State: ANDHRA PRADESH

Agriculture Contingency Plan for District: SPSR NELLORE

Contributors

1. Dr.G.Krishna Reddy, Principal Scientist (Agronomy), RARS, Tirupati
2. Dr.S.M.Muneedra Naidu, Programme coordinator, KVK, Nellore
3. Dr.K.Pullam Raju, Coordinator, DAATTC, Nellore
4. Dr.P.Rajasekhar, Associate Director of Research, RARS, Tirupati

State: ANDHRA PRADESH

Agriculture Contingency Plan for District: SPSR NELLORE

1.0 District Agriculture profile					
1.1	**Agro-Climatic/Ecological Zone**				
	Agro Ecological Sub Region (ICAR)	Deccan Plateau, hot arid eco region (7.3, 18.3)			
	Agro-Climatic Region (Planning Commission)	Southern Plateau and Hills Region (X)			
	Agro Climatic Zone (NARP)	Southern Zone (AP-3)			
	List all the districts or part thereof falling under the NARP Zone	Nellore, Chittoor, Dr. Y.S.R Kadapa Districts			
	Geographic coordinates of district	Latitude	Longitude	Altitude	
		13°25' and 15° 55' N	79°9' and 80°14' E		
	Name and address of the concerned ZRS/ ZARS/ RARS/ RRS/ RRTTS	Regional Agricultural Research Station, Tirupati, Chittoor District.			
	Mention the KVK located in the district	Krishi Vigyan Kendra, Nellore-524003			
1.2	**Rainfall**	Normal RF(mm)	Normal Rainy days (no)	Normal Onset	Normal Cessation
	SW monsoon (June-Sep):	337	16	1st week of June	2nd week of October
	NE Monsoon(Oct-Dec):	665	21	1st week of October	4th week of December
	Winter (Jan- Feb)	30	0		--
	Summer (Mar-May)	64.0	1	--	--
	Annual	1095.0	38	--	--

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)	1307.6	262.8	251.9	73.1	111.4	18.9	138.2	45.0	61.5

1. 4	**Major Soils (common names like shallow red soils etc.,)**	**Area ('000 ha)**	**Percent (%) of total**
	Red Soils	536.1	41
	Coastal Sandy Soils	444.6	34
	Black Cotton Soils	196.1	15
	Alluvial Soils	65.4	5
	Laterite soils	65.4	5
1.5	**Agricultural land use**	Area ('000 ha)	Cropping intensity %
	Net sown area	330.5	123.0
	Area sown more than once	76.1	
	Gross cropped area	406.6	

1.6	**Irrigation**	**Area ('000 ha)**		
	Net irrigated area	237.4		
	Gross irrigated area	306.5		
	Rainfed area	93.1		
	Sources of Irrigation	**Number**	**Area ('000 ha)**	**Percentage of total irrigated area**
	Canals Major projects/reservoirs Medium irrigation projects Streams	332	87.7	35.9

	Tanks	1763	73.8	30.2
	Open wells	31,479	14.9	5
	Bore wells	47,898	73.8	30.2
	Lift irrigation schemes	3,212	11.1	--
	Micro-irrigation		--	--
	Other sources		11.1	3
	Total Irrigated Area		326.4	--
	Pump sets			
	No. of Tractors			
	Groundwater availability and use* (Data source: State/Central Ground water Department /Board)	No. of blocks/ Tehsils/Mandals	(%) area	
	Over exploited	-	-	
	Critical	-	-	
	Semi- critical	6	13	
	Safe	40	87	
	Net water availability and use	264391 ha.m		
	Ground water quality	In general suitable for irrigation		
*over-exploited: ground water utilization > 100%; critical: 90-100%; semi-critical: 70-90%; safe: <70%				

Area under major field crops and Horticulture, etc., (2008-2009) (Source: APHU)

1.7	**Major Field Crops cultivated**	**Area ('000 ha)**					
		Kharif		***Rabi***		**Summer**	**Total**
		Irrigated	***Rainfed***	***Irrigated***	***Rainfed***		
	Paddy	64.6	--	191.5	--	--	256.1
	Blackgram	0.3	--	--	20.5	--	20.8
	Sugarcane	7.8	--	6.3	--	--	14.1
	Groundnut	7.1	--	5.5	--	--	12.6
	Bengal gram	--	--	--	10.5	--	10.5
	Sunflower	3.8	--	--	5.2	--	9.05

	Tobacco	6.1	--	0.8	--	--	7.0
	Cotton	5.6	--	0.8	--	--	6.4
	Sesame	1.6	--	--	0.6	--	2.2
	Greengram	0.08	--	--	2.08	--	2.1
	Chilli	0.049	--	1.5	--	--	1.6
	Redgram	0.7	--	--	0.3	--	1.04
	Maize	--	--	--	--	--	--
	Horticulture crops - Fruits	**Total area**					
	Lemon	25.6					
	Mango	10.5					
	Orange & batavina	5.09					
	Cashew	1.1					
	Banana	1.1					
	Horticultural crops - Vegetables	**Total area**					
	Chilies	1.6					
	Bhendi	0.8					
	Brinjal	0.4					
	greens	0.4					
	Horticultural crops - Flowers	**Total area**					
	Marigold	0.2					
	Plantation and Spice crops	**Total area**					
	Oil palm	3.4					
	Coconut	0.9					
	Betel vine	0.5					

1.8	**Livestock**	**Male(number)**	**Female (number)**	**Total (number)**
	Non descriptive Cattle (local low yielding)	73,346	84485	1,57,831
	Crossbred cattle	1,794	11,296	13,090
	Non descriptive Buffaloes (local low yielding)	1,05,339	6,64,105	7,69,444
	Graded Buffaloes			

	Goat			3,65,685
	Sheep			3,65,685
	Others (Camel, Pig, Yak etc.)			12.18
	Commercial dairy farms (Number)			
1.9	**Poultry**	**No. of farms**	**Total No. of birds (number)**	
	Commercial		1084763	
	Backyard		1682956	

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)	
		14664	21	2466 / 2677	6 / 54102	0 / 10704	30 / 6
	ii) Inland (Data Source: Fisheries Department)	**No. Farmer owned ponds**		**No. of Reservoirs**		**No. of village tanks**	
		1553		4		417	
	B. Culture						

		Water Spread Area (ha)	**Yield (t/ha)**	**Production ('000 tons)**
	i) **Brackish water** (Data Source: MPEDA/ Fisheries Department)	3677	0.002	8.530
	ii) **Fresh water** (Data Source: Fisheries Department)	2221	0.011	24.586
	Others		0.000	84.150

1.11	Production and Productivity of major crops	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)
1	Paddy	238.1	3684	719.5	3756	--	--	957.5	3738
2	Groundnut	16.3	2280	12.7	2310	--	--	29.0	2293
3	Blackgram	0.2	580	12.5	610	--	--	12.7	609
4	Sugarcane	781.3	99850	603.9	96580	--	--	1385.2	98215
5	Sunflower	3.6	940	5.1	980	--	--	8.7	960
Major Horticultural crops (Crops to be identified based on total acreage)									
	Horticulture crops - Fruits								
1	Lemon							375.1	14667
2	Mango							86.7	8267
3	Orange & batavian							67.7	133
4	Cashew							0.7	627
5	Banana							33.0	29998
	Horticultural crops - Vegetables								
1	Chillies							4.6	2750
	Plantation and Spice crops								
1	Oil palm							15791	4667

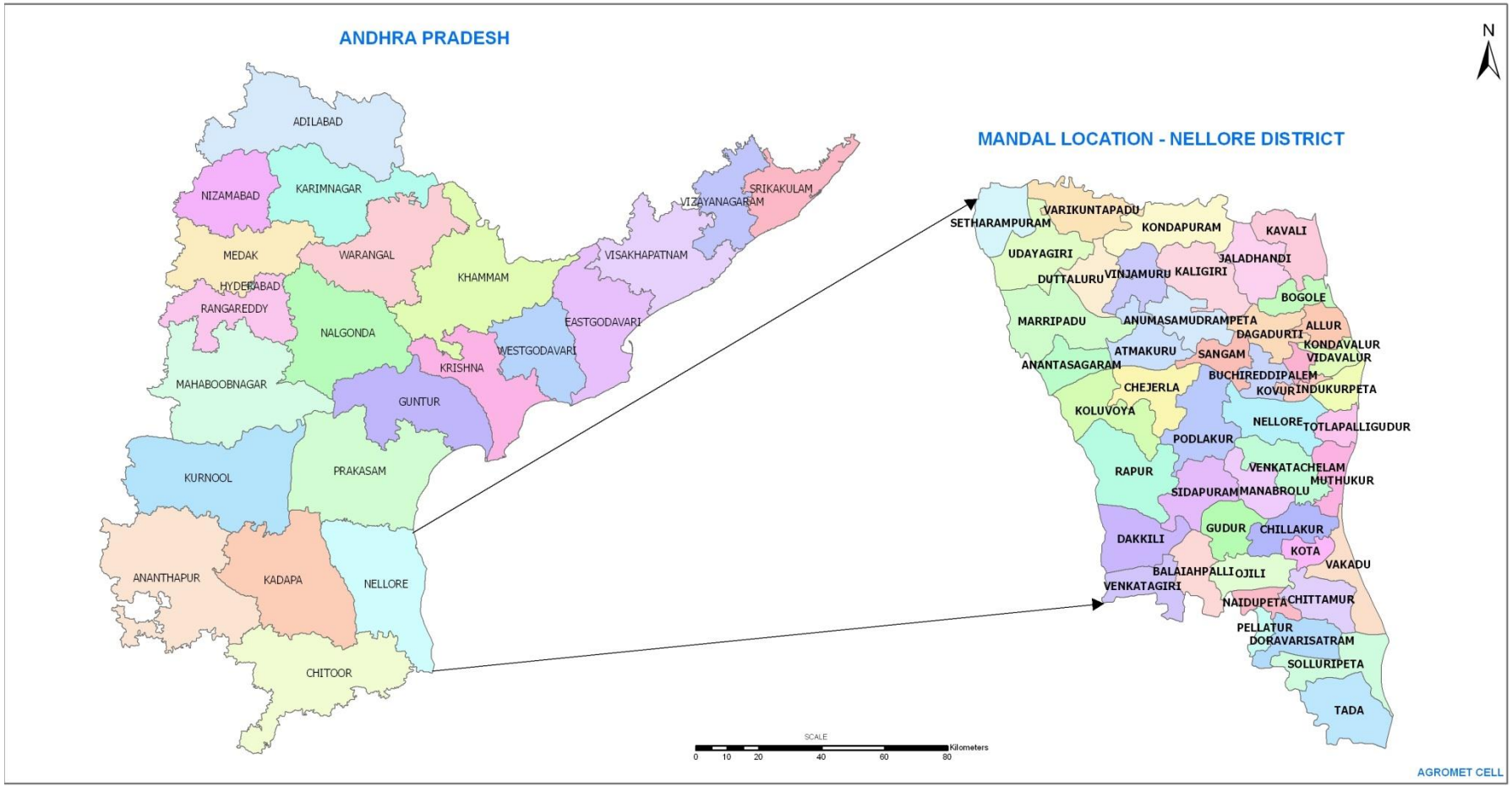
1.12	Sowing window for 5 major field crops (start and end of normal sowing period)	Paddy	Blackgram	Groundnut	Sugarcane	Sunflower
	Early Kharif	April - May	--	--	--	--

	Kharif	August - September	--	May - June	--	June
	Rabi	October - November	October	December – January 1st FN	December - February	November – December

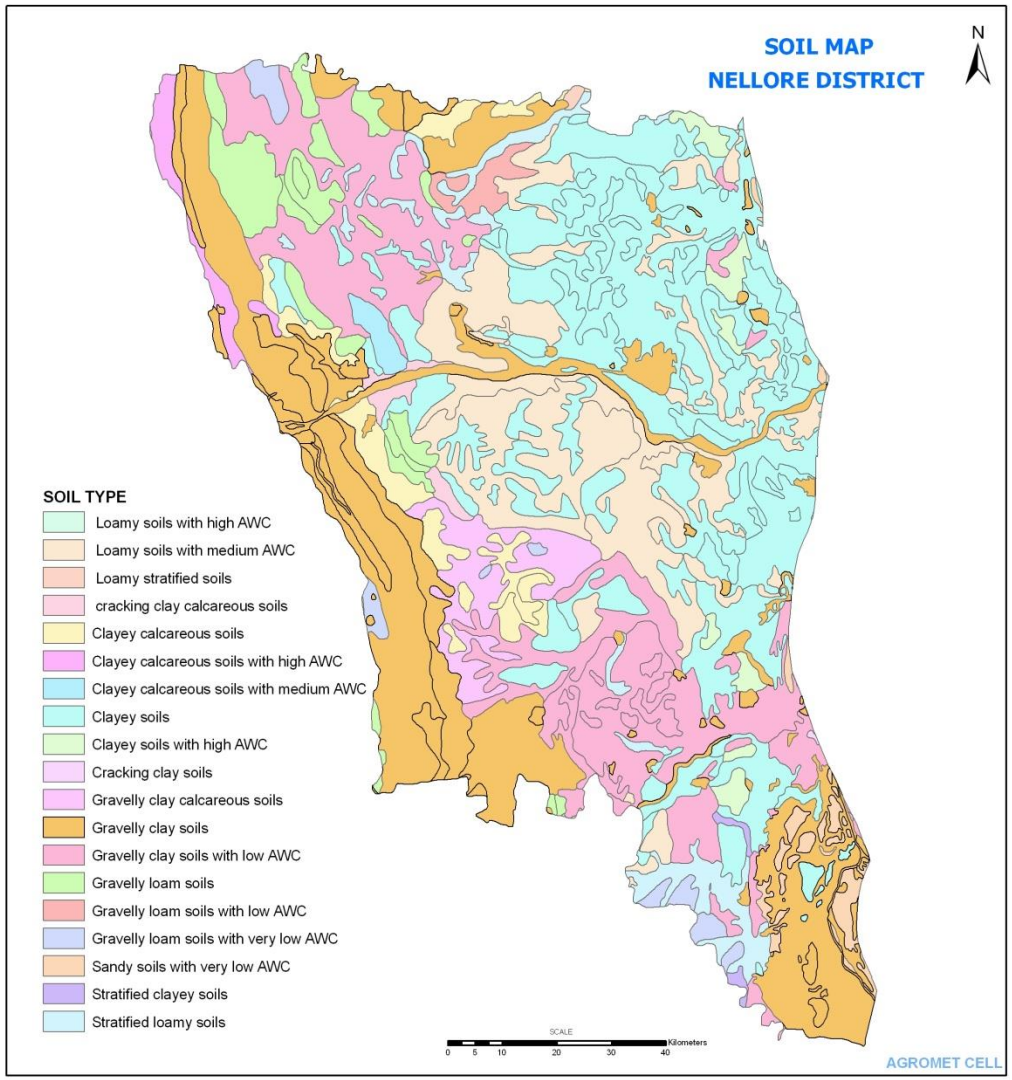
1.13	**What is the major contingency the district is prone to? (Tick mark and mention years if known during the last 10 year period)**	Regular	Occasional	None
	Drought			√
	Flood		√	
	Cyclone	√		
	Hail storm			√
	Heat wave			√
	Cold wave			√
	Frost			√
	Sea water intrusion		√	
	Snow fall			√
	Land slides			√
	Earth quake			√
	Pests and diseases outbreak (specify) Rice	Blast (Rabi) Mite (Early Kharif) Sheath blight (Kharif /Rabi) Leaf folder(Kharif /Rabi) Stem bore (Kharif /Rabi)) Bacterial leaf blight (Rabi)	Stem rot Gall midge Brown Plant Hopper	
	Blackgram	Leaf spots Maruka pod borer Spodoptera	Yellow mosaic virus Powdery mildew	--

	Groundnut	Collar/crown rot Spodoptera Sclerotium stem rot	Leaf miner Bud necrosis Tikka leaf spot	--
	Sugarcane	Early shoot borer Inter nodal borer	Whip smut Red rot	--
	Sunflower	Helicoverpa	Bud necrosis	--
	Others	--	--	--

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


ANDHRA PRADESH
ADILABAD
NIZAMABAD
KARIMNAGAR
MEDAK
WARANGAL
HYDERABAD
RANGAREDDY
NALGONDA
KHAMMAM
VISAKHAPATNAM
VIZAYANAGARAM
SRIKAKULAM
EASTGODAVARI
WESTGODAVARI
KRISHNA
MAHABOOBNAGAR
GUNTUR
PRAKASAM
KURNOOL
ANANTHAPUR
KADAPA
NELLORE
CHITOOR
MANDAL LOCATION - NELLORE DISTRICT
SETHARAMPURAM
VARIKUNTAPADU
KONDAPURAM
KAVALI
UDAYAGIRI
JALADHANDI
DUTTALURU
VINJAMURU
KALIGIRI
BOGOLE
MARRIPADU
ANUMASAMUDRAMPETA
ALLUR
DAGADURTI
KONDAVALUR
ATMAKURU
SANGAM
VIDAVALUR
ANANTASAGARAM
BUCHIREDDIPALEM
CHEJERLA
KOVUR
INDUKURPETA
KOLUVOYA
NELLORE
TOTLAPALLIGUDUR
PODLAKUR
VENKATACHELAM
RAPUR
MUTHUKUR
SIDAPURAM
MANABROLU
GUDUR
CHILLAKUR
DAKKILI
KOTA
VAKADU
BALAIAHPALLI
OJILI
VENKATAGIRI
NAIDUPETA
CHITTAMUR
PELLATUR
DORAVARISATRAM
SOLLURIPETA
TADA
N
SCALE
0 10 20 40 60 80 Kilometers
AGROMET CELL


MANDAL WISE - NORMAL RAINFALL (mm)
NELLORE DISTRICT
N
SETHARAMPURAM 953.2
VARIKUNTAPADU 884.6
KONDAPURAM 1008.4
KAVALI 1192.3
UDAYAGIRI 1033.5
JALADHANDI 1233.2
DUTTALURU 1024
VINJAMURU 938.5
KALIGIRI 981
BOGOLE 1123.4
MARRIPADU 911.6
ANUMASAMUDRAMPETA 907
ALLUR 1127.9
DAGADURTI 1088.7
ATMAKURU 918.7
SANGAM 919.3
KONDAVALUR 1033.8
VIDAVALUR 1132
ANANTASAGARAM 902.8
BUCHIREDDIPALEM 1090.4
CHEJERLA 934.8
KOVUR 1093.8
INDUKURPETA 1136.3
KOLUVOYA 1073.6
NELLORE 1138.5
PODLAKUR 1064.6
TOTLAPALLIGUDUR 1175.1
VENKATACHELAM 1070.4
RAPUR 1074.6
MUTHUKUR 1214.2
SIDAPURAM 1057.6
MANABROLU 1014
CHILLAKUR 1015.1
GUDUR 995.1
DAKKILI 1033.4
KOTA 1239.3
VAKADU 1204.8
BALAIAHPALLI 1102
OJILI 1088.3
VENKATAGIRI 1213
NAIDUPETA 1063.7
CHITTAMUR 1090.3
PELLATUR 1129.2
DORAVARISATRAM 1306.1
SOLLURIPETA 1331.5
TADA 1394.8
SCALE
0 5 10 20 30 40 Kilometers
AGROMET CELL


SOIL MAP
NELLORE DISTRICT
N
SOIL TYPE
Loamy soils with high AWC
Loamy soils with medium AWC
Loamy stratified soils
cracking clay calcareous soils
Clayey calcareous soils
Clayey calcareous soils with high AWC
Clayey calcareous soils with medium AWC
Clayey soils
Clayey soils with high AWC
Cracking clay soils
Gravelly clay calcareous soils
Gravelly clay soils
Gravelly clay soils with low AWC
Gravelly loam soils
Gravelly loam soils with low AWC
Gravelly loam soils with very low AWC
Sandy soils with very low AWC
Stratified clayey soils
Stratified loamy soils
SCALE
0 5 10 20 30 40
Kilometers
AGROMET CELL

Rainfall distribution pattern in Nellore district during *Kharif* & Rabi

Month	Normal rainfall (mm)	Actual Rainfall (mm)									
		2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
January	14.2	0	2.2	4.3	27.8	0	2.3	7.3	4	0	13.6
February	5.7	0	0	0	0	26.9	0.9	0	0	0	0
March	4	0	0	0	0	0	3.3	0	5.9	31.6	0
April	10.1	0	0	27.2	0	0	48	0	4.6	3.6	0
May	53.7	11.6	127.6	0	1.6	0	21.2	91	16	18.1	0
June	56.8	24.2	76.5	47.9	12.7	76.8	29.4	40.7	63.8	82.8	50.7
July	86.3	22.6	69.1	59.5	113.1	186.0	39.1	26.1	39.6	62.8	23.4
August	86.1	110.2	233.1	125.9	31.2	156.0	79	138	26.7	164.3	58.9
September	102.1	99.2	51.0	24.9	36.6	78.8	60.1	101.5	30.2	174.7	51.6
October	239	33.4	425.0	458.2	201.8	276.8	124.1	75.1	31	145	53.1
November	313.4	545.8	280.4	357.9	92.2	169.2	108.7	754	24	210	198.6
December	109	179.6	85	43	225.4	0	104.5	123.2	142.6	3.6	76.4
Total											

Coverage of crops and Productivity levels in SPSR Nellore district during Kharif 2018

S. No.	Name of the crop	Normal area (ha)	Actual area (ha)	Productivity (kg/ha)	Production (tonnes)
1.	Paddy	43979	26638	5539	**147548**
2.	Jowar	6	2	2669	**5**
3.	Bajra	1057	218	3160	**689**
4.	Maize	136	254	4650	**1181**
5.	Ragi	56	110	950	**105**
6.	Korra	4	0	-	**-**
7.	Bengalgram	8302	11040	1925	**21252**
8.	Redgram	163	84	1150	**97**
9.	Greengram	6115	2359	685	**1616**
10.	Blackgram	16592	7034	710	**4994**
11.	Horsegram	256	448	876	**392**
12.	Cow pea	73	131	978	**128**
13.	Other pulses	1	0	950	**0**

14.	Groundnut	4102	3025	3526	**10666**
15.	Sesame	2743	2652	437	**1159**
16.	Sunflower	723	238	1538	**366**
17.	Castor	2	8	1151	**9**
18.	Other Oil Seeds	1	0	0	**0**
19.	Cotton	2377	2223	2319	**5155**
20.	Sugarcane	2467	350	--	--

Coverage of crops and Productivity levels in SPSR Nellore district during Rabi 2018-19

S. No.	Name of the crop	Normal area (ha)	Actual area (ha)	Productivity (kg/ha)	Production (tonnes)
1.	Paddy	192625	140225	7431	1042012
2.	Jowar	1361	2168	3099	6719
3.	Bajra	38	1	3415	3
4.	Maize	948	488	6250	3050
5.	Ragi	54	41	1050	43
6.	Minor Millet	1	6		
7.	Bengal gram	8302	11040	1925	21252
8.	Redgram	163	84	1150	97
9.	Greengram	6115	2359	685	1616
10.	Blackgram	16592	7034	710	4994
11.	Horsegram	256	448	876	392
12.	Cow pea	73	131	978	128
13.	Other pulses	1	0	950	0
14.	Groundnut	4102	3025	3526	10666
15.	Sesame	2743	2652	437	1159
16.	Sunflower	723	238	1538	366
17.	Castor	2	8	1151	9
18.	Other Oil Seeds	1	0		0
19.	Cotton	2377	2223	2319	5155
20.	Tobacco	8112	4504	2531	11400
21.	Sugarcane	2467	350	--	--

S. No	Source of Irrigation	Nellore(ha)
1.	Canals	1,41,967
2.	Tanks	78,257
3.	Tube wells	44,796
4.	Dug wells	2,807
5.	Other	2,541
6.	Lift Irrigation	2,766
	Total	**2,73,134**

Source wise (Water) cultivated area

S. No	Crop name	Cultivated area under ('000 ha)			
		Residual moisture condition/rainfed	Ground water irrigated	Tank irrigated	Canal irrigated
1	Rice				
2	Groundnut				
3	Sugarcane				
4	Redgram				

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

Sl. No.	**Name of the Crop**	***Sowing window***	
		Kharif	***Rabi***
1	Rice	15th July to 15th September	15th October to 15th November
2	Greengram	15th June to 15th July	I FN October
3	Blackgram	15th June to 15th July	I FN October
4	Redgram	15th June to August	20th September to 20th October
5	Groundnut	II FN June to first week of August (Best time I FN July)	November – December (I FN of December)
6	Sesame	---	II FN January
7	Cotton	June to I FN July (Red soil)	

		June to 31st of July (Black soils)	
8	Tobacco		
9	Bengal gram	---	October to November
10	Sugarcane	**Early varieties:** December – January **Mid varieties :** February **Late varieties** : March	
11	Sunflower	II FN June – IIFN July	September to I FN October (Rainfed) November (irrigated) 15th January to first week of February

Strategies for weather related contingencies

2.1 Condition 1 Drought

Rainfed situation

Early season drought (delayed onset)	Major Farming situation	Normal Crop/cropping system	Change in crop/ cropping system	Varieties
Delay by 2 weeks (October 3rd wk)*	Black soils (Silty clay, sandy clay and clayey)– Rainfed	Blackgram	Blackgram Grain Maize	**Blackgram:** TBG 104, LBG-645, LBG-648, LBG-685, LBG-709, LBG-20, GBG-1, LBG-623, LBG-752, PBG-1, PBG-107, LBG-787, T9, PU 31. **Greengram:** - LGG-460, ., TM96-2 WGG42, IPM 2-14. **Maize:-** **Short duration:** DHM 115, Pioneer 3342, KH 5991, DKC 7074R, JKMH 1701, MMH 133, Bio605 and SunVamana **Sweet corn:** Sugar 75, Bright Gene
		Tobacco		
	Red soils - Rainfed	Blackgram		
		Greengram		
Delay by 4 weeks (November 1st wk)	Black soils (Silty clay, sandy clay and clayey)– Rainfed	Blackgram	No change	Measures similar to 4 weeks delay
	Red soils - Rainfed	Greengram		As above in delay by 4 weeks
Delay by 6 weeks (November 3rd wk)	Black soils (Silty clay, sandy clay and clayey) – Rainfed	Bengal gram	No change	**Bengal gram:-** **Desi:** Nandyal Gram 49(NBeG 49), Dheera (NBEG 47), Nandyala Sanagal (NBeG3), JG 11 and JAKI 9218 **Kabuli:** Nandyal Gram 119(NBeG 119), KAK 2, Vihar (Phule G 95311) and LBeG 7 (Lam sanaga), MNK 1 (Extra large seeded Kabuli) and Kripa **Greengram:** - LGG-460, TM96-2 , WGG42, IPM 2-14 .
Delay by 8 weeks (December 1st wk)	Black soils (Silty clay, sandy clay and clayey) – Rainfed	Bengal gram	No change	
	Red soils - Rainfed	Greengram		

Condition 2

Early season drought **(Normal onset)**	**Major Farming situation**	**Normal Crop/cropping system**	**Crop management**	**Soil nutrient & moisture conservation measures**
Normal onset followed by 15-20 days dry spell after sowing leading to poor germination/crop stand etc.	Black soils (Silty clay, sandy clay and clayey) – Rainfed	Blackgram	Plant protection against flea beetles, thrips and white fly (YMV)	---
	Red soils - Rainfed	Blackgram	Plant protection against flea beetles, thrips and white fly (YMV)	--
		Greengram		

Condition 3

Mid season drought (long dry spell, consecutive 2 weeks /more	**Major Farming situation**	**Normal Crop/cropping system**	**Crop management**	**Soil nutrient & moisture conservation measures**
At vegetative stage	Black soils (Silty clay, sandy clay and clayey) – Rainfed	Blackgram	Plant protection against thrips and whitefly/YMV	Supplemental Irrigation at 15-20 days interval
	Red soils - Rainfed	Blackgram	Plant protection against thrips and whitefly/YMV	Supplemental Irrigation of 20 mm at 10-15 days interval
		Greengram		
At reproductive stage	Black soils (Silty clay, sandy clay and clayey) – Rainfed	Blackgram	Plant protection against thrips and white fly/YMV, Maruca pod borer and Tobacco caterpillar	Supplemental irrigation of 20 mm at flower initiation and pod development stages
	Red soils - Rainfed	Blackgram	Plant protection against thrips and white fly/YMV, Maruca pod borer and Tobacco caterpillar	Spray 0.5% KNO3 followed by spray of 2% urea at flowering & pod development stages Supplemental irrigation at flower initiation and pod development stages

Condition 4

Terminal drought	Major Farming situation	Normal Crop/cropping system	Crop management	Rabi Crop planning
	Black soils (Silty clay, sandy clay and clayey) – Rainfed	Blackgram	Harvest at physiological maturity	Bengalgram
		Tobacco	Harvest matured leaves	
	Red soils - Rainfed	Blackgram	Harvest at physiological maturity	
		Greengram		

Irrigated situation

1. **Delayed release/receipt of water in canals/tanks due to low rainfall**

Major Farming situation	Normal Crop/ cropping system	Change in crop/ cropping system	Agronomic measures
Irrigated wet lands – supplemented with bore wells, filter points and canals under sandy clay loams and deltaic alluvials, costal lands	Early *Kharif* Rice	No change (under bore wells/filter points.)	Prefer short duration varieties : Bharani, Somasila, MTU-1010 (Cottondora sannalu), NLR-34242, NLR-34449, Swetha (NLR 40024).
	Kharif Rice	No change	**Normal Plantings:** NLR 9674, NLR 3041(Nellore Sona), Varam **Aged Nursery:** Swarna mukhi
	Late *Kharif*		Swarna mukhi, Nellore sona, Nellore mahsuri, Tarangini, Sri Druthi, Chandra
	Rabi Rice		**Prefer medium/short duration varieties**: Swathi, Swetha, Satya, Varalu, Sri Satya, Deepti, BPT-5204, JGL-384, JGL 17004 (Prathyumma), Chandra,

Major Farming situation	Normal Crop/ cropping system	Change in crop/ cropping system	Agronomic measures
			NLR-34449, NDLR-7, 8, Vijetha, ADT-37, Swarna mukhi, Sravani, Somasila, NLR-33636, NLR-33671,Swarnamukhi, NLR 40024, MTU 1156, MTU 1153 . Prefer green manure crop after harvest of Early *Kharif* Rice. Adopt recommended practices.
	Sugarcane		**Prefer early/mid late maturing varieties:** 85 A 261, 84 A 125, Co 8014, 83 A 30, 87 A 298, 99 V 30, 86 V 96, 91 V 83, 2000 V 59, 2003 V 46, Co T 8201, Co A 7602, CO 7805, 83 V 15, 86 A 146, 88 A 162, 2002 V 48
Irrigated uplands under wells and bore wells – Red loams, sandy clay loams Coastal sands	*Rabi* Rice	No change	**Prefer medium/short duration varieties**: Swathi, Swetha, Satya, Varalu, Sri Satya, Deepti, BPT-5204, JGL-384, JGL 17004 (Prathyumma), Chandra, NDLR-7, 8, Vijetha, ADT-37, Swarna mukhi, Sravani, Somasila, NLR-33636, NLR-33671,Swarnamukhi, NLR 34449, NLR 40024, MTU 1156, MTU 1153 .
	Groundnut		Deeraj, Kadiri 6, Dharani, Narayani, ICGV 91114, , Nithya Haritha, Kadiri, Amaravathi, Kadiri Harithandra, TAG 24,
	Sesame		Gouri, Madhavi, YLM-11, YLM-17, YLM -66 (Sarada) (Brown seeded) Swetha til, Hima (white seeded)
	Cotton		**Cotton:** **Desi cotton varieties:** Aravinda, Srinandi (NDLA-2463), Yaganti (NDLA-2933) **American Cotton Varieties:** Kanchana (LPS 141), LK-861, L-839, L-603, L-604, Narasimha (NA-1325), Sivanandi (NDLH-1755), NDLH-1938, MCUS VT, LRA-5166, and LRK-516 **Intra-specific Cotton Hybrids:** LAHH-1, LAHH-4, LAHH-5, Lam Cotton Hybrid-7, NDLHH-390, NDLHH-240, Orugallu Krishna (WGHH-2), NHH-44, JKHyI, Savitha, H-6, H-8, anH-10

Major Farming situation	**Normal Crop/ cropping system**	**Change in crop/ cropping system**	**Agronomic measures**
	Sunflower		**Sunflower:-** Hybrids – NDSH 1012 (Prabhath), DRSF-113, KBSH- 44, NDSH-1, LSFH 171, DRSH-1
Irrigated wet lands Under Tanks - Red loams, Sandy clay loams, coastal sands	*Rabi* Rice		**Prefer medium/short duration varieties**: Swathi, Swetha, Satya, Varalu, Sri Satya, Deepti, BPT-5204, JGL-384, JGL 17004 (Prathyumma), Chandra, NLR-34449, NDLR-7, 8, Vijetha, ADT-37, Swarna mukhi, Sravani, Somasila, NLR-33636, NLR-33671, Swarnamukhi, NLR 40024, MTU 1156, MTU 1153 . Dry direct drill sown paddy Drum seed paddy Alternate wetting and drying method of irrigation

2. Limited release/receipt of water in canals/tanks due to low rainfall

Major Farming situation	**Normal Crop/ cropping system**	**Change in crop/ cropping system**	**Agronomic measures**
Irrigated wet lands – supplemented with bore wells, filter points and canals under sandy clay loams and deltaic alluvials, costal lands	Early *Kharif* Rice	No change (under bore wells/filter points.) Replace rice crop with Maize, summer pulses, etc,. under canals.	**Prefer short duration varieties:** Bharani, Somasila, MTU-1010 (Cottondora sannalu), NLR-34242, NLR-34449, Swetha (NLR 40024). Dry direct drill sown paddy Drum seed paddy Alternate wetting and drying method of irrigation **Blackgram:** TBG 104, LBG-645, LBG-648, LBG-685, LBG-709, LBG-20, GBG-1, LBG-623, LBG-752, PBG-1, PBG-107, LBG-787, T9, PU 31. **Greengram:** - LGG-460, TM96-2 WGG 42, IPM 2-14. **Maize:-** **Short duration:** DHM 115, Pioneer 3342, KH 5991, DKC 7074R, JKMH 1701, MMH 133, Bio605 and SunVamana **Sweet corn:** Sugar 75, Bright Gene
	Rabi Rice	No change	**Prefer medium/short duration varieties**: Swathi, Swetha, Satya, Varalu, Sri Satya, Deepti, BPT-5204, JGL-384, JGL 17004 (Prathyumma), Chandra, NLR-34449, NDLR-7, 8, Vijetha, ADT-37, Swarna mukhi, Sravani, Somasila, NLR-33636, NLR-33671,Swarnamukhi, NLR 34449, MTU-1010, NLR 40024, MTU 1156, MTU 1153 .
Irrigated uplands under wells and bore wells – Red looms, sandy clay loams	*Rabi* Rice	Replace rice crop with Maize, summer pulses, etc,. under canals	Varieties mentioned as above for Maize and Pulses

	Groundnut		Deeraj, Kadiri 6, Dharani, Narayani, ICGV 91114, Nitya Haritha, Kadiri, Amaravathi, Kadiri Harithandra, TAG 24
	Sunflower		**Sunflower:-** Hybrids – NDSH 1012, DRSF-113, KBSH- 44, NDSH-1, LSFH 171, DRSH-1
	Sesame		Gouri, Madhavi, YLM-11, YLM-17, YLM – 66 (sarada), Hima & Swetha til
	Cotton		**Cotton:** **Desi cotton varieties:** Aravinda, Srinandi (NDLA-2463), Yaganti (NDLA-2933) **American Cotton Varieties:** Kanchana (LPS 141), LK-861, L-839, L-603, L-604, Narasimha (NA-1325), Sivanandi (NDLH-1755), NDLH-1938, MCUS VT, LRA-5166, and LRK-516 **Intra-specific Cotton Hybrids:** LAHH-1, LAHH-4, LAHH-5, Lam Cotton Hybrid-7, NDLHH-390, NDLHH-240, Orugallu Krishna (WGHH-2), NHH-44, JKHyI, Savitha, H-6, H-8, anH-10
Irrigated wet lands Under Tanks - Red loams, Sandy clay loams, coastal sands	*Rabi* Rice	Replace rice crop with Maize, summer pulses, etc,. Under canals.	**Prefer medium/short duration varieties**: Swathi, Swetha, Satya, Varalu, Sri Satya, Deepti, BPT-5204, JGL-384, JGL 17004 (Prathyumma), Chandra, NTJ 5, NTJ 15 NLR-34449, NDLR-7, 8, Vijetha, ADT-37, Swarna mukhi, Sravani, Somasila, NLR-33636, NLR-33671,Swarnamukhi, NLR 34449, MTU-1010, NLR 40024, MTU 1156, MTU 1153 . **Blackgram:** TBG 104, LBG-645, LBG-648, LBG-685, LBG-709, LBG-20, GBG-1, LBG-623, LBG-752, PBG-1, PBG-107, LBG-787, T9, PU 31. **Greengram:** - LGG-460, ., TM96-2 WGG42, IPM 2-14. **Maize:-** **Short duration:** DHM 115, Pioneer 3342, KH 5991, DKC 7074R, JKMH 1701, MMH 133, Bio605 and SunVamana **Sweet corn:** Sugar 75, Bright Gene

Condition	Major Farming situation	Normal Crop/ cropping system	Change in crop/cropping system	Agronomic measures	Remarks on Implementation
Non release /receipt of water in canals/tanks under delayed onset of monsoon in catchment		Fallow	**Sorghum:-** 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 Jowar : Single Cut :** CSH 24 MF & Pant Chari 6. **Multicut :** SSG 59-3 & SSG 898 **Multicut :** Co FS 29 (Perennial)		
Lack of inflows into tanks due to insufficient /delayed onset of monsoon					
Insufficient groundwater recharge due to low rainfall					

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

Condition - Continuous high rainfall in a short span leading to water logging				
Crop	**Suggested contingency measure**			
	Vegetative stage	**Flowering stage**	**Crop maturity stage**	**Post harvest**
Rice	1. Drain out excess water 2. Apply booster dose of 20-25 kg urea + 15 kg MOP /acre. to hasten the establishment and promote more tillering 3. Survived hills are to be split into individual tillers and used for gap filling. 4. Take up plant protection measures against leaf folder, stem borer, cut worm, sheath blight and stem rot.	1. Drain out excess water 2. Take up plant protection measures against leaf folder, cut worm, BPH, sheath blight, neck blast and stem rot.	1. Drain out excess water 2. Harvest at physiological maturity.	1. Drain out water and spread sheaves loosely in field or field bunds where there is no water stagnation 2. Spray common salt at 5% on sheaves to prevent germination and spoilage of straw from moulds 3. Thresh after drying the sheaves properly
Blackgram	1. Drain out water 2. Spray 2% urea. 3. Spray fungicides like Copper oxy chloride 3 g or Carbendazim 1g or Mancozeb 2.5g/ lit of water. 4. Take up plant protection measures against *Spodoptera* etc.	1. Drain out water 2. Spray 2% urea. 3. Spray fungicides like Copper oxy chloride 3 g or Carbendazim 1g or Mancozeb 2.5g/ lit of water. 4. Take up plant protection measures against *Spodoptera* etc.	1. Drain out water 2. Allow the crop to dry completely before harvesting 3. Protect crop from moulds.	1. Spread the bundles on field bunds or drying floors to quicken the drying 2. Thresh the bundles after they are dried properly
Groundnut	1. Drain out water 2. Take up plant protection measures against *Spodoptera* etc.	Drain out water Take up plant protection measures against *Spodoptera* etc.	Drain out water Take up plant protection measures against *Spodoptera* and Tikka leaf spot.	Shifting of produce to safer place Stripping of pods immediately after harvest of groundnut crop
Sugarcane	Drain out water	Drain out water	Drain out water	Transport immediately after harvest to factory
Sunflower	Drain out water	Drain out water Protect crop from Helicoverpa and	Drain out water Protect crop from Helicoverpa	Shifting of produce to safer place

		Spodoptera.	and Spodoptera. Protect from parrots	
Horticulture				
Lemon	• Drain the excess water as soon as possible. • Spray 1% KNO3 or Urea 2% solution 2-3 times. • Foliar spray of micronutrient mixture is also to be taken up. • Sand casting around the tree trunks should be removed up to the collar region of the tree to prevent fungal infections. • If the tree age is above eight years a booster dose of 500 g of Urea and 750 g MOP per tree should be applied.	• Drain the excess water as soon as possible. • Spray 1% KNO_3 or Urea 2% solution 2-3 times. • Foliar spray of micronutrient mixture is also to be taken up. • Sand casting around the tree trunks should be removed up to the collar region of the tree to prevent fungal infections. • If the tree age is above eight years a booster dose of 500 g of Urea and 750 g MOP per tree should be applied. • Plant protection measures may be taken for control of insect vectors and diseases.	• Drain the excess water as soon as possible. • Harvest the mature fruits 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.
Mango	• 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.	Same as above	Same as above
Orange & Batavian	• Drain the excess water as soon as possible. • Spray 1% KNO3 or Urea 2% solution 2-3 times. • Foliar spray of micronutrient mixture is also to be taken up. • Sand casting around the tree trunks should be removed up to the collar region of the tree to prevent fungal infections.	• Drain the excess water as soon as possible. • Spray 1% KNO3 or Urea 2% solution 2-3 times. • Foliar spray of micronutrient mixture is also to be taken up. • Sand casting around the tree trunks should be removed up to the collar region of the tree to prevent fungal infections.	Same as above	Same as above

	• If the tree age is above eight years a booster dose of 500 g of Urea and 750 g MOP per tree should be applied. •	• If the tree age is above eight years a booster dose of 500 g of Urea and 750 g MOP per tree should be applied.		
Cashew	• 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.	Same as above	Same as above
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 % 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. • Staking with bamboos to prevent further lodging.	Same as above	Same as above
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 MOP + 30 kg Urea	• 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	• 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 for quick

	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.	acre as soon as possible. •		drying • Grade the pods and market as soon as possible. • Do not store such produce for long periods.
Spices &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 bunches as soon as possible.	• Market the bunches to nearby factories for oil extraction.
Condition - Heavy rainfall with high speed winds in a short span				
Rice	1. Drain out excess water 2. Apply booster dose of 20-25 kg urea + 15 kg MOP /acre. to hasten the establishment and promote more tillering 3. Survived hills are to be split into individual tillers and used for gap filling.	1. Drain out excess water 2. Take up plant protection measures against leaf folder, cut worm, BPH, sheath blight , neck blast and stem rot.	1. Drain out excess water 2. Harvest at physiological maturity.	1. Drain out water and spread sheaves loosely in field or field bunds where there is no water stagnation 2. Spray common salt at 5% on sheaves to prevent germination and

	4. Take up plant protection measures against leaf folder, stem borer, cut worm, sheath blight and stem rot.			spoilage of straw from moulds 3. Thresh after drying the sheaves properly
Blackgram	1. Drain out water 2. Spray 2% urea. 3. Spray fungicides like Copper oxy chloride 3 g or Carbendazim 1g or Mancozeb 2.5g/ lit of water. 4. Take up plant protection measures against *Spodoptera* etc.	1. Drain out water 2. Spray 2% urea. 3. Spray fungicides like Copper oxy chloride 3 g or Carbendazim 1g or Mancozeb 2.5g/ lit of water. 4. Take up plant protection measures against *Spodoptera* etc.	1. Drain out water 2. Allow the crop to dry completely before harvesting 3. Protect crop from moulds.	1. Spread the bundles on field bunds or drying floors to quicken the drying 2. Thresh the bundles after they are dried properly
Groundnut	1. Drain out water 2. Take up plant protection measures against *Spodoptera* etc.	1. Drain out water 2. Take up plant protection measures against *Spodoptera* etc.	1. Drain out water 2. Take up plant protection measures against *Spodoptera* and Tikka leaf spot.	1. Shifting of produce to safer place 2. Stripping of pods immediately after harvest of groundnut crop
Sugarcane	1. Drain out water 2. Wrapping and propping.	1. Drain out water	1. Drain out water	1.Transport immediately after harvest to factory
Sunflower	1. Drain out water	1. Drain out water 2. Protect crop from Helicoverpa and Spodoptera.	1. Drain out water 2. Protect crop from Helicoverpa and Spodoptera. 3. Protect from parrots	1.Shifting of produce to safer place
Horticulture				
Lemon	• 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. • Foliar spray of micronutrient	• 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

		mixture is also to be taken up. • Sand casting around the tree trunks should be removed up to the collar region of the tree to prevent fungal infections. • If the tree age is above eight years a booster dose of 500 g of Urea and 750 g MOP per tree should be applied.		possible. • Store the produce in well ventilated place temporarily before it can be marketed. • Market the produce as soon as possible.
Mango	Same as above	Same as above	Same as above	Same as above
Orange & Batavian	Same as above	Same as above	Same as above	Same as above
Cashew	Same as above	Same as above	Same as above	Same as above
Banana	Same as above	Same as above	Same as above	Same as above
Horticultural crops - Vegetables				
Chillies	• Drain the excess water as soon as possible	• 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.	• 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. • Spray any drying oil after the pods are free from surface moisture for quick drying. • Use poly house solar driers for quick drying • Remove the pest and disease infected pods.

				• Market the produce as soon as possible .
Spices & 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 bunches/nuts as soon as possible. • Market the produce as soon as possible.

2.3 Floods

Condition	**Transient water logging/ partial inundation**			
	Suggested contingency measure			
	Seedling / nursery stage	**Vegetative stage**	**Reproductive stage**	**At harvest**
Rice	Drain out excess water	1. Drain out excess water 2. Apply booster dose of 20-25 kg urea + 15 kg MOP /acre .to hasten the establishment and promote more tillering 3. Survived hills are to be split into individual tillers and used for gap filling. 4. Take up plant protection measures against leaf folder, stem borer , cut	1. Drain out excess water 2. Take up plant protection measures against leaf folder, cut worm, BPH, sheath blight, neck blast and stem rot. 3. Community approach to control rodents	1. Drain out excess water 2. Harvest at physiological maturity.

		worm, sheath blight and stem rot.		
Blackgram	Drain out water	1. Drain out water 2. Spray 2% urea. 3. Spray fungicides like Copper oxy chloride 3 g or Carbendazim 1g or Mancozeb 2.5g/ lit of water. 4. Take up plant protection measures against *Spodoptera* etc.	1. Drain out water 2. Spray 2% urea. 3. Spray fungicides like Copper oxy chloride 3 g or Carbendazim 1g or Mancozeb 2.5g/ lit of water. 4. Take up plant protection measures against *Spodoptera* etc.	1. Drain out water 2. Allow the crop to dry completely before harvesting 3. Protect crop from moulds.
Groundnut	Drain out water	1. Drain out water 2. Take up plant protection measures against *Spodoptera* etc.	1. Drain out water 2. Take up plant protection measures against *Spodoptera* etc.	1. Drain out water
Sugarcane	Drain out water	Drain out water	1. Drain out water	1. Drain out water
Sunflower	Drain out water	Drain out water	1. Drain out water 2. Protect crop from Helicoverpa and Spodoptera.	1. Drain out water 2. Protect from parrots
Condition - Continuous submergence for more than 2 days :				
	Suggested contingency measure[o]			
Rice	Drain out excess water	1. Drain out excess water 2. Apply booster dose of 20-25 kg urea + 15 kg MOP /acre to hasten the establishment and promote	-	-

		more tillering 3. Survived hills are to be split into individual tillers and used for gap filling. 4. Take up plant protection measures against leaf folder, stem borer, cut worm, sheath blight and stem rot. 5. Community approach to control rodents		
Blackgram	Resowing	-		
Groundnut				
Sugarcane	Drain out water			
Sunflower	Resowing			

2.4 Extreme events: Heat wave / Cold wave/Frost/ Hailstorm /Cyclone: Not applicable

Extreme event type	**Suggested contingency measure**			
	Seedling / nursery stage	**Vegetative stage**	**Reproductive stage**	**At harvest**
Heat Wave				
Cold wave				
Frost				
Hailstorm				
Cyclone	-	-	-	-
Rice	Resowing	1. Drain out excess water 2. Apply booster dose of 20-25 kg urea + 15 kg MOP /acre.to hasten the establishment and promote more tillering 3. Survived hills are to be split into individual tillers and used for gap filling. 4. Take up plant protection measures against leaf folder, stem borer , cut worm, sheath blight and stem rot. 5. Community approach to control rodents	1. Drain out excess water 2. Take up plant protection measures against leaf folder, cut worm, BPH, sheath blight , neck blast and stem rot. 3. Community approach to control rodents	1. Drain out excess water 2. Harvest at physiological maturity.
Blackgram	Resowing	1. Drain out water 2. Spray 2% urea. 3. Spray fungicides like Copper oxy chloride 3 g or Carbendazim 1g or Mancozeb 2.5g/ lit of water. 4. Take up plant protection	1. Drain out water 2. Spray 2% urea. 3. Spray fungicides like Copper oxy chloride 3 g or Carbendazim 1g or Mancozeb 2.5g/ lit of	1. Drain out water 2. Allow the crop to dry completely before harvesting 3. Protect crop from moulds.

		measures against *Spodoptera* etc.	water. 4. Take up plant protection measures against *Spodoptera* etc.	
Groundnut	Resowing	1. Drain out water 2. Take up plant protection measures against *Spodoptera* etc.	1. Drain out water 2. Take up plant protection measures against *Spodoptera* etc.	1. Drain out water
Sugarcane	Replanting	1. Drain out water 2.Wrapping and propping.	1. Drain out water	1. Drain out water
Sunflower	Resowing	1. Drain out water	1. Drain out water 2. Protect crop from Helicoverpa and Spodoptera.	1. Drain out water 2. Protect from parrots
Horticulture				
Lemon	• If the damage is severe, go for resowing.	• 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	• 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
Mango Orange & Batavian Cashew	-do-			
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 plants 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. • 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	• 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 plants 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 but still attached to	• 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 wellventilated place temporarily before it can be marketed.

		less than three months and submergence up to three feet better to replant the garden.	the plant may be covered with leaves and harvested with in 15-20days	• Market thebunches as soon as possible. • 3-4 foliar application of KNO3 on immature/ developing bunches and leaves at weekly intervals. • Staking with bamboo for support .
Horticultural 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. .
Spices & Plantation crops				
Oil palm	• Planting should be done on mounts or bunds • Drainage system suited to	• Drain the excess water as soon as possible • Twisted leaves may be cut	• Drain the excess water as soon as possible	• Twisted leaves may be cut and removed

	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	and removed • Apply booster dose of NPK fertilizers • 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	• Hanging bunches may be provided with supports wherever possible. Apply booster dose of NPK fertilizers • 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	• Hanging bunches may be provided with supports wherever possible • Harvest the mature nuts as soon as possible. • Market the produce as soon as possible.

2.5 Livestock, Poultry
General contingency plans

Before the event	During the event	After the event
Feed and fodder availability		
1.Conserving fodder/crop residues/ forest grass by silage / hay making either by individual or on community basis 2. Preparing complete diets and storing in strategic locations 3. Organize procurement of dry fodders / feed ingredients from surplus areas 4. Establish fodder banks and feed banks 5. Livestock relief camps during floods/cyclones must be planned in the vicinity of relief camps for people 6. Capacity building and preparedness	1.Organise relief camps 2.Supply silage / hay to farmers with productive stock on subsidized rates 3.Segregate old, weak and unproductive stock and send for slaughter 4. Supply mineral mixture to avoid deficiencies 5. Dry fodder must be offered to the livestock in little quantities for number of times 6.Concentrate feed or complete feed must be offered to only productive and young stock only	1. Capacity building to stake holders on drought /cyclone/flood mitigation in livestock sector 2. Promote fodder cultivation. 3. Flushing the stock to recoup 4. Avoid soaked and mould infected feeds / fodders to livestock 5. Replenish the feed and fodder banks 6.Promote fodder preservation techniques like silage / hay making
Drinking water		
1.Construct drinking water tanks in herding places, village junctions and in relief camp locations 2.Plan for sufficient number of tanks for water transportation 3. Identify bore wells, which can sustain demand. 4.Procure sufficient quantities of water Sanitizers	1.Regular supply of clean drinking water to all tanks 2.Cleaning the tanks in regular intervals 3.Keep the livestock away from contaminated flood/cyclone/stagnated waters 3.Add water sanitizers	1.Hand over the maintenance of the structures to panchayats 2.Sensitize the farming community about importance of clean drinking water
Health and disease Management		

1.Procure and stock emergency medicines and vaccines for important endemic diseases of the area 2. All the stock must be immunized for endemic diseases of the area 3. Carry out deworming to all young stock 4. Keep stock of bleaching powder and lime 5.Carry out Butax spray for control of external parasites 6.Identify the Clinical staff and trained paravets and indent for their services as per schedules 7.Identify the volunteers who can serve in need of emergency	1.Keep close watch on the health of the stock 2. Sick animals must be isolated and treated Separately. 3. Carry out deworming and spraying to all animals entering into relief camps 4. Clean the animal houses regularly and apply disinfectants. 5.Safe and hygienic disposal of dead animal carcasses 6. Organize with community daily lifting of dung from relief camps	1.keep close surveillance on disease outbreak. 2.Undertake the vaccination depending on need 3.Keep the animal houses clean and spray disinfectants

2.5.1 Detailed contingency strategies for Livestock,

	Suggested contingency measures		
	Before the event	**During the event**	**After the event**
Drought			
Feed and Fodder availability	Establishment of silvi-pastoral system in CPRs with ***Stylosanthus hamata*** and ***Cenchrus ciliaris*** as grass with ***Leucaena leucocephala*** as tree component 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 Promote cultivation of short duration fodder crops of sorghum/bajra/maize(UP chari, MP chari, HC-	Harvest and use biomass of dried up crops (Rice, Maize, Bajra, Horse gram, Groundnut, black gram, sun hemp) 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 UMMB, hay, concentrates and vitamin &	Concentrates supplementation should be provided to all the animals. The farmers may be advised to practice "flushing the stock" to recoup Short duration

	136, HD-2, GAINT BAJRA, L-74, K-677, Ananad/African Tall, Kisan composite, Moti, Manjari, B1-7 and also sun hemp Chopping of fodder should be made as mandatory in every village through supply and establishment of good quality chaff cutters. Establishment of backed yard cultivation of para grass with drain water from bath room/washing area 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 villages	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. 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 (Cow-calf camps or other special arrangements to protect high productive & breeding stock) Motivate the farmers to mix the dry fodder with available kitchen waste while feeding Arrangements should be made for mobilization of small ruminants across the villages where no drought exits with subsidized road/rail transportation and temporary shelter provision for the shepherds 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.	fodder crops of 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

Cyclone	Harvest all the possible wetted grain (rice/maize/bajra etc) and sugar cane tops and use as animal feed. Motivate the farmers to store a minimum quantity of hay (25-50 kg) and concentrates (10-25 kg) per animal in farmer's / LS keepers' house/ shed for feeding the animals 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 (Maize, Rice, Bajra, Groundnut) that can be useful as fodder in future (store properly) and also sugar cane tops Don't allow the animals for grazing if severe floods are forewarned Motivate the farmers to store a 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 de-wormers 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.

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 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	Crop holiday or going for stocking	Harvesting of fish and leaving	Removal of top layer, deep

insufficient rains/inflow	of yearlings by reducing the density according to availability of water	the pond fallow till next season	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			
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 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	Removal of weeds, top layer of soil, deep ploughing of tank and application of lime, exposing to sun light

		Tetra Cycline to the feed to control the disease	
B. Aquaculture			
(i) Inundation with flood water	Raising and riveting the bunds, construction of spill way to release excess water, erection of nets to avoid escape of fish	Continuous pumping of excess water, erection of nets low lying areas	Strengthening of bunds, excavating channels along the sides of the ponds for free escape of water
(ii) Water continuation and changes in water quality		When dissolved oxygen levels go down, aerators, recirculation of water, etc are to be attempted to maintain DO levels, going for partial harvest, etc	
(iii) Health and diseases	Sometimes there may be heavy accumulation of nutrients and organic matter.	There may be break out of Hemorrhagic septicemia. Addition of antibiotics like Chloro Tetra Cycline or Oxy Tetra Cycline to the feed to control the disease	Removal of weeds, top layer of soil, deep ploughing of tank and application of lime, exposing to sun light
(iv) Loss of stock and inputs (feed, chemicals etc)	Advance erection of nets, strengthening of bunds where they are prone to breaches, harvesting or reducing the density	Suspension of feeding, application of organic manures	Compensatory stocking, assessment of values and payment of subsidy on inputs
(v) Infrastructure damage (pumps, aerators, huts etc.)	Insuring pond, accessoires, 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
(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 /	Avoidance of fishing when	Shifting and relocating boats	Assessment of damages to boats

nets/damaged	warnings are issued, shifting of boats and nets to safe places	and nets to safer places	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 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
(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	Avoidance of fishing	Compensatory stocking of seed and restoration of all physical and

	DO levels will be very low.		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			

****