State: TAMIL NADU

Agriculture Contingency Plan for District: RAMANATHAPURAM

1.0 District Agriculture Profile				
1.1	**Agro-Climatic/Ecological Zone**			
	Agro Ecological Region / Sub Region (ICAR)	South Tamil Nadu plains (Coastal), hot dry semi-arid eco-subregion (18.1)		
	Agro-Climatic Region (Planning Commission)	East Coast Plains and Hill Region (XI)		
	Agro Climatic Zone (NARP)	Southern Zone (TN-5)		
	List all the districts or part thereof falling under the NARP Zone	Ramanathapuram, Tirunelveli Dindigul Natham, Melur, Thirumangalam, Madurai, Pudukottai		
	Geographic coordinates of district	Latitude	Longitude	Altitude
		9^0 05' 9^0 50' N	78^0 10' to 78^0 27' E	440 m
	Name and address of the concerned ZRS/ ZARS/ RARS/ RRS/ RRTTS	Coastal Saline Research Centre, Ramanathapuram-623 501		
	Mention the KVK located in the district	ICAR-KVK, Ramanathapuram -623 501		
1.2	**Rainfall**	Average (mm)	Normal Onset	Normal Cessation
	SW monsoon (June-Sep):	113	-	-
	NE Monsoon(Oct-Dec):	576	1st Week of October	4th Week of December
	Winter (Jan- Feb)	78		
	Summer (Mar-May)	83		
	Annual	850		

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)	409.0	4.5	86.7	0.2	4.2	38.9	4.6	32.9	49.9

1. 4	**Major Soils**	Area ('000 ha)	Percent (%) of total
	1 Very deep black soil	91.8	22.3
	2. Deep black soil	122.7	30.0
	3. Very deep red soil	37.8	09.3
	4. Deep red soil	84.1	20.6
	5. Miscellaneous	53.0	13.1
1.5	**Agricultural land use**	Area ('000 ha)	Cropping intensity %
	Net sown area	189.6	100.2
	Area sown more than once	0.4	
	Gross cropped area	190.0	

1.6	**Irrigation**	Area ('000 ha)		
	Net irrigated area	69.7		
	Gross irrigated area	69.7		
	Rainfed area	119.9		
	Sources of Irrigation	Number	Area ('000 ha)	% area
	Canals		-	-
	Tanks	1694	53.1	72.5
	Open wells	7591	2.9	9.20

	Bore wells	310	2.9	4.0
	Lift irrigation schemes	-	-	
	Other sources	-	-	23.5
	Total	9595	58.9	100.0
	Pump sets	7901	-	-
	Micro-irrigation	-	0.6	-

	Groundwater availability and use	No. of blocks	% area	Quality of water
	Over exploited	-	-	-
	Critical	1	7.0	Poor
	Semi- critical	3	21.2	Moderate
	Safe	7	71.7	Poor to moderate
	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.

1.7		**Major Field Crops cultivated**	**Area ('000 ha)**					
			Kharif		***Rabi***		**Summer**	**Total**
			Irrigated	***Rainfed***	***Irrigated***	***Rainfed***		
	1	Paddy	-	-	52.2	69.9	1.6	123.7
	2	Groundnut	-	0.6	0.02	3.4	-	6.1
	3	Black gram	-	0.05	0.02	4.0	-	4.1
	4	Gingelly	-	-	0.3	2.7	-	3.2
	5	Cotton	-	0.08	1.03	1.0	-	2.2
	6	Greengram	-	-	0.03	0.3	-	0.3
		Horticulture crops - Fruits	**Total area**					
	1	Mango	0.2					
	2	Banana	0.1					
	3	Sapota	0.05					
	4	Guava	0.04					
	5	Watermelon	0.005					

		Horticultural crops - Vegetables	**Total area**
	1	Onion	0.14
	2	Brinjal	0.02
	3	Drumstick	0.01
	4	Bhendi	0.006
	5	Bittergourd	0.006
		Flowers	**Total area**
	1	Jasmine	0.08
	2	Mullai	0.002
		Medicinal and Aromatic crops	
	1	Betelvine	0.01
	2	Manjium	0.009
	3	Medicinal grass	0.006

		Spices and condiments	
	1.	Chilli	25.3
	2.	Coriander	1.1
	3.	Tamarind	0.2
		Plantation crops	**Total area**
	1	Coconut	8.4
	2	Palmyrah	3.7
		Fodder crops	**Total area**
	1	Cholam	0.1
	2	Minni	0.06
	3	Subha grass	0.008
		Total fodder crop area	0.2
		Grazing land	-
		Sericulture etc	-

1.8	Livestock	Male(000)	Female(000)	Total(000)
	Non Descriptive Cattle(local low yielding)	1.1	0.5	1.7
	Crossbred cattle	26.8	103.4	130.3
	Non descriptive Buffaloes(local low yielding)	1.0	2.5	3.5
	Graded buffaloes			
	Goat			290.5
	Sheep			358.6
	Others(Camel, Pig, Yak etc.,)			33.2
	Commercial dairy farms (Number)			28
1.9	Poultry	No. of farms	Total No. of birds	--
	Commercial	11	45000	--
	Backyard	1141	256959	--

1.10 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)	
		124387	2861	8403	83529	7474	18
	ii. Inland (Data Source : Fisheries Department)	**No. Farmer Owned Ponds**		**No. of Reservoirs**		**No. of Village tanks**	
		--		NIL		--	
A. Culture							
		Water Spread Area (ha)		Yield (t/ha)		Production ('000 tons)	
	Brackish Water (Data Source:	--		--		7643.43	

	MPEDA / Fisheries Department)			
	Fresh Water (Data Source : Fisheries Department)	--	--	--

1.11 Production and Productivity of major crops (Average of last 3 years: 2006, 07, 08)

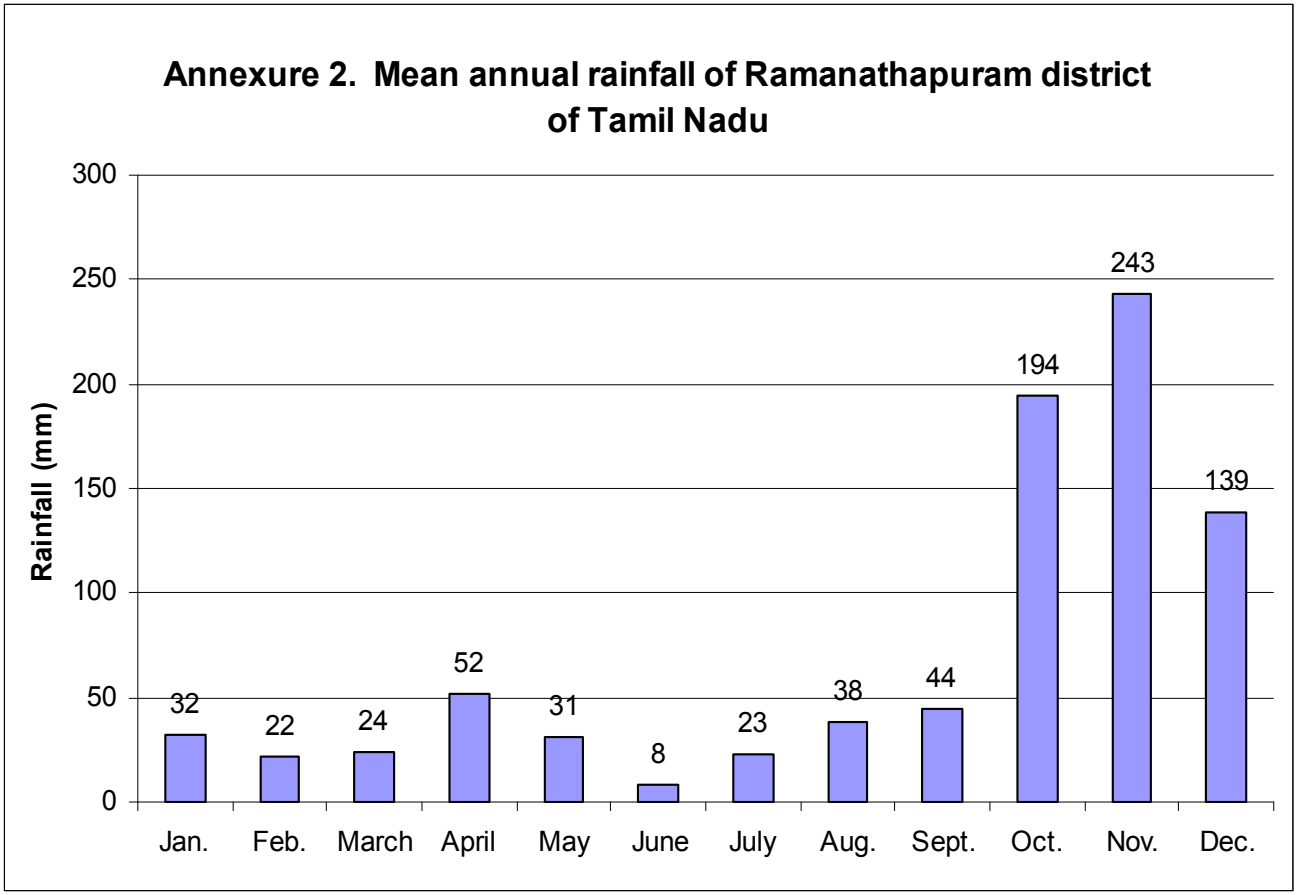
1.11	Name of crop	Kharif		Rabi		Summer		Total	
		Production ('000 t)	Productivity (kg/ha)	Production ('000 t)	Productivity (kg/ha)	Production ('000 t)	Productivity (kg/ha)	Production ('000 t)	Productivity (kg/ha)
1	Paddy	-	-	166.713	1350.0	-	-	166.713	1350.0
2	Ground nut	-	-	7.160	1171.6	-	-	7.160	1171.6
3	Blackgram	-	-	1.053	255.8	-	-	1.053	255.8
4	Gingelly	-	-	0.436	136.7	-	-	0.436	136.7
5	Cotton (Production in bales and productivity in kg lint/ha)	-	-	2319.7	182.14	-	-	2319.7	182.14
	Major Horticultural crops								
1	Chilli	-	-	10982	433.5	-	-	10982	433.5
2	Coriander	-	-	494.3	437.0	-	-	494.3	437.0
3	Onion	-	-	1169.7	7903.4	-	-	1169.7	7903.4
4	Mango	-	-	723.0	4756.5	-	-	723.0	4756.5
5	Banana	-	-	5321.3	46269.6	-	-	5321.3	46269.6

1.12	**Sowing window for 5 major crops (start and end of sowing period)**	Paddy	Chilli	Groundnut	Blackgram	Cotton
	Kharif- Rainfed	-	-	-	-	-
	Kharif-Irrigated	-	-	-	-	-
	Rabi- Rainfed	Sept 2nd fortnight –Oct 2rd week	Oct 1st week–Oct 4th week	Oct 1st FN – Oct 4th week	Nov 1st week– Nov 4th week	Jan1st week– Jan 3rd week
	Rabi-Irrigated	Oct 3rd week– Nov 3rd week	-	-	-	Dec 2nd week- Dec 4th week

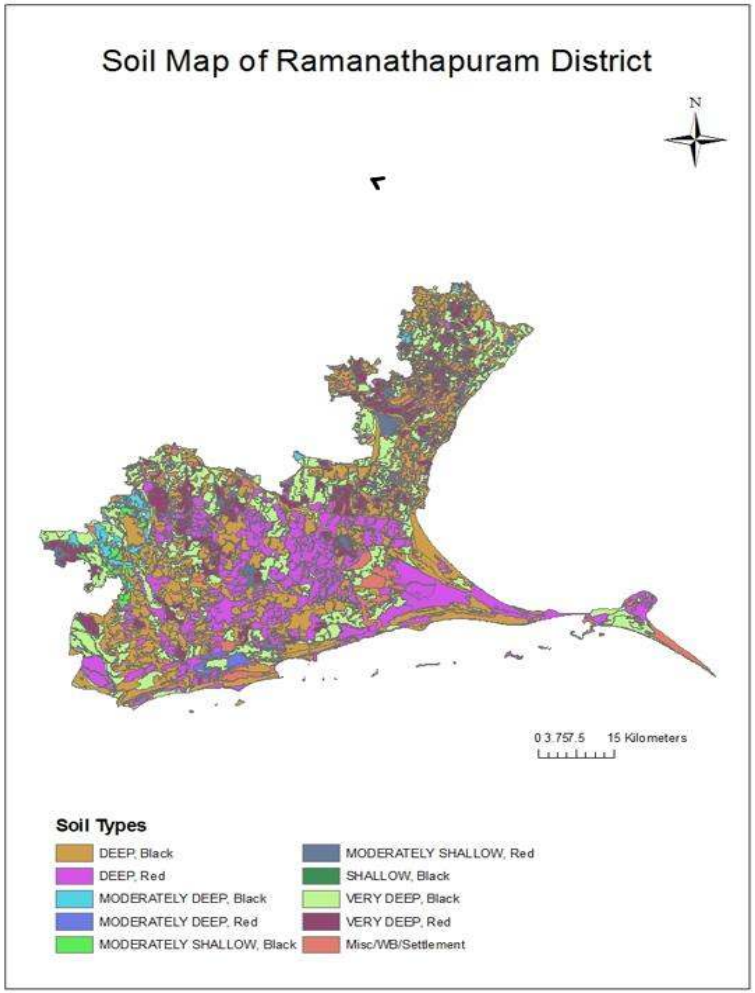
1.13	**What is the major contingency the district is prone to? (Tick mark and mention years if known during the last 10 year period)**	**Regular**	**Occasional**	**None**
	Drought	✓	-	-
	Flood	-	✓	-
	Cyclone	-	-	√
	Hail storm	-	-	√
	Heat wave	-	-	√
	Cold wave	-	-	√
	Frost	-	-	√
	Sea water intrusion	-	-	√
	Pests and diseases	-	-	√

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

Annexure 1. Location map of Ramanathapuram district and the blocks


Annexure 2. Mean annual rainfall of Ramanathapuram district of Tamil Nadu
Rainfall (mm)
300
250
200
150
100
50
0
32
22
24
52
31
8
23
38
44
194
243
139
Jan.
Feb.
March
April
May
June
July
Aug.
Sept.
Oct.
Nov.
Dec.

Annexure 3. Soil map of Ramanathapuram district



2.0 Strategies for weather related contingencies

2.1 Drought

2.1.1 Rainfed situation

Condition			Suggested Contingency measures		
Early season drought (delayed onset)	**Major Farming situation**	**Normal Crop /cropping system**	**Change in crop /cropping system**	**Agronomic measures**	**Remarks on Implementation**
Delay by 2 weeks (Oct 3rd week)	Red, black and laterite soils	Rice	No change	Seed hardening with 1% KCl or 3% NaCl for 16 hours and shade drying Line sowing using seed drill FYM enriched (750 kg) recommended phosphorous application (25 kg P)	Linkage with State Department of Agriculture and Horticulture for supply of seeds and seed drills
		Groundnut		Seed hardening with 0.5% $CaCl_2$ Seed treatment using Rhizobium 500g Line sowing using seed drill /gorru Supplemental irrigation using Mini mobile sprinkler	
		Chilli		Dry sowing in line 8-10 days before rains with 15-20% higher seed rate Broad bed furrow system of planting Sowing with broad bed former cum seed drill	

Condition			Suggested Contingency measures		
Early season drought (delayed onset)	**Major Farming situation**	**Normal Crop /cropping system**	**Change in crop /cropping system**	**Agronomic measures**	**Remarks on Implementation**
Delay by 4 weeks (Nov 1st week)	Red, black and laterite soils	Rice	Sowing with short duration varieties (PMK 3, Anna 4, RMD(R)1, ADT 36, ADT 43, ADT 45)	Seed treatment with 1% KCl or 3% NaCl for 16 hours followed hours shade drying Line sowing using seed drill FYM enriched (750kg) recommended phosphorous application (25 kg P) Thinning is essential.	Linkage with State Department of Agriculture and Horticulture for supply of seeds and seed drills
		Groundnut	Short duration varieties (TMV 7, VRI 2)	Seed hardening with 0.5% $CaCl_2$ Seed treatment using Rhizobium 500g Line sowing using seed drill /gorru Supplemental irrigation using Mini mobile sprinkler	

Condition			Suggested Contingency measures		
Early season drought (delayed onset)	**Major Farming situation**	**Normal Crop /cropping system**	**Change in crop /cropping system**	**Agronomic measures**	**Remarks on Implementation**
		Chilli	Sowing of Local Mundu variety	Dry sowing in line 8-10 days before rains with 15-20% higher seed rate Broad bed furrow system of planting Sowing with broad bed former cum seed drill	

Condition			Suggested Contingency measures		
Early season drought (delayed onset)	**Major Farming situation**	**Normal Crop/cropping system**	**Change in crop/cropping system**	**Agronomic measures**	**Remarks on Implementation**
Delay by 6 weeks (Nov 3rd week)	Red, black and laterite soils	Rice / groundnut / chilli / pulses / millets / cotton	Alternate crops: Black gram: VBN (Bg)4, VBN 5 Greengram: VBN (Gg) 2 Cowpea grain: CO 2, VBN 2, CO(CP) 7 Fodder Cowpea: CO 5, COFC 8 Jowar: CO 26, K11, K Tall, BSR 1, APK 1 Fodder Jowar: CO 27, K 10 Bajra: CO 7, CO (Cu) 9, ICMV 221 Fodder Bajra: CO 8 Maize : COH(M) 4, COBC 1 Finger millet: CO 13, CO (Ra) 14 Sunflower: MODERN, CO 4 Annual redgram: COPH 2, CO(RG)7, APK 1, VBN (RG) 3 Sesame: TMV5, TMV7, SVPR1, SVPR 2 Panivaragu: CO 4, K2 Kudhiraivalli : CO 1 Coriander: CO (CR) 4) Watermelon: Sugar Baby, Arka Manik, Arka Jyoti, Pusa Bedana	Mechanical sowing using seed drill Seed hardening of jowar and pulses by soaking seeds with 0.5 % MnSO4 and ZnSO4 for 6 hours Seed hardening of sunflower by soaking seeds in 2% ZnSO4 for 12 hours and shade drying Thinning to maintain normal crop stand Supplemental irrigation using mini mobile sprinkler	Linkage with State Department of Agriculture and Horticulture for supply of seeds and seed drills

Condition			Suggested Contingency measures		
Early season drought (delayed onset)	**Major Farming situation**	**Normal Crop/cropping system**	**Change in crop/cropping system**	**Agronomic measures**	**Remarks on Implementation**
Delay by 8 Weeks (Dec 1st week)	Red, black and laterite soils	Rice / groundnut / chilli/ pulses / millets / cotton	Watermelon: Sugar Baby, Arka Manik, Arka Jyoti, Pusa Bedana Kolingi	Supplemental irrigation using mini mobile sprinkler	--

Condition			Suggested Contingency measures		
Early season drought (Normal onset, followed by 15-20 days dry spell after sowing leading to poor germination/crop stand etc.)	**Major Farming situation**	**Crop/cropping system**	**Crop management**	**Soil management**	**Remarks on Implementation**
	Red, black and laterite soils	Rice	Resowing with short duration varieties (PMK 3, Anna 4, RMD 1, IR 36, ADT 36, ADT 43, ADT 45) Seed hardening with 1% KCl or 3% NaCl for 16 hours and shade drying enable the crop to withstand early moisture stress Supplemental irrigation through farm ponds	Opening of conservation furrows at an interval of 15-20m to conserve soil moisture. Soil mulching	Linkage with State Department of Agriculture and Horticulture for supply of seeds and seed drills Farm ponds through DRDA programme
		Groundnut	Initial drought of 15-20 days will not affect germination/ crop stand. It actually helps groundnut for profuse and synchronous flowering		
		Chilli	Thinning and gap filling the existing crop Raising chilli in broad bed furrow system Resowing / Transplanting		

Condition			Suggested Contingency measures		
Mid season drought (long dry spell)	**Major Farming situation**	**Crop/cropping system**	**Crop management**	**Soil management**	**Remarks on Implementation**
At vegetative stage	Red, black and laterite soils	Rice	Foliar spray of Kaolin 3% or KCl 1% to overcome moisture stress Spraying Cycocel 1000 ppm under water deficit situation to mitigate ill effects Supplemental irrigation through farm ponds	Opening of conservation furrows at an interval of 15-20 m to conserve soil moisture. Soil mulching	Farm ponds through DRDA programme
		Groundnut	Supplemental irrigation through farm pond using mini mobile sprinkler		
		Chilli	Thinning Supplemental irrigation through farm pond		

Condition			Suggested Contingency measures		
Mid season drought (long dry spell)	**Major Farming situation**	**Crop/cropping system**	**Crop management**	**Soil management**	**Remarks on Implementation**
At reproductive stage	Red, black and laterite soils	Rice	Supplemental irrigation through farm pond	Soil mulching Opening of conservation furrows at an interval of 15-20 m Earthing up Application of gypsum after receipt of rains	Farm ponds through DRDA programme
		Groundnut	do		
		Chilli	do		

Condition			Suggested Contingency measures		
Terminal drought	**Major Farming situation**	**Crop/cropping system**	**Crop management**	**Kharif Crop planning**	**Remarks on Implementation**
	Red, black and laterite soils	Rice	Supplemental irrigation if possible through farm pond Harvest at physiological maturity stage	___	Farm ponds through DRDA programme Harvesting and threshing implements through Dept of Agriculture
		Groundnut			
		Chilli			

2.1.2 Irrigated situation

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

Condition			Suggested Contingency measures		
	Major Farming situation	**Crop/cropping system**	**Change in crop/cropping system**	**Agronomic measures**	**Remarks on Implementation**
Non release of water in canals under delayed onset of monsoon in catchment	Not applicable				

Condition			Suggested Contingency measures		
	Major Farming situation	**Crop/cropping system**	**Change in crop/cropping system**	**Agronomic measures**	**Remarks on Implementation**
Lack of inflows into tanks due to insufficient /delayed onset of monsoon	Tankfed areas with heavy clay soils	Rice-cotton/ Rice - chilli	No change	Direct sowing using seed drill Supplemental irrigation through farm pond	

Condition			Suggested Contingency measures		
	Major Farming situation	**Crop/cropping system**	**Change in crop/cropping system**	**Agronomic measures**	**Remarks on Implementation**
Insufficient groundwater recharge due to low rainfall	Not applicable				

2.2 Unusual rains (untimely, unseasonal etc) (for both rainfed and irrigated situations -- **Not applicable**

2.3 Floods

Condition	Suggested contingency measure			
Transient water logging/ partial inundation	**Seedling / nursery stage**	**Vegetative stage**	**Reproductive stage**	**At harvest**
Paddy	Drainage should be aided and all possible means are to be taken up	Drainage should be aided and all possible means are to be taken up	Drainage should be aided and all possible means are to be taken up	Combine harvesters can be used for rapid harvesting of the crop The grain at this situation may be excessively wet. If drying is difficult for few days, the harvested grain may be mixed with common salt and the produce may be sun dried at the earliest opportunity
Groundnut	Drainage should be aided and all possible means are	Draining excess water from the field and judicious use of the same is	Draining excess water from the field	Combine harvesters can be used for rapid harvesting of the crop

	to be taken up	advocated		
Blackgram	Drainage should be aided and all possible means are to be taken up	Draining excess water from the field and judicious use of the same is advocated 2% DAP spray for further growth and development	Draining excess water from the field 2% DAP spray for further growth and development	Draining excess water from the field and harvesting the crop
Horticulture				
Chilli	Drainage should be aided and all possible means are to be taken up COC 2g/l or Bavistin 1g/l drenching to prevent damping off Foliar spray (19:19:19) 0.5%	Draining excess water from the field and judicious use of the same is advocated Micronutrient spray COC 2g/l or Bavistin 1g/l to prevent damping off	Draining excess water from the field. Micronutrient spray	Draining excess water from the field. Micronutrient spray
Continuous submergence for more than 2 days				
Paddy	Drainage should be aided and all possible means are to be taken up	Excess application of nitrogenous fertilizers to be avoided Instead of 1-2 splits nitrogenous fertilizers can be applied in 3-4 splits Additional dose of 10% potash as MOP to prevent lodging and to induce resistance to pest and diseases Foliar application of Tricyclazole @ 200g/ac to manage blast Foliar application of Profenophos @	Drainage should be aided and all possible means are to be taken up	Combine harvesters can be used for rapid harvesting of the crop The grain at this situation may be excessively wet. If drying is difficult for few days, the harvested grain may be mixed with common salt and the produce may be sun dried at the earliest opportunity

		400 ml/ac to manage leaf folder		
Groundnut	Drainage should be aided and all possible means are to be taken up	Draining excess water from the field and judicious use of the same is advocated	Draining excess water from the field	Combine harvesters can be used for rapid harvesting of the crop
Blackgram	Drainage should be aided and all possible means are to be taken up	Draining excess water from the field and judicious use of the same is advocated 2% DAP spray for further growth and development	Draining excess water from the field	Draining excess water from the field and harvesting the crop
Horticulture				
Chilli	Drainage should be aided and all possible means are to be taken up COC 2g/l or Bavistin 1g/l drenching to prevent damping off Foliar spray (19:19:19) 0.5%	Draining excess water from the field and judicious use of the same is advocated Raising chilli in broad bed furrow system Micronutrient spary COC 2g/l or Bavistin 1g/l to prevent damping off	Draining excess water from the field. Micronutrient spray	Draining excess water from the field. Micronutrient spray
Sea water inundation	**- Not applicable for Ramanathapuram district-**			

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

2.5 Contingent strategies for Livestock, Poultry & Fisheries

2.5.1 Livestock

	Suggested contingent measures		
	Before the event	**During the event**	**After the event**
Drought			
Feed and fodder availability	1.Development of Drought resistant grass varieties 2.Technology adoption of Fodder Preservation methods like Silage making, Urea enrichment of Paddy straw etc.,	1. Provision of green fodder for the productive animals.	1. Storage of chaffed fodder materials as feed blocks.
Drinking water	1.Construction of Check dams 2.Construction of Rain harvesting structures etc.,	1. Usage of water judiciously for drinking and storage.	1.The message of importance of water usage and its application has to be delivered to the farmers and livestock owners through training classes and awareness camps.
Health and disease management	1.Special training programmes for Village Level Workers etc., 2.Awareness camps on Disease outbreaks, prevention and vaccination details etc., 3.Special vaccination camps to be conducted in endemic areas. 4.Conducting Mass Conduct Programmes, Infertility camps etc.,	1. Participating in the Cattle Protection Camps and other camps in coordination with the Animal Husbandry Department and offering expert opinion to cases referred in the camps.	1. Segregation of flock according to instructions of the veterinarian in terms of Convalascent,ailing etc as per age and sex of the animals. 2.Feeding for pregnant and lactating animals judiciously.
Floods			
Feed and Fodder availability	1. Storage facilities to be created. 2. Camps organized to safeguard fodder advocation esp. tree fodders. 3.Propagation of Tree Fodder cultivation	1.Economic feeding of leguminous fodder to livestock 2. Safeguarding the feeds and fodder	1. Tree fodder to be advocated in exigency conditions.
Drinking water	1.Chlorination of drinking water 2. Water treatment protocols to be followed strictly. 3. Usage of fresh water advocated. 4. Housing in an elevated area. 5. Pamplets on important diseases and health aspect to be distributed. 6. Precautionary measures to be adopted to avoid seepage of sewage water and dirty water.	1. Sanitary measures to be adopted. 2.Water logging areas to be sanitized and maintained properly	1. Awareness camps on infection through water spread to be conducted. 2. Diseases and its management should be emphasized through audio video lessons and other aids through extension oriented training programmes.

Health and disease management	1. Rearing of separate groups of Livestock to prevent carrier status in animals. 2. Construction of quarantine sheds advocated.	1. Healthy flock to be segregated and vaccinated against contagious diseases. 2.Stocking and feeding of animals in quarantine sheds	1.Disease prevention training programmes and economy of maintaining livestock should be taught to the livestock rearing community.
Cyclone			
Feed and fodder availability	1.Storage of feeds, preservation of feed materials etc 2.Field demonstration on Paddy straw enrichment, Silage making and Cultivation of Fodder grass.	1.Feed blocks and mineral licks can be used for productive animals 2. Young animals and pregnant animals to be judiciously fed.	1. Series of workshops, Seminars on Urea enriched paddy straw preparation, Feed block preparation and its usage and Mineral supplements and its application and impact has to be conducted.
Drinking water	1.Proper storage of water through construction of Water tanks 2. Water treatment through chemical sanitization has to be advocated.	1. Providing Water to animals with utmost care especially in sanitized condition. 2.Livestock should be kept in partitions to prevent the cold weather	1. Polluted water being an important focal point in spread of disease and hence its aftereffects has to be advocated. 2. Special training programmes at village level periodically on sanitation and its benefit to livestock have to be conducted.
Health and Disease management	1. Deworming and Vaccination schedule has to be propagated to create awareness among the village people and cattle rearing population.	1.Newborn animals to be safeguarded against the rough weather by keeping in enclosures	1. Pamplets on the various diseases and its management and general scientific management of livestock during the period has to be distributed among the livestock rearing community.
Heat wave and cold wave			
Shelter/environment management	1. Construction of Temporary shed with pen and run system to be adopted. 2.Provision of Foggers 2.Awareness camps on Heat stroke emphasized Fodder cultivation practices i.e. Trees around the shelter 4.Provision of anti stress medication in water 5.Increase or decrease the drinkers according to the atmosphere 7. Increase or decrease the floor space availability according to the ambience prevailing in the shed.	1. Medication to be continued to prevent heat shock during the period. 2. Green fodder adlibitum to be provided for the livestock. 3. Crossventilation to be provide by means of exposing the livestock during early morning and late evenings. 4. During the cold wave, side ventilation to be arrested during night hours.	1. Conducting various training programmes on how to prevent cold shock in animals and its management to Women in the villages.
Health and	1.Provision of Green Fodder	1. Feeding of animals in the early hours of the	1. Pamphlets on scientific management of

Disease management	2.Feed and fodder preservation techniques to be advocated 3.Training on disease management during the heat wave and increase in temperature should be widely taught to livestock owners.	day during heat wave condition. 2. Bathing of animals to be increased daily.	animals during heat wave or cold wave have to be distributed. 2. Off campus training programmes at the livestock rearing villages along with field demonstration have to be conducted.

2.5.2 Poultry

	Suggested contingent measures			**Convergence/linkages with ongoing programmes, if any**
	Before the event	**During the event**	**After the event**	
Drought				
Shortage of Feed ingredients	1.Development of feed ingredient storage banks 2.Storage of essential feed ingredients for poultry	1.Propagation of non conventional feed ingredient Usage techniques by means of campaigns, Method demonstration and pamphlets among farmers.	1.Increasing the number of Storage banks 2. Increasing the quantum of storage ingredients. 3. Utilisation of non conventional feed ingredients in preparation of poultry feed.	--
Drinking water	1.Incorporation of rain harvesting facilities in available buildings 2.Construction of Check dams 3. Conducting Awareness camps on Strict measures to avoid water wastage to rural farmers. 4. Conducting Awareness camps on Effect of Deforestation and reforestation to farmers. 5.Construction of proper channels to divert the rain water properly to water catchment areas.	1. Awareness camps on Effective utilization of available water to be conducted. 2.Water recycling techniques to be implemented. 3.Desalination of hard water to be carried out.	1. Tree planting to be implemented to a major extent. 2.Waste lands and barren areas to be effectively utilized for cultivation of trees. 3.Repair work in the water channels and water resources to be carried out. 4.Rain harvesting structures and intensive implementation at all levels to be done.	
Health and disease management	1.Proper vaccination to be performed against all contagious diseases 2.Conducting vaccination camps regularly. 3.Awareness camps on disease outbreak,	1.Vaccination camps for proper vaccination against various diseases to be conducted. 2.Awareness camps on diseases outbreak,management,prevention	1.Prior vaccination to be carried out through vaccination camps. 2.Awareness programmes on health and diseases management to be conducted regularly.	

	management ,prevention and vaccination to be conducted 4.Sanitation of water to be done to control water borne diseases. 5.Awareness on proper disposal of carcasses to be created.	and vaccination to be conducted.		
Floods				
Feed and Fodder availability	1.Proper storage of feed ingredients. 2.Repair works of feed storage banks to ensure water proof 3.Proper storage of non conventional feed ingredients.	1.Utilisation of non conventional feed ingredients 2.Proper utilization of available feed ingredients 3.Avoid spillage of feed ingredients by proper storage 4.Conducting awareness camps on usage of unconventional feed ingredients and proper storage of the same.	1.Proper storage banks to be developed. 2.Cultivation of more feed ingredients. 3.Storage of more feed ingredients.	
Drinking water	1. Precautionary measures to be adopted to avoid seepage of sewage water into the water resources. 2.Awareness camps on water borne diseases and preventive measures to be conducted. 3.Distribution of palm plates on Various disease management protocols.	1.Chlorination of water. 2.Proper water sanitation procedures to be adopted. 3.Awareness camps to safeguard the poultry from water borne diseases to be conducted	1.Awareness camps on water sanitation to conducted	
Health and disease management	1.Proper vaccination to be carried out. 2.Conducting vaccination camps regularly. 3. Awareness camps on Disease management to be conducted. 4. Water sanitation to be done to control water borne diseases. 5. Awareness on proper disposal of carcasses to be created.	1.Conducting vaccination camps for proper vaccination against various diseases. 2.Awareness camps on diseases outbreak,management,prevention and vaccination to be conducted. 3.Water sanitation programmes to strictly adopted.	1.Preparation of vaccination charts and displaying them in endemic areas. 2.Routine health protection camps to be conducted.	
Cyclone				
Feed and fodder availability	1.Storage of feeds, preservation of feed materials etc	1.Utilisation of unconventional feed ingredients 2. Awareness camps on use of unconventional feed ingredients to be conducted and for proper storage of	1. Proper vaccination before the outbreak of disease. 2. Sanitation procedures to be followed on water and land.	

		the same.		
Drinking water	1.Proper storage of water through construction of Water tanks 2.Water treatment through chemical sanitization has to be advocated.	1. Providing Water to birds with utmost care especially in sanitized condition. 2.Birds should be kept in partitions to prevent the cold weather	1. Providing Water to birds with utmost care especially in sanitized condition. 2.Birds should be kept in partitions to prevent the cold weather	
Health and Disease management	1.Proper vaccination schedule to be followed 2.Water sanitation to be done	1.Vaccination camps for proper vaccination against various diseases to be conducted. 2.Awareness camps on diseases outbreak,management,prevention and vaccination to be conducted.	1.Prior vaccination to be carried out through vaccination camps. 2.Awareness programmes on health and diseases management to be conducted regularly.	
Heat wave and cold wave				
Shelter/environment management	1.Construction of poultry shed in east west orientation 2.Propagation of trees around the shed for shelter. 3.Provision of foggers/sprayers for birds.	During Heat wave 1.Spraying of water through foggers/sprayers 2.Providing anti stress medicines through water 3.Increaseing the number of drinkers 4.Provision of clean drinking water 5.The height of bedding to be increased During Cold wave 1. Chlorinated water to be given 2.The thickness of bedding material to be increased 3.The floor space to be decreased 4.Proper management of litter material	1.The height of the bedding material to be corrected 2.Floor space availability to be corrected 3.Cultivation of trees around the poultry shed 4.Proper sanitation of water and land	
Health and Disease management	1.Proper vaccination schedule to be followed 2.Water sanitation to be done	1.Water sanitation to be followed 2.Awareness camps on health and diseases management during heat wave and cold wave to be conducted 3.Proper disposal of dead carcasses	1.Sanitataion of land and water 2.Proper vaccination schedule to be followed 3.Conducting awareness camps on Management during heat wave and cold wave conditions 4.Distribution of pamphlet on disease management	

2.5.3 Fisheries/ Aquaculture

	Suggested contingency measures		
	Before the event	**During the event**	**After the event**
1) Drought			
A. Capture			
Marine	Negligible changes	Negligible changes	Negligible changes
Inland			
(i) Shallow water depth due to insufficient rains/inflow	• Harvesting large individuals • Move and enclose Stacked into pens or in smaller/confined areas	• Harvesting large individuals • Disposable of unwanted excess stock • Stocking of desirable/special individuals in brood stock ponds	• Proper nutrition and management of water bodies to improve remaining stock
(ii) Changes in water quality	Negligible changes in water quality	Negligible changes in water quality	Negligible changes in water quality
(iii) Any other			
B. Aquaculture			
(i) Shallow water in ponds due to insufficient rains/inflow	• Harvesting of the stock	• Harvesting of the stock • Transferring of smaller fishes to artificial ponds (if available) for tiding over the drought	• Steps to improve the quality of stocked fishes, via supplementary feed/fertilizer water quality management
(ii) Impact of salt load build up in ponds / change in water quality	• Harvesting of the stock	• Harvesting of the stock • Transferring of smaller fishes to artificial ponds (if available) for tiding over the drought with water from other source (less hardness)	• Steps to improve the quality of stocked fishes, via feed/fertilizer water quality management
2) Floods			
A. Capture			
Marine	Proper bunds and strengthening of existing structures to prevent flooding Ensure proper draining works to divert flood water	Netting and strengthening of weaker beach structures to prevent escaping of fishes	Improve the shore structures and beaches
Inland	• Proper fencing to prevent escaping of fishes • Increasing bund height and improve bund	• In extreme conditions, controlled draining of flooded	• Repair damaged bunds • Collect and preserve existing stock

	strength • Improve land drainage to allow easy and quick flow of flood waters	ponds • Thinning of stock by harvesting of larger individuals	
(i) Average compensation paid due to loss of human life	--	--	--
(ii) No. of boats / nets/damaged	--	--	--
(iii) No. of houses damaged	--	--	--
(iv) Loss of stock	--	--	--
(v) Changes in water quality	• Negligible changes	• Flood water can bring parasites, and increased turbidity – repair/correct drainage to improve quick drainage of flood waters	• Turbid waters may be flushed off with fresh bore well/well water
(vi) Health and diseases	--	--	--
B. Aquaculture			
(i) Inundation with flood water	• Proper fencing to prevent escaping of fishes • Increasing bund height and improve bund strength • Improve land drainage to allow easy and quick flow of flood waters	• In extreme conditions, controlled draining of flooded ponds • Thinning of stock by harvesting of larger individuals	• Repair damaged bunds • Collect and preserve existing stock
(ii) Water continuation and changes in water quality	• Negligible changes	• Water can become turbid due to flood waters, reduce stock to prevent mortality	• Flushing of pond water with bore- well water to improve water quality
(iii) Health and diseases	--	--	--
(iv) Loss of stock and inputs (feed, chemicals etc)	• Negligible changes	• Harvesting of stock • Shift reserve of brood stock to ponds at elevated levels	• Selling remaining stock and inundated equipment immediately to minimize losses
(v) Infrastructure damage (pumps, aerators, huts etc)	• Dismantling of pumps, aerators and other equipment and shifting to safer zones	• Salvaging of inundated pumps, aerators and other equipment and shifting to safer zones	• Selling remaining stock and inundated equipment immediately to minimize losses
(vi) Any other			

3. Cyclone / Tsunami			
A. Capture			
Marine	Move fisher folk to higher/safer zone	Keep vigil of any trapped person and keep rescue operations on red alert	Assess damage and take up measures to build structures to check beach erosion
(i) Average compensation paid due to loss of fishermen lives	--	--	--
(ii) Avg. no. of boats / nets/damaged	--	--	--
(iii) Avg. no. of houses damaged	--	--	--
Inland	--	--	--
B. Aquaculture	--	--	--
(i) Overflow / flooding of ponds	--	--	--
(ii) Changes in water quality (fresh water / brackish water ratio)	--	--	--
(iii) Health and diseases	--	--	--
(iv) Loss of stock and inputs (feed, chemicals etc)	--	--	--

(v) Infrastructure damage (pumps, aerators, shelters/huts etc)	--	--	--
4. Heat wave and cold wave	--	--	--
A. Capture	--	--	--
Marine	Improve land drainage to control salinity fluctuations	Can release water from reservoirs to maintain salinity	Damage control measure like proper rainwater drainage, removal of municipal waste etc., can be taken
Inland			

B. Aquaculture			
(i) Changes in pond environment (water quality)	• Strengthening of pond bund to prevent seepage • Shifting of stock to a more sheltered pond	• Shifting of stock to a more sheltered pond • Improve aeration and water recycling	• Shifting of stock to normal ponds to ensure proper growth
(ii) Health and Disease management	-	-	-
(iii) Any other			