96.1	75.4
July	101.9	40.9	180.4	135.5	143.8	71.7	75.6	43.6	166.2	70.1	49.0
August	117.4	128.8	152.0	172.8	132.2	106.9	129.6	133.6	22.8	209.3	57.5
September	141.4	125.6	135.3	105.5	75.7	180.2	84.6	115.7	40.6	213.3	129.1
October	162.7	35.2	96.5	127.6	174.3	178.0	120.5	156.1	29.5	238.5	69.5
November	162.6	186.8	233.3	177.3	121.0	70.1	60.3	606.4	11.0	101.7	103.0
December	70.1	60.8	69.7	65.1	101.4	3.5	46.6	93.7	130.5	31.0	16.4
Total	933.9	708	1085.8	952.5	905	811.1	655	1406.2	666.7	1056.2	598

Coverage of crops and Productivity levels in Chittoor district during Kharif 2018

S. No.	Name of the crop	Normal area (ha)	Actual area (ha)	Production (tonnes)	Productivity (kg/ha)
1	Rice	15190	17633	98392	5580
2	Groundnut	125634	102437	104486	1020
3	Sugarcane	22304	17266	1562573	90500
4	Redgram	7651	7785	2842	365
5	Bajra	2116	1848	5082	2750
6	Ragi	5599	3792	4740	1250
7	Greengram	523	494	358	725
8	Horsegram	5692	21439	13399	625
9	Blackgram	413	1078	809	750
10	Sesame	37	57	31	550
	Total	185159	173829		

Coverage of crops and Productivity levels in Chittoor district during Rabi, 2018-19

S. No.	Name of the crop	Normal area (ha)	Actual area (ha)	Production (tonnes)	Productivity (kg/ha)
1	Rice	42908	28080	146016	5200
2	Groundnut	12384	12281	24808	2020
3	Sugarcane	0	0	0	0
4	Redgram	0	0	0	0
5	Bajra	0	0	0	0
6	Ragi	709	1237	2258	1825
7	Greengram	379	383	153	400
8	Horsegram	3509	84815	18235	215
9	Blackgram	2407	4246	1741	410
10	Sesame	640	1202	661	550
	Total	62936	132244		

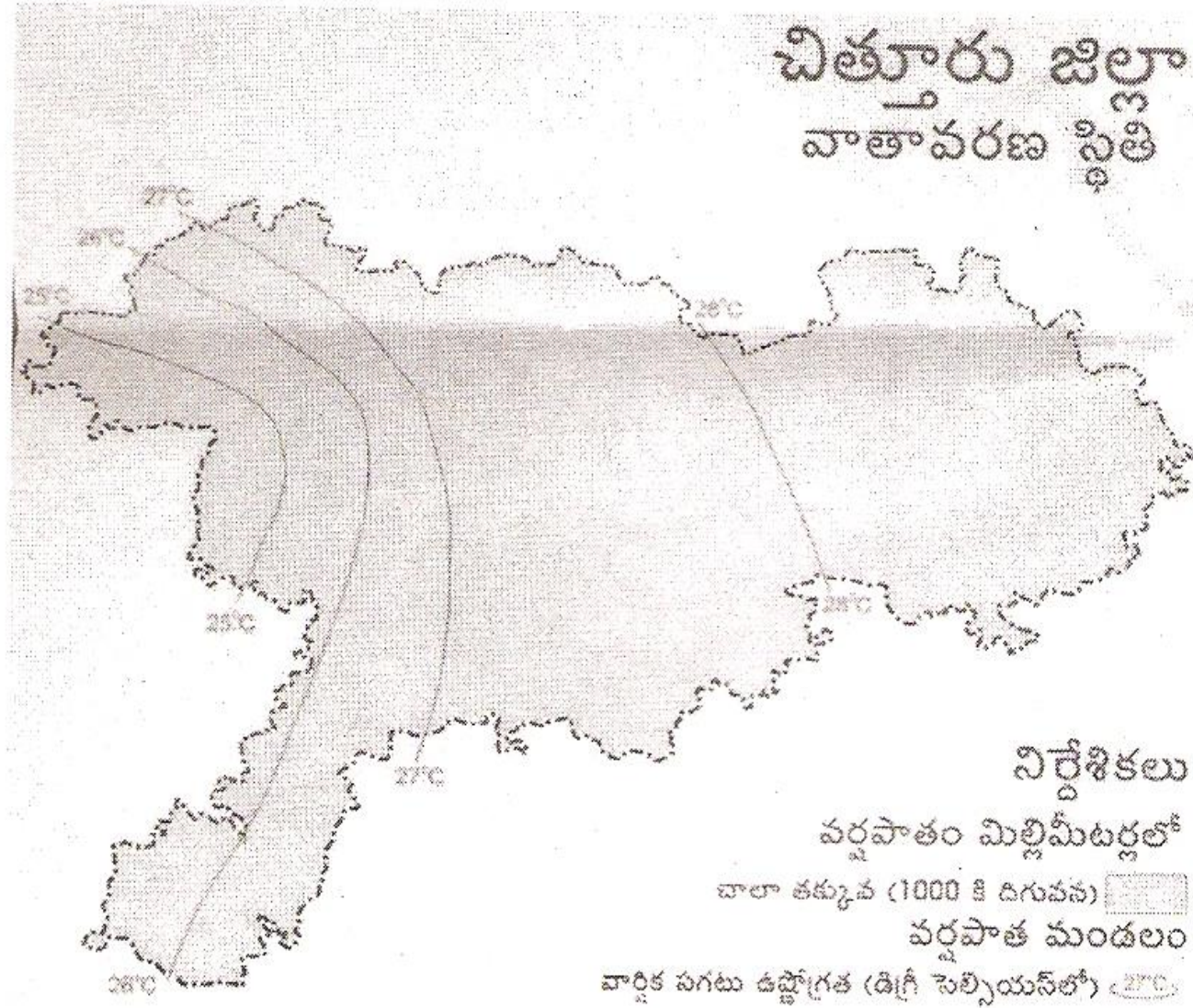
Sowing window for major crops grown in Southern zone districts during *Kharif & Rabi*

Sl. No.	Name of the Crop	Sowing window	
		<i>Kharif</i>	<i>Rabi</i>
1	Rice	15 th July to 15 th September	15 th October to 15 th November
2	Groundnut	II FN June to first week of August (Best time I FN July)	November – December (I FN of December)
3	Sugarcane	Early varieties: December – January Mid varieties : February Late varieties : March	
4	Redgram	15 th June to August	20 th September to 20 th October
5	Bajra	Complete sowing by 15 th July	September, October
6	Ragi	July, August	November, December
7	Greengram	15 th June to 15 th July	I FN October
8	Horsegram		
9	Blackgram	15 th June to 15 th July	I FN October
10	Sesame		II FN January

Source wise Irrigation area particulars

S. No	Source of Irrigation	Chittoor (ha)
1.	Canals	564
2.	Tanks	55,123
3.	Tube wells	1,06,448
4.	Dug wells	
5.	Other	
6.	Lift Irrigation	
	Total	162135

Rainfall pattern in Chittoor district



Strategies for weather related contingencies

❖ **Rainfed situation**

Condition 1

Early season drought (delayed onset)	Soil type and farming situation	Cropping system	Crop name	Sowing window	Change in crop/cropping system	Varieties	Management practices /Critical interventions
Delay by 2 weeks June 2 nd FN	Rainfed - shallow Red soil	Groundnut, + Redgram intercropping (7:1) or (11:1)	Groundnut Redgram	II FN June to first week of August (Best time I FN July)	Groundnut + Castor (11:1)	<p>Groundnut: Narayani , Dharani, K-6, K-9 , Kadiri Anatha, Kadiri Harithandra, Dheeraj, Nitya Haritha, ICGV 91114</p> <p>Redgram: Medium Duration: LRG 52, LRG 41, LRG 38, LRG 30, ICPL 332, ICP 8863, ICPL 87119, ICPL 85063, TRG 22</p> <p>Short duration: ICPL 84031 (Dhurga), ICPL 85010,</p> <p>Wilt resistant : ICP 8863 and ICPL 87119</p> <p>SMD Resistant: ICPL 87119, BSMR 736 and BSMR 853,</p> <p>Castor:- PCH-222, PCh-111, DCH-519, DCH-177(Deepak), DCH-32(Deepthi), GCH-4, PCS-262(Pragathi), Jwala(48-1), Kiran(PCS-136), Haritha (PCS-124, Kranthi (PCS-4), Jyothi (DCS-9)</p>	Mechanical sowing with tractor drawn seed drills as the sowing window is narrow.
Delay by 4 weeks July 1 st FN	Rainfed - shallow Red soil	Groundnut, + Redgram intercropping (7:1) or (11:1)					
Delay by 6 weeks July 2 nd FN	Rainfed - shallow Red soil	Groundnut, + Redgram (7:1) or 11:1					

<p>Delay by 8 weeks August</p>	<p>Rainfed - shallow Red soil</p>	<p>Groundnut, + Redgram (7:1) or 11:1</p>			<p>Red gram Bajra Jowar Black gram Green gram</p>	<p>Redgram: Medium Duration: LRG 52, LRG 41, LRG 38, LRG 30, ICPL 332, ICP 8863, ICPL 87119, ICPL 85063, TRG 22 Short duration: ICPL 84031 (Dhurga), ICPL 85010, Wilt resistant : ICP 8863 and ICPL 87119 SMD Resistant: ICPL 87119, BSMR 736 and BSMR 853. Bajra: ICMV 221, ICTP 8203, Raj 171, PHB 3, ABV 04. Fodder: Gaint Bajra, APFB 2, NDFB-1 & 2 Jowar:- PSV-1, Palem-2, CSV-10, CSV-11, CSV-13, CSV-1, Srisaila(PSV 56), N-15 and NTJ-5, Hybrids: CSH-10, CSH-11, CSH-14, CSH-16, CSH-18, CSH-21, CSH-23, CSH-25, CSH-30, PSH-1 Fodder: Single Cut: CSH 24 MF & .Pant Chari - 6 6. Multicut : SSG 59-3 & SSG 898 Multicut : Co FS 29 (Perennial) Blackgram: TBG 104, LBG-645, LBG-648, LBG-685, LBG-709, LBG-20, GBG-1, LBG-623 - 752, PBG-1, PBG-107, LBG-787, T9, PU 31. Greengram: - LGG-460, TM96-2 WGG42, IPM 2-14.</p>	
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Condition 2

Early season drought (Normal onset)	Soil type and farming situation	Cropping system	Crop management	Soil management
15-20 days dry spell after sowing	Rainfed – shallow Red soil	Groundnut + Redgram (7:1 or 11:1)	-	Take up hoeing to suppress weeds and to create dust mulch

Condition 3

Mid season drought (long dry spell, > 2 consecutive weeks)	Soil type and farming situation	Cropping system	Crop management	Soil management	Remarks on Implementation
Flowering, Pegging and pod development	Rainfed - shallow Red soil	Groundnut + Redgram (7:1 or 11:1)	<p>1. Life saving irrigation with harvested rain water in farm ponds (20 mm depth.) using sprinkler method at critical stages.</p> <p>2. Foliar spray of urea @ 2% at critical stages</p>	<p>1. Take up hoeing to suppress weeds and to create dust mulch</p> <p>2. Open dead furrow to retain the rain water</p>	Encourage farm ponds under NREGA

Condition 4

Terminal drought	Soil type and farming situation	Cropping system	Crop management	Soil management	Remarks on Implementation
Pod development and maturity stages	Rainfed - shallow red soils	Groundnut + Redgram (7:1) intercropping system	1. Life saving irrigation with harvested rain water in farm ponds (20 mm depth.) using sprinkler at critical stages 2. Harvesting the crop with mechanical harvesters at physiological maturity	---	-do-

Irrigated situation

Condition	Major Farming situation	Normal Crop/cropping system	Suggested Contingency measures		
			Change in crop/cropping system	Agronomic measures	Remarks on Implementation
Delayed release of water in canals due to low rainfall	-NA-				

Condition	Major Farming situation	Normal Crop/cropping system	Suggested Contingency measures		
			Change in crop/cropping system	Agronomic measures	Remarks on Implementation
Limited release of water in canals due to low rainfall	Not applicable				

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

Condition	Suggested Contingency measures			
	Major Farming situation	Normal Crop/cropping system	Change in crop/cropping system	Agronomic measures
Lack of inflows into tanks due to insufficient /delayed onset of monsoon	Irrigated uplands Wells/bore/ open	Rice-Rice	<p>Rice –Groundnut / Greengram</p> <p>Rice:- NLR 9674, ADT 37, NLR 34449, NDLR 7, NLR 3041 (Nellore sona), Vara,</p> <p>Kharif aged Nursery: Swarnamuki,</p> <p>Groundnut:- Narayani , Dharani, K-6, K-9 , TAG-24, Kadiri Anatha, Kadiri Harithandra, Dheeraj, Nitya Haritha, ICGV 91114</p> <p>Greengram: - LGG-460, TM96-2 WGG 42, IPM 2-14.</p>	<p>Dry direct drill sown paddy Drum seed paddy Alternate wetting & drying irrigation method</p> <ul style="list-style-type: none"> • Irrigation at critical stages i.e. flowering, pegging and pod development stage of Groundnut
		Sugarcane	<p>Maize:- Short duration: DHM 115, Pioneer 3342, KH 5991, DKC 7074R, JKMH 1701, MMH 133, Bio605 and Sun Vamana Sweet corn: Sugar 75, Bright Gene Sorghum:- PSV-1, Palem-2, CSV-10, CSV-11, CSV-13, CSV-1, Srisaila (PSV 56), N-15 and NTJ-5, Fodder Jowar : Single Cut : CSH 24 MF & .Pant Chari - 6 6. Multicut : SSG 59-3 & SSG 898 Multicut : Co FS 29 (Perennial) Bajra: ICMV 221, ICTP 8203, Raj 171, PHB 3, ABV 04. Fodder bajra : Gaint Bajra, APFB 2, NDFB-1 & 2</p>	
		Rice- Tomato	<p>Sunflower: DRSH 1, NDSH1012 (Prabhath), LSFH 171 & KBSH 44 Tomato: (Np-5005)</p>	

Condition	Major Farming situation	Normal Crop/cropping system	Change in crop/cropping system	Agronomic measures
Insufficient groundwater recharge due to low rainfall	Medium lands (Loam, Silty loam, Silty Sandy clay loam, Clay loam and silty clay loam) (Tube well irrigation)	Rice- Vegetables	<u>Redgram:</u> Medium Duration: LRG 52, LRG 41, LRG 38, LRG 30, ICPL 332, ICP 8863, ICPL 87119, ICPL 85063, TRG 22 Short duration: ICPL 84031 (Dhurga), ICPL 85010, Wilt resistant : ICP 8863 and ICPL 87119 SMD Resistant: ICPL 87119, BSMR 736 and BSMR 853, Groundnut:- Narayani , Dharani, K-6 , K-9, TAG-24, Kadiri Anatha, Kadiri Harithandra, Dheeraj, Nitya Haritha, ICGV 91114	Supplemental irrigation at critical stages in Light soils (Sandy, Loamy sand and sandy loam): 10 - 15 days interval Medium soils : 15 -20 days interval
		Rice-Groundnut	Green gram LGG-407,460, TM 96-2, WGG-42 <u>Redgram:</u> Medium Duration: LRG 52, LRG 41, LRG 38, LRG 30, ICPL 332, ICP 8863, ICPL 87119, ICPL 85063, TRG 22 Short duration: ICPL 84031 (Dhurga), ICPL 85010, Wilt resistant : ICP 8863 and ICPL 87119 SMD Resistant: ICPL 87119, BSMR 736 and BSMR 853,	Supplemental irrigation at critical stages in Light soils : 10 - 15 days interval Medium soils : 15 -20 days interval
		Sugarcane	Maize:- Short duration: DHM 115, Pioneer 3342, KH 5991, DKC 7074R, JKMH 1701, MMH 133, Bio605 and Sun Vamana Sweet corn: Sugar 75, Bright Gene Sorghum:- PSV-1, Palem-2, CSV-10, CSV-11, CSV-	Supplemental irrigation at critical stages in Light soils : 10 - 15

			13, CSV-1, Srisaila(PSV 56), N-15 and NTJ-5, Hybrids: CSH-10, CSH-11, CSH-14, CSH-16, CSH-18, CSH-21, CSH-23, CSH-25, CSH-30, PSH-1 Single cut: CSH 24 MF & .Pant Chari - 6 6. Multicut : SSG 59-3 & SSG 898 Multicut : Co FS 29 (Perennial)	days interval Medium soils : 15 -20 days interval
	Uplands (Tube well / well irrigation)	Rice	Groundnut + Redgram Groundnut: Narayani , Dharani, K-6, K-9 , Kadiri Anatha, Kadiri Harithandra, Dheeraj, Nitya Haritha, ICGV 91114 Redgram: Medium Duration: LRG 52, LRG 41, LRG 38, LRG 30, ICPL 332, ICP 8863, ICPL 87119, ICPL 85063, TRG 22 Short duration: ICPL 84031 (Dhurga), ICPL 85010, Wilt resistant : ICP 8863 and ICPL 87119 SMD Resistant: ICPL 87119, BSMR 736 and BSMR 853,	Supplemental irrigation at critical stages in Light soils : 10 - 15 days interval Medium soils : 15 -20 days interval

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

Condition 1	Suggested contingency measure			
	Vegetative stage	Flowering stage	Crop maturity stage	Post harvest
Continuous high rainfall in a short span leading to water logging				
Groundnut	<ul style="list-style-type: none"> • Provide drainage • Resowing of the crop • Suitable control measures to prevent disease outbreak 	<ul style="list-style-type: none"> • Drain excess water 	<ul style="list-style-type: none"> • Suitable control measures to prevent disease outbreak 	<ul style="list-style-type: none"> • Shifting of produce immediately after drying • Threshing immediately after harvest of groundnut crop.

	<ul style="list-style-type: none"> • Booster dose of 50Kg N/ ha 			
Paddy	<ul style="list-style-type: none"> • Provide drainage 	-	<ul style="list-style-type: none"> • Precautionary measures to be taken to avoid <i>insitu</i> germination 	<ul style="list-style-type: none"> • Spray 5% salt solution
Sugarcane	<ul style="list-style-type: none"> • Planting on the ridges • Draining excess water 	-	<ul style="list-style-type: none"> • Wrapping and propping and earthing-up to prevent lodging • Early harvesting 	-
Horticulture fruits				
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.
Banana	<ul style="list-style-type: none"> • Drain the excess water as soon as possible • Inter-cultivate the soil with goru 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. • 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. 	<ul style="list-style-type: none"> • Drain the excess water as soon as possible • 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. • 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. 	<ul style="list-style-type: none"> • 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. 	<ul style="list-style-type: none"> • Use ripening chambers for quick ripening • Market the produce as soon as possible.

		<ul style="list-style-type: none"> • Staking with bamboos to prevent further lodging. 		
Horticultural Crops - Vegetables				
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.
Brinjal	-do-	-do-	-do-	-do-
Chillies	<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 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 	<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 as possible. 	<ul style="list-style-type: none"> • Drain the excess water as soon as possible • Harvest the matured fruits in a clear sunny day. 	<ul style="list-style-type: none"> • Dry the pods on concrete floor immediately after the appearance of sunlight (or). • 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.

	(considered as complete economical loss), and the contingency period is between June to August, sowing of best alternative crop must be taken up.			
Potato	-do-	-do-	-do-	-do-
Beans	<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), go for re-sowing of same crop or best alternative crop must be taken up. 	<ul style="list-style-type: none"> • Drain the excess water as soon as possible • Spray KNO3 1% or 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 KNO3 1% or Urea 2% solution 2-3 times. • Harvest the mature produce as soon as possible. 	<ul style="list-style-type: none"> • Store the produce in well ventilated place temporarily before it can be marketed. • Market the produce as soon as possible.

2.3 Floods

: Not applicable

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

Extreme event type	Suggested contingency measure ^r			
	Seedling / nursery stage	Vegetative stage	Reproductive stage	At harvest
Cyclone				
Horticulture Fruits				
Mango	<ul style="list-style-type: none"> • If the damage is severe, go for resowing 	<ul style="list-style-type: none"> • Trees fallen on ground may be lifted and earthed 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 • 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.
Banana		<ul style="list-style-type: none"> • Wind damaged plants should be pruned using disinfected secateurs 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 goru 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 	<ul style="list-style-type: none"> • Wind damaged plants should be pruned using disinfected secateurs 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 	<ul style="list-style-type: none"> • Wind damaged plants should be pruned using disinfected secateurs 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.

		<p>intervals.</p> <ul style="list-style-type: none"> • 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. 	<p>be covered with Leaves and harvested with in 15-20days</p>	<ul style="list-style-type: none"> • 3-4 foliar application of KNO₃ on immature/developing bunches and leaves at weekly intervals. • Staking with bamboo for support
Horticulture Vegetables				
Tomato	<ul style="list-style-type: none"> • Grow nursery on raised beds. • Drench the nursery beds with COC 3 g per litre to prevent damping off. • 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. 	<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.
Chilies	<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 immediately • If damage is more go for replanting Spray Urea 2% solution 2-3 times. • Topdressing of booster dose 	<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. 	<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 quick drying • Remove the pest and disease infected pods.

		of 15 kg MOP + 30 kg Urea per acre as soon as possible.		
Brinjal	<ul style="list-style-type: none"> • Grow nursery on raised beds. • Drench the nursery beds with COC 3 g per litre to prevent damping off • 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 • Gap filling must be done immediately • Spray Urea 2% solution 2-3 times. • Topdressing of booster dose of 12 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 • Gap filling must be done immediately • 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. 	<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. • Collect the fruits and sell immediately or go for preparation of processed products.
Potato	<ul style="list-style-type: none"> • Grow nursery on raised beds. 	<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 • 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.

Beans		<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 must be done immediately • If damage is more, go for resowing with the same crop or grow alternate crops. 	<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 12 kg MOP + 30 kg Urea per acre as soon as possible. • If damage is more, go for replanting 	<ul style="list-style-type: none"> • Drain the excess water as soon as possible. • Harvest the mature pods as soon as possible. • Store the pods in well ventilated place temporarily before it can be marketed. • Market the pods as soon as possible.
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Contingent strategies for Livestock, Poultry & Fisheries

2.5.1 Livestock

Detailed contingent strategies for Livestock, Poultry & Fisheries

	Suggested contingency measures		
	Before the event	During the event	After the event
Drought			
Feed and Fodder availability	<ul style="list-style-type: none"> 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) 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 In chronically drought prone districts promote cultivation of short duration fodder crops of sorghum/bajra/maize (UP chari, MP chari, HC-136, HD-2, GAIN TALL, Kisan composite, Moti, Manjari, B1-7) Chopping of fodder should be made as mandatory in every village through supply and establishment of good quality chaff cutters. 	<ul style="list-style-type: none"> Harvest and use biomass of dried up crops (Groundnut, Sorghum, Bajra, Maize, Rice, Horse gram) material as fodder. Harvest the tree fodder (Neem, Subabul, Acacia, 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 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. Educate the farmers about mixing groundnut haulms and paddy straw (1:3) before feeding the animals. All the hay should be enriched with 2% Urea molasses solution or 1% common salt solution and fed to LS Herd should be split and supplementation should be given only to the highly productive and breeding animals Provision of emergency grazing/feeding 	<ul style="list-style-type: none"> Concentrates supplementation should be provided to all the animals. The farmers may be advised to practice “flushing the stock” to recoup Short duration fodder crops should be sown in unsown and crop failed areas where no further routine crop sowing is not possible Supply of quality seeds of fodder varieties and motivating the farmers to cultivate at least 10% of their land holding for fodder production

	<ul style="list-style-type: none"> • Avoid burning of maize stover • Harvesting and collection of perennial vegetation particularly grasses which grow during monsoon • Proper drying, baling and densification of harvested grass from previous season • Creation of permanent fodder, feed and fodder seed banks in all drought prone areas 	<p>(Cow-calf camps or other special arrangements to protect high productive & breeding stock)</p> <ul style="list-style-type: none"> • Available kitchen waste should be mixed with dry fodder while feeding • 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 • Unproductive livestock should to be culled during severe drought • Create transportation and marketing facilities for the culled and unproductive animals • Supply silage and or hay on subsidized rates to the farmers having high productive stock • Subsidized loans should be provided to the livestock keepers 	
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 	<ul style="list-style-type: none"> • Allow the animals preferably early in the morning or late in the evening for grazing during heat waves • Feed green fodder/silage / concentrates during day time and roughages / hay during night time in case of heat waves • Put on the foggers / sprinklers during heat weaves in case of high productive animals • 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. 	<ul style="list-style-type: none"> • Feed the animals as per routine schedule • Allow the animals for grazing (normal timings)
Health and Disease	<ul style="list-style-type: none"> • Timely vaccination (as per enclosed vaccination schedule) against all endemic 	<ul style="list-style-type: none"> • Carryout deworming to all animals entering into relief camps 	<ul style="list-style-type: none"> • Conducting mass animal health camps

management	<p>diseases</p> <ul style="list-style-type: none"> • Procurement of emergency medicines and medical kits • Surveillance and disease monitoring network to be established at Joint Director (Animal Husbandry) office in the district 	<ul style="list-style-type: none"> • Identification and quarantine of sick animals • 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 	<ul style="list-style-type: none"> • Conducting fertility camps • 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	<ul style="list-style-type: none"> • Encouraging insurance of livestock 	<ul style="list-style-type: none"> • Listing out the details of the dead animals 	<ul style="list-style-type: none"> • Submission for insurance claim and availing insurance benefit • Purchase of new productive animals
Drinking water	<ul style="list-style-type: none"> • 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 	<ul style="list-style-type: none"> • Restrict wallowing of animals in water bodies/resources 	<ul style="list-style-type: none"> • 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
Hemorrhagic septicemia (HS)	March / June
Sheep pox (SP)	November

2.5.2 Poultry

	Suggested contingency measures		
	Before the event ^a	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	<ul style="list-style-type: none"> • Supplementation only for productive birds with house hold grain • Supplementation of shell grit (calcium) for laying birds • Culling of weak birds 	Supplementation to all survived birds
Drinking water		Use water sanitizers or offer cool drinking water	
Health and disease management	Culling of sick birds. Deworming and vaccination against RD and fowl pox	Mixing of Vit. A,D,E, K and B-complex including vit C in drinking water (5ml in one litre water)	<ul style="list-style-type: none"> • Hygiene 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	<ul style="list-style-type: none"> • In severe cases, foggers/water sprinklers/wetting of hanged gunny bags should be arranged • Don't allow for scavenging during mid 	Routine practices are followed

		day	
Health and disease management	Deworming and vaccination against RD and fowl pox	<ul style="list-style-type: none"> • Supplementation of house hold grain • Provide cool and clean drinking water with electrolytes and vit. C (5-10 ml per litre) • In hot summer, add anti-stress probiotics in drinking water or feed (Reestobal etc., 10-20ml per litre) 	Routine practices are followed

2.5.3 Fisheries/ Aquaculture

	Suggested contingency measures		
	Before the event ^a	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 sanitizers.	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

(iii) Any other			
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 buoys, 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 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 riveting the bunds, construction of spill way to release	Continuous pumping of excess water, erection of nets low lying	Strengthening of bunds, excavating channels along the sides of the

	excess water, erection of nets to avoid escape of fish	areas	ponds for free escape of water
(ii) Water continuation and changes in water quality		When dissolved oxygen levels go down, aerators, recirculation of water, etc are to be attempted to maintain DO levels, going for partial harvest, etc	
(iii) Health and diseases	Sometimes there may be heavy accumulation of nutrients and organic matter.	There may be break out of Hemorrhagic septicemia. Addition of antibiotics like Chloro Tetra Cycline or Oxy Tetra Cycline to the feed to control the disease	Removal of weeds, top layer of soil, deep ploughing of tank and application of lime, exposing to sun light
(iv) Loss of stock and inputs (feed, chemicals etc)	Advance erection of nets, strengthening of bunds harvesting or reducing the density	Suspension of feeding, application of organic manures	Compensatory stocking, assessment of values and payment of subsidy on inputs
(v) Infrastructure damage (pumps, aerators, huts etc)	Insuring pond, accessories, etc., Shifting of aerators, pumps soon after warnings are issued	Relocating pumps, aerators to elevated places	Assessment of damages and provision of them on subsidy
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 minimize 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 minimize 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 minimize 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
